Preparing tomorrow's health sciences librarians: feasibility and marketing studies*

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The University of North Carolina at Chapel Hill is devising and evaluating five curricular models designed to improve education for health sciences librarianship. These models fit into a continual learning process from the initial professional preparation to lifelong learning opportunities. Three of them enhance existing degree and certificate programs in the School of Information and Library Science (SILS) with a health sciences specialization, and two are new programs for working information professionals. The approaches involve partnerships among SILS, the Health Sciences Library, and the Program in Medical Informatics. The planning process will study the feasibility of the proposed programs, test the marketability of the models to potential students and employers, and make recommendations about implementation.

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INTRODUCTION

The National Library of Medicine (NLM) awarded a one-year $65,000 education and training planning grant in October 1995 to the University of North Carolina at Chapel Hill (UNC) School of Information and Library Science (SILS). With the support of the grant, SILS, in collaboration with the UNC Health Sciences Library and the Program in Medical Informatics, aims to address each of the goals outlined in *The Education and Training of Health Sciences Librarians* [1]. The study seeks to improve the relevance of both the initial professional preparation and lifelong learning opportunities for health sciences librarians, to enable them to respond to their evolving roles in a rapidly changing environment. It also calls for the development of strategies to expand recruitment of new personnel into the field of health sciences librarianship. The needs and interests of potential and practicing health sciences librarians are quite diverse, as are the needs of employers. Therefore, this study plans to devise and evaluate five curricular models designed to improve education for health sciences librarianship. Significantly, it sets forth a two-phase data collection and analysis plan that includes both feasibility and market studies to determine the potential success of each of the five approaches. Based on the current educational programs and strengths of the university, offering each of these five approaches is potentially feasible:

1. a master of science degree in library science or information science with a health sciences specialization
2. a Certificate of Advanced Study with a health sciences specialization, offered on-site
3. an Executive Certificate of Advanced Study with a health sciences specialization, offered on- and off-site
4. a Health Sciences Advanced Internship Program
5. a doctor of philosophy degree with a specialization in health sciences information management

At UNC, each of these approaches holds opportunities to strengthen existing partnerships and meet goals shared by the School of Information and Library Science, the Program in Medical Informatics, and the Health Sciences Library. There are also opportunities to develop partnerships with related professional education programs, such as those of the UNC School of Public Health and other library and informatics organizations and institutions, including the Medical Informatics Program at Duke University. These possibilities will be explored in the context of the five approaches.

The goals of the study are

1. to develop models for each of the five alternative approaches, with assistance from an expert advisory group convened in Chapel Hill, and with refinement and development of the options through input from a Delphi study;
2. to test the marketability of these models, both to potential recruits and to potential employers, using a set of market surveys; and
3. to produce a report with recommendations about the feasibility of each of the five approaches. This should be helpful to the broader health sciences education domain as well as being a guide to UNC for implementation of any of these programs.

The results of this two-phase study will enable UNC to determine which of the approaches are likely to be successful, both in attracting applicants and in meeting market needs. Further, the resources required to support these programs will be identified. UNC is prepared to implement one or more of the models, according to the outcome of the planning studies.

BACKGROUND AND SIGNIFICANCE

The information management role as a national priority

It is widely held that the health sciences are among the most information-intensive of all professions. The health sciences librarian's role has been to provide the most current information in the most convenient and timely manner possible, in order to support a wide range of activities, ranging from patient care to teaching to biomedical bench and clinical research. Through the Medical Library Assistance Act of the mid-1960s, the National Library of Medicine supported the growth of many of the nation's premier medical libraries from small collections into comprehensive service agencies. Later, in the *Long Range Plan* issued in 1987, NLM recognized another important need: to ensure that the work force of health sciences library professionals had the knowledge and skills needed to support the rapidly changing information needs of today's health professionals [2].

The Medical Library Association (MLA) reiterated this need in its educational policy statement, *Platform for Change* [3]. This report was the culmination of a three-year study, which included surveys of both health sciences librarians and their employers. It produced a list of knowledge and skills needed in seven broad areas: environment and information policies; management of information services; health sciences information services; health sciences resource management; information systems and technology; instructional support systems; and research, analysis, and interpretation. In its introduction, *Platform for Change* notes that "while drawing heavily on general librarianship, a librarian in the intellectually and technologically sophisticated context of health care also requires expertise and values significantly dif-

ferent from those of colleagues in some other library services." It concludes that "today, the management of information and knowledge in a health care environment is a national priority" [4].

The National Library of Medicine convened a special Planning Panel on the Education and Training of Health Sciences Librarians in 1993, to help define the specific roles that individuals, institutions, and organizations, including NLM itself, should play in fulfilling this significant educational challenge. In his introduction to the panel's report, Panel Chair Thomas Detre, M.D., underscored the dramatic changes occurring in the health care delivery system and the impact of new technologies on these changes [5]. The rapid development of managed care systems, the integration of information management requirements throughout the new accreditation standards of the Joint Commission on Accreditation of Healthcare Organizations, the renewed emphasis on training of generalist physicians, the rapid integration of information technology into health sciences curricula, and the national interest in evidence-based medicine are some of the major trends in health care that are already defining new roles for health sciences librarians. Braude and others have noted the impact of information technology on these changing roles [6].

What is being done to meet the need

More than two-thirds of the current membership of MLA is over forty years old; this fact points to a clear need to encourage recruits to health sciences librarianship through professional education programs. While some schools of library and information science offer courses that are related to the needs identified above [7], these programs are not now bringing large numbers of new recruits into the field. Further, it is not clear to what extent these programs provide graduates with a health sciences specialization that adequately prepares them for the challenges that lie ahead. The report of the Planning Panel suggests that education beyond the basic master's degree will be necessary for most health sciences librarians. Already, members of MLA are active participants in continuing education activities, and the association supports a certification program that places a strong emphasis on a personal professional development plan. On the other hand, while a range of short courses exists for continuing education, there are few examples of more intensive "retooling" programs for practicing professionals that are designed to prepare them for the new information management roles in health care organizations and institutions. Although NLM supports training programs in medical informatics, these are largely unavailable to the vast majority of health sciences librarians who lack doctorates or health professional degrees.

Significance of approach

The perspective taken in this study recognizes that a variety of approaches will be needed to recruit new members to the profession and to retool those currently in practice. At the master's level, the models will be based on an attempt to identify what would constitute a health sciences specialization, and what would appeal to potential recruits and potential employers. At the post-master's level, the models will be designed to respond to the particular constraints of practicing professionals, such as the need to maintain income and avoid relocation during training. The study will attempt to correlate anticipated outcomes with each of the approaches. For example, a short-term internship program might appeal to a practicing librarian who is not working in a health sciences position but would like to consider moving into one, or to a health sciences librarian who needs an overview of innovative practices in a health sciences library or informatics setting, or to a new graduate who wants to refine a special skill or interest before moving into the job market. A certificate program combining academic coursework with practical experience in a clinical information setting might appeal to a practicing health sciences librarian who needs evidence of newly mastered skills in order to advance within his or her organization. A doctorate with a specialization in health sciences information management should prepare graduates for leadership and research positions in health care organizations and institutions.

PROGRAM DESCRIPTIONS: EXISTING PROGRAMS

Three SILS degree programs already exist and can form the basis of specialized degrees emphasizing the health sciences: the master of science degree (in information science and in library science), the Certificate of Advanced Study (CAS), and the doctor of philosophy degree. While each of these programs is different, each of them can serve potential health sciences professionals and can prepare individuals to work in various career tracks and environments. Consultation with health sciences information experts and market research, conducted as part of this planning grant, will focus future programmatic efforts in the most efficacious and responsive directions. The planning to be conducted during the grant period will help to refine and adapt the programs, accommodate the evolving workplace needs and realities, and "match the capabilities of health sciences librarians to the needs of employers" as stated in Goal 1.2 of NLM's Planning Panel report [8].

The master of science program

SILS currently offers two master's degrees: a master of science in information science (M.S.I.S.) and a master of science in library science (M.S.L.S.). The degrees are similar, with some required courses and the professional focus of students being the primary differences. In general, many of the M.S.L.S. students take several information science courses and M.S.I.S. students frequently enroll in library science courses. This not only enriches the classes with different perspectives, but also broadens the background and experiences that the students bring to their work and the classroom.

Unlike the vast majority of degrees given by library and information science programs today, the SILS degrees require forty-eight semester hours of course work. It is this additional time beyond the standard thirty-six hours seen in most master's programs that allows students to go beyond core disciplinary requirements. The twelve "extra" credit hours facilitate some specialization and a much better opportunity to work hands-on with today's rapidly expanding and evolving information technologies. While students may graduate with differing career paths, either one of these degrees can accommodate a concentration in health sciences information.

The M.S.I.S. with a concentration in health sciences would prepare students for professional employment in information agencies and organizations affiliated with the health sciences. In addition to the standard curriculum, which includes courses in information retrieval, systems analysis, the organization of information, communication processes, and research methods, students might be required to take courses on topics such as science information, health sciences information, Internet applications, introduction to medical informatics, and information management in health policy and administration.

The M.S.L.S. with a concentration in health sciences would prepare students for professional employment in health sciences libraries and health-related information agencies and organizations. To obtain this degree, students might be required to take courses on science information, health sciences information, telecommunication, Internet applications, or introduction to medical informatics, in addition to the standard curriculum, which includes courses on the organization of materials, information resources and services, resource selection and evaluation, communication processes, and research methods.

Students in either master's degree program also might be required to enroll in a field practicum at an Area Health Education Center (AHEC) or at UNC Hospitals, to get exposure to the provision of information in educational and clinical environments. Other nearby practicum sites could include a pharmaceutical company, a government-sponsored health research agency, or a health maintenance organization (HMO).

The Certificate of Advanced Study

The Certificate of Advanced Study (CAS) in library and information science is given at the end of a post-master's program designed for practitioners who seek an articulated and systematic continuing education program to enhance their professional career development. The CAS is designed to provide the opportunity to develop a specialty in a subject discipline, redirect a career path, or enrich and strengthen demonstrated capabilities in an individual's career. Many students use the CAS to update their technological skills. The CAS offers opportunities to develop leadership skills as well. It is envisioned that many of the students in a CAS program with health sciences specialization would be employed in health sciences environments and would be returning to school to improve their skills, especially in the area of technology. It is hoped that a CAS program will also attract graduates who would like to extend their education for an additional thirty credits. While only students with master's degrees in librarianship are eligible to apply to the CAS program at present, the proposed feasibility and market studies will provide an opportunity to determine whether practitioners in a related field, such as public health or another of the health professions, might be recruited to obtain the advanced information management skills that the CAS program could offer.

The CAS program consists of thirty semester hours of graduate-level course work, selected from the school's curriculum and other departments and schools of the university on the basis of the individual's needs and objectives. The program is tailored to an individual's previous education, experience, and career intentions, and so can be designed with a focus on health sciences librarianship. Students may select ten courses from a roster of SILS course offerings such as Science Information, Health Sciences Information, and Telecommunications, as well as courses such as Introduction to Medical Informatics or Information Management in Health Policy and Administration. Depending on their professional background and goals, students may also be encouraged to enroll in a field practicum in a health sciences information environment.

The Ph.D. program

The current SILS doctoral program will be used as a basis for developing the program for a Ph.D. with a specialization in health sciences information management. Its stated purpose is to "educate scholars who are capable of addressing problems of scholarly

consequence in the field of information and library science" [9]. Interdisciplinary programs are encouraged, and current combinations include associations with education, computer science, business, and social science. The program in health sciences information management will build upon links with the UNC Health Sciences Library, the Medical Informatics Programs in the UNC School of Medicine and at Duke University, and the UNC School of Public Health.

During the current program, students are required to take a minimum of thirty-six hours of coursework, exclusive of the dissertation. Required courses include a seminar on information retrieval, a seminar on communication, and two semesters of statistics. In addition, students are encouraged to take at least one research practicum, an advanced research methods course, and a theory development course. Again, this course work would be appropriate for those emphasizing health sciences information management. In addition, they could be expected to take a practicum in health sciences information management or to conduct research related to health sciences information management. It would be expected that dissertation topics would address the "new forms of information, new users, and new practice patterns that may be required for health sciences librarianship" [10].

PROGRAM DESCRIPTIONS: TWO NEW MODELS

Two additional models will be developed that could be attractive to practicing health sciences librarians who are unable to commit an extensive amount of time to on-site education programs: the Executive Certificate of Advanced Study and the Health Sciences Advanced Internship Program.

In the typical graduate professional program, the students move to the place where the program is offered and, usually, are expected to enroll full time. While this model is well suited to some students, there are others to whom it is not. Adults, especially those with families and jobs, find it difficult to relocate and to live for an extended period of time on, at best, a graduate student stipend. This difficulty confronts librarians (or would-be librarians) from all types of settings, and it has been noted as a problem in the preparation of health sciences librarians. For instance, in the 1980s, NLM and the Council of Library Resources sponsored a program that was designed to prepare mid-career health sciences librarians to assume leadership positions. However, many individuals who would have benefited from the program were unable to leave family and work responsibilities to take part [11].

Schools of business have responded to the needs of working adults by providing executive education programs; medical schools and schools of public health have explored ways to provide continuing education by restructuring certain segments of the curriculum into short intensive courses. Such approaches to providing education in health sciences librarianship have not been tried, but they are promising as a means of delivering training to those professionals who are currently working in health sciences libraries and need to update and enhance their skills; to other master's level librarians who are not working in a health sciences environment but who seek to enter this market; and to health professionals who do not hold a degree in librarianship but who desire to supplement their subject expertise with specialized training in information technology and librarianship. Therefore, in addition to examining ways of strengthening the health sciences component of the three existing programs discussed above, this proposal also seeks to investigate the feasibility of mounting two innovative programs that would provide alternative delivery methods so as to reach previously unserved audiences: an Executive CAS program and an Advanced Internship Program.

The Executive CAS program

The Executive CAS model would provide a Certificate of Advanced Study to health sciences information professionals who are unable to leave full-time positions to get the education they need. Students enrolling in this program would already have a master's degree. Most of the participants would already be working in the field of health sciences librarianship, but would be individuals who want to update or expand their knowledge or who want to prepare for an administrative position. Some participants might be working in professional positions in other types of libraries. Others might hold professional graduate degrees in a health discipline, such as public health, without the master's in librarianship. As with the on-site CAS program, the feasibility and market studies will provide the opportunity to identify whether such individuals could be attracted to this program.

The Executive Certificate of Advanced Study program would provide, in a nontraditional manner, a combination of work on campus and at other locations and of academic course work and exposure to working environments and leaders in the field. It would offer opportunities for experienced practitioners to enrich and strengthen existing capabilities, develop a subject or functional specialty, redirect a career path, or prepare for an executive position. It would use a variety of brief intensive courses taught at Chapel Hill combined with the use of the Internet as a means of maintaining contact and working on collaborative assignments in the period when the students are not on campus.

Students would be selected for the program as part of a cohort; the size of the cohort will be determined as part of the feasibility study. The program would consist of both on-campus and off-campus learning experiences. The students would be required to come to Chapel Hill for some intensive classes especially designed for the adult working learner. The bulk of the classes would be drawn from the current SILS curriculum, but they would be short and more intensive, so that the courses could be completed much more rapidly. In addition, classes would be designed to provide concentrated exposure to a clinical environment during an on-campus session. It is expected that these classes would be taught by faculty from the School of Information and Library Science, the Medical Informatics Program, the School of Public Health, and the Health Sciences Library.

Every attempt would be made to provide exposure to a vibrant health sciences library or information services environment for the Executive CAS participants. There are numerous health sciences libraries in the Research Triangle and in surrounding states that provide fertile settings for short-term internships and applied research projects. Many of these have created Integrated Advanced Information Management System (IAIMS) environments or begun IAIMS planning. Students who work and live at a distance may identify a library or information services setting close to home where a project could be carried out, with guidance from a UNC faculty member via the Internet or brief visits to campus. Since some individuals seeking this Executive CAS may wish to compete for advanced information management positions in their institutions or elsewhere, this program should also aim to expose participants to the key leaders in health sciences librarianship through visits or other means.

After each of the on-campus sessions, students would leave with assignments that they would complete in their home environments. Feedback on these assignments, as well as additional assignments and feedback, would be provided through a World Wide Web facility mounted on the SILS server. Readings otherwise unavailable to students could be mounted on the Web page for easy access if copyright permission is granted. The Internet would provide a means for the faculty and the students to keep in touch with each other. Student teams could communicate on the Internet and complete joint projects electronically. Faculty members would be able to provide feedback and assessment by the same means. Since a number of courses in this CAS program would focus on the use of the new information technologies in health sciences librarianship, it would be appropriate for some of the coursework to be delivered by means of these same technologies.

The Advanced Internship Program

An internship program would attempt to provide site-based work opportunities for experienced or new librarians. The program would be customized to meet the educational needs of the individual with flexibility in the choice of sites and environments; academic coursework would not be required but would supplement the practical experience as appropriate. The specific aims of the internship program would be (1) to expose the intern to innovative practices in health sciences libraries and informatics arenas; (2) to provide hands-on experience in using the latest information technologies in various areas of information management, including clinical information management, education, research and administrative areas; (3) to support practical experience with academic coursework in areas selected by the intern to match individual professional development needs, drawing from curricula in SILS, the Medical Informatics Program, and other curricula at UNC; and (4) to foster the development of interns' research interests and experience in areas of health sciences librarianship and informatics. No formal degree or certificate would be offered.

Each intern's program would be customized to address individual development needs. Each program should be cohesive while utilizing assignments in a variety of places, including some outside UNC. Ideally these assignments, while being responsive to individual academic and experiential needs, will also benefit health sciences libraries, hospital and medical school information systems offices, and other health-related information settings. Exposure to the clinical environment may also be an important component of an intern's program. Finally, the planning process will investigate ways to recruit interns, whether in small cohorts or individually. An evaluation of the factors contributing to the success of internship programs and a clear understanding of the direct and administrative costs of such programs will also result.

ISSUES TO BE CONSIDERED

Development of the models of the educational programs focuses on the following issues: target audience, structure of the educational experience, academic content, experiential content, resources required to deliver the program, and expected outcomes. The definition of the target audience includes the motivation for participation, entrance requirements, and cohort size. The structure of the program must be designed to be appropriate for the audience. In the case of the programs for working professionals, the length, timing, and fees will be particularly important to define. The academic content of the programs will likely include courses and material from

existing SILS and medical informatics courses packaged in new ways, as well as courses from other academic units and entirely new courses. The experiential content may include clinical experience involving the observation of health sciences professionals using and developing information. The method of delivery of the academic and experiential content will incorporate current technologies and allow working professionals to undertake off-campus follow-up or internships. The analysis of the resources required to deliver the programs will be important to their feasibility; faculty, physical, and technological resources, and assistance from partners will be considered. The expected outcomes of the programs include the degree or certificate for some programs, as well as the competencies achieved and potential employment.

RESEARCH DESIGN AND METHODS

The goals of this study are to develop detailed descriptions of each of five alternative programs for educating health sciences librarians and researchers in health sciences information management, to test the market potential and market demand for each alternative, and to make recommendations concerning the implementation of the viable alternatives. To achieve these goals, planning is being conducted in two phases. In the first phase, initial planning will be undertaken and the feasibility of the initial plans will be assessed. In the second phase, the market potential and market demand for those plans will be investigated. The results of these two phases will then be integrated in order to recommend the implementation of the most promising educational approaches.

The first phase began with the selection of an expert advisory group that will provide guidance for the internal planning team throughout the process. The members of this group are Rachael Anderson, director, Arizona Health Sciences Library, University of Arizona; Keith Cogdill, doctoral student, SILS, UNC; Joel Dobbs, director, Worldwide Information Management and Analysis, Glaxo Wellcome; Donna Flake, director, Medical Library, Coastal AHEC, Wilmington, NC; Mark Frisse, associate dean for academic information management and director, Bernard Becker Medical Library, Washington University School of Medicine; Sherrilynne Fuller, director, Health Sciences Library and Information Center, University of Washington; Betsy Humphreys, deputy associate director, Library Operations, National Library of Medicine; Joanne Marshall, associate professor, Faculty of Information Studies, University of Toronto; Paul Schyve, senior vice president, Joint Commission on Accreditation of Healthcare Organizations; and Phyllis Self, assistant director for Health Sciences User Services and head, Tompkins-McCaw Library, Virginia Commonwealth University. This group met in January and provided valuable input with particular emphasis on the two programs with which SILS has the least experience, the Executive CAS and the Advanced Internship Program. The internal planning team has also conducted interviews with selected information professionals and employers in the area to test assumptions about these programs gained from the expert advisory group meeting.

The views of the expert advisory group and the additional information provided by the professionals and employers interviewed have shaped the context of the educational programs. The proposed alternatives for educating professionals are part of a continual learning process, from the initial professional preparation to lifelong learning opportunities. Although the programs meet different needs, there is a core set of knowledge and skills common to them all. SILS, in partnership with other academic units and employers, has the potential to assume responsibility for sustaining as well as creating a work force. Individual professionals have an increasing obligation to add new knowledge and skills to be competitive throughout the phases of their careers.

The expert advisory group also urged that broad boundaries be established for the programs. Health sciences information management should be defined as encompassing all types of information, including patient data, clinical information, research data, and knowledge-based information. Programs that attract persons from multiple information backgrounds can produce an enriched learning process and meet organizational needs for persons with broader skills and the perspective to provide leadership. The experts agreed that information professionals need a combination of technical and personal skills to be successful in a changing and complex information environment.

The next step is a Delphi study, which will provide additional expert opinion to support the decision making related to the design and implementation of the five educational programs. A Delphi questionnaire based on the input from the expert advisory group and the interviews will list components of the educational programs. Two panels of experts, the first made up of potential employers of health sciences librarians and the second composed of practicing mid-career health sciences librarians, will be selected. They will be asked to rate each component on its importance in the relevant educational program and to comment on the advantages and disadvantages of each component and its relationships to other components. During a second Delphi round, panelists will receive feedback on responses from the first round and be asked for new ratings of the importance of each program component.

Three market surveys based on the results of the

Delphi study will be conducted. The intention of these studies is to estimate the demand from employers for graduates of the five educational programs and to estimate the demand from potential students for enrollment in the programs. One survey will be distributed to potential employers, asking them about the importance of particular educational components within the planned educational programs and about the number of program graduates that they might hire. A second survey will be distributed to applicants to information and library science schools, potential applicants, and paraprofessionals, asking them about their interest in enrolling in a health sciences specialization as outlined in the M.S.L.S./M.S.I.S. program description, about potential barriers to their enrollment in such a program, and about the program components necessary for overcoming those barriers. A third survey will be distributed to mid-career information professionals, asking them about their interest in and potential barriers to enrollment in the post-master's programs, and ways to overcome those barriers.

RESULTS

There will be two important outcomes from the proposed planning, feasibility, and market studies. Both of these outcomes are intended for use by UNC, but also by other interested schools, and will be reported in a form that will support local planning in a variety of institutions.

The first outcome will be model curricula for (approximately) five educational programs for health sciences librarians and researchers in health sciences information management. The number of curricula will depend upon the results of the studies. During the course of the planning year, it may be found that some educational programs are not desirable or are not feasible. Another possibility is that ideas will be generated during the planning phase that will result in the development of plans for additional educational programs. In either circumstance, the results from the final round of the Delphi study and the results from the market surveys will be used to identify the programs to be described in the final report.

The second outcome will be estimates of the level of demand for each educational program. One estimate will be of the level of demand from employers for graduates of each program. This estimate will be based on the employer market survey results and publicly available data on current employment levels. The second estimate will be of the level of demand from potential students in each program. This estimate will be based on projections of the full market potential (as evidenced by potential students' expressions of interest in the program) and of the kinds of constraints that might prevent potential students from enrolling in the program. In cases where there is high interest but many barriers to enrollment, recommendations will be made concerning actions that can be taken by schools, professional associations, and NLM to diminish these obstacles.

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