Interdisciplinary multiinstitutional alliances in support of educational programs for health sciences librarians*

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This project responds to the need to identify the knowledge, skills, and expertise required by health sciences librarians in the future and to devise mechanisms for providing this requisite training. The approach involves interdisciplinary multiinstitutional alliances with collaborators drawn from two graduate schools of library and information science (University of Illinois at Urbana-Champaign and Indiana University) and two medical schools (University of Illinois at Chicago and Washington University). The project encompasses six specific aims: (1) investigate the evolving role of the health sciences librarian; (2) analyze existing programs of study in library and information science at all levels at Illinois and Indiana; (3) develop opportunities for practicums, internships, and residencies; (4) explore the possibilities of computing and communication technologies to enhance instruction; (5) identify mechanisms to encourage faculty and graduate students to participate in medical informatics research projects; and (6) create recruitment strategies to achieve better representation of currently underrepresented groups. The project can serve as a model for other institutions interested in regional collaboration to enhance graduate education for health sciences librarianship.

Graduate schools in library and information science (LIS) face a number of barriers to meeting the need for enhanced educational opportunities for health sciences librarians. The school may not be located near a medical school having research or teaching programs in medical informatics. There may not be enough students seeking to specialize in health sciences librarianship to justify substantial coursework in such a specialization. Full-time faculty may have limited familiarity with health sciences librarianship, and courses and curriculum development may fail to incorporate knowledge and skills important for this area of specialization. The planning project with participants from the University of Illinois at Urbana-Champaign, University of Illinois at Chicago, Indiana University, and Washington University seeks to respond to this situation by (1) addressing identified needs through an interdisciplinary, multiinstitutional approach; (2) considering all levels of graduate education as well as the potential role of practicums, internships, and residencies; and (3) serving as a model for other institutions interested in regional collaboration to enhance graduate education for health sciences librarianship.

BACKGROUND

This project builds on prior work in developing special educational programs as well as on discussions of the current context for health information delivery.

Education for health sciences librarianship

Concern for the development of special educational programs for health sciences librarianship has existed since at least the 1950s. In a series of articles, Roper

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sought to determine the nature and distinguishing characteristics of the special programs of education for medical librarianship in the United States for the period 1957 to 1971 and to provide some quantitative evidence of the value of those programs [1-3]. Program directors and trainees in a total of eight degree programs (including one at the University of Illinois at Urbana-Champaign) and eight internship programs (including one at Washington University) were surveyed. The purposes of special programs as a group included providing an opportunity for the trainee to acquire an overview of medical library operations, knowledge of the literature of biomedical librarianship and the biomedical sciences, knowledge of the biomedical field, administrative experience, a professional attitude, insight into user needs, knowledge of computer applications in medical librarianship, a working knowledge of research methods, and familiarity with library resources in the biomedical sciences.

At the end of the 1970s Roper reported the results of a survey that focused on library school education for medical librarianship. He concluded that “to a large extent we are following the same pattern set up nearly forty years ago by Fleming at Columbia and further refined by Brodman. Individual topics and titles have changed, but essentially the same pattern continues of one course attempting to cover both the literature of the health and biological sciences and the administrative aspects of health sciences librarianship” [4]. The 1980s brought calls for new approaches to education for health sciences librarianship, given the changes that were taking place in medicine and health care. Detlefsen and Galvin recommended interdisciplinary and cooperative efforts, such as joint degree programs, especially in conjunction with centers of excellence in medical informatics [5]. Concern continues to be expressed in the 1990s, as in Braude’s discussion of how information technology is transforming the nature of health sciences information and its management, thereby altering the traditional responsibilities of health sciences librarians [6]. LIS education programs must evolve to reflect this situation, lest information management be taken over by individuals with different educational backgrounds and skills.

Detlefsen offers the most comprehensive recent survey of LIS education for health sciences librarianship [7]. She identifies five success factors for a specialized LIS program in health information (at least one faculty member in a doctoral LIS program with a declared interest in health information; a group of associated medical or health sciences faculties and programs nearby; a large academic health sciences center library nearby; medical informatics research and training initiatives under way at the same university; personal, professional, and electronic links among the four groups), but recognizes that a situation in which all five factors are present is quite uncommon.

**Position and policy statements on education and research**

Two recent policy statements from the Medical Library Association (MLA) provide useful frameworks for considering how to enhance the education of health sciences librarians and how better to equip them to undertake research. Drawing on the results of a survey of a sample of the MLA membership [8], *Platform for Change*, the educational policy statement of MLA, provides concrete guidelines for graduate programs in health sciences librarianship by identifying knowledge and skills relevant to health information professionals [9]. The categories used include health sciences 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. Specific directives to LIS education state that (1) every graduate program in library and information science must lay a broad foundation that stresses theory over application, places librarianship in context with other related disciplines, fosters professional values, and prepares students to design their own learning program throughout the length of their careers; (2) educators should provide a range of programs and opportunities that meet needs throughout one’s professional career, rather than focus solely on the master’s degree; and (3) educators need to define the boundaries of their programs and develop effective relationships with related information disciplines [10].

The research policy statement of MLA, *Using Scientific Evidence to Improve Information Practice*, presents research as “a foundation for excellence in health information practice, for new and expanded roles for health sciences librarians, and for attracting excellent people to the profession” [11]. The policy statement articulates a dual role for health sciences librarians in relation to research: (1) “health sciences librarians must be familiar with health care research methods and sources in order to provide information services based on scientific knowledge to their users”; and (2) “they must pay particular attention to the development and application of their own research knowledge base” [12]. To give librarians the necessary research skills, LIS degree programs must ensure that opportunities to develop quantitative and qualitative research knowledge and skills appear throughout the curriculum for both master’s and doctoral programs. Subsequent to the publication of MLA’s policy statement on education for health sciences librari-
The evolving role of the medical sciences librarian as the basis for library and information science (LIS) course and curriculum development and for the design of practicum, internship, and research opportunities.

2. Analyze existing programs of study at all levels (M.S., C.A.S., Ph.D. at Illinois; M.L.S., M.I.S., and Specialist degree at Indiana) to identify possibilities for enhancing education for health sciences librarian-ship through revisions to courses, the introduction of new courses, the incorporation of coursework from related fields, and the development of joint degrees.

3. Develop opportunities for practicums, internships, and residencies at the cooperating medical schools and affiliated institutions, in health sciences libraries and information services for clinical care, that would allow better preparation in the areas of information integration and medical informatics.

4. Explore the possibilities of computing and communication technologies that could support collaborative learning among students at different sites and the involvement of experts in instructional activities at distributed sites.

5. Identify mechanisms that will encourage LIS faculty and graduate students to participate in medical informatics research projects, with particular emphasis on encouraging doctoral students to select research topics in medical informatics for their dissertation research.

6. Create recruitment strategies to achieve better representation of currently underrepresented groups (e.g., ethnic minorities) in LIS degree programs at all levels.

COLLABORATORS AND COLLABORATING INSTITUTIONS

The accomplishment of the aims depends on the work of several collaborators at four institutions in three midwestern states. The collaborating institutions have a number of resources and programs in place that could contribute to the success of this planning effort.

Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign

The Graduate School of Library and Information Science (GSLIS) at the University of Illinois at Urbana-Champaign (UIUC) has degree programs allowing students to earn a master of science degree, Certificate of Advanced Study (C.A.S.), or doctor of philosophy degree. Each of these programs is now sufficiently flexible to allow specialization in a designated area, such as health sciences librarianship. Project personnel affiliated with GSLIS include Linda C. Smith, Ph.D., professor; Leigh Estabrook, Ph.D., dean and professor; Pauline Cochrane, M.A., visiting professor;
Edward Lakner, Ph.D., assistant director for research programs; and Mark Spasser, doctoral student.

The M.S. program has a recently revised core curriculum which is 1.5 of the ten units needed for the M.S., where a unit is four credit hours. The core curriculum emphasizes research methods and technology as well as the core concepts of librarianship. Information technology applications are integrated throughout courses in such areas as cataloging and reference, and there are many LIS electives available on topics such as information storage and retrieval, online information systems, library automation, telecommunications, architecture of information systems, electronic publishing and the information industry, implementation of distributed information systems, and information resources management. The C.A.S program attracts two categories of students: those who have recently finished an M.S. and want the opportunity to specialize further, and those who wish to update their knowledge or pursue a different area of specialization. The program requires eight units (thirty-two credit hours) of elective coursework, of which up to half can be outside GSLIS. In addition the student completes a two-unit (eight credit hour) project, which can involve basic research or applied problem solving. A revised Ph.D. program was implemented in the 1995/96 academic year. It allows greater flexibility in pursuing a specialization, places more emphasis on research methods training, and incorporates a research and a teaching practicum, while at the same time having a required proseminar and core reading list. Students have opportunities to engage in research at various points, including the final dissertation stage.

The school has a well-equipped computer laboratory with full Internet connectivity. The Library Research Center, housed with the school, conducts research on problems of all types of libraries and information centers and has expertise in such data collection techniques as survey research and focus group use. The student body includes a large proportion of students from outside Illinois. In the past few years, more emphasis has been placed on scheduling courses to support part-time students better (i.e., the Fridays Only program), some of whom commute from Chicago one day per week. The school has recently received approval for the LEEP3 scheduling option that will allow students at a distance to earn an M.S. degree from their homes with limited stays on campus. Web and other Internet-based technologies will be used to create a learning environment for these students.

University of Illinois at Chicago

The University of Illinois at Chicago (UIC) is the largest institution of higher learning in the Chicago area. Among its colleges are: Associated Health Professions, Medicine (at Chicago, Peoria, Rockford, and Urbana), Nursing, Pharmacy, and the School of Public Health. Project personnel affiliated with UIC include Walter B. Panko, Ph.D., director and professor, School of Biomedical and Health Information Sciences; Elaine R. Martin, M.S.L.S., assistant university librarian for health sciences and director, NN/LM, Greater Midwest Region; Cynthia L. Henderson, M.I.L.S., health sciences librarian (Urbana); Victoria Pifalo, M.L.S., assistant health sciences librarian (Urbana); Annette L. Valenta, Dr.P.H., assistant director for curriculum, School of Biomedical and Health Information Sciences; Lewis L. Sadler, M.S., associate professor and department head, Biomedical Visualization; and Gail Langer, graduate student in health information management.

The School of Biomedical and Health Information Sciences, housed in the College of Associated Health Professions, is a new academic unit created to advance information management and technologies for the health sciences in both theory and application. Divisions within the new school include: Biomedical Visualization, Health Information Management, and Medical Laboratory Management. The school's research and educational programs are strengthened by the active affiliations of its academic units with clinical counterparts in the UIC Medical Center and with the Library of the Health Sciences (LHS). LHS is UIC's primary resource for biomedical information in fields such as medicine, dentistry, nursing, public health, allied health professions, and pharmacy. The library serves as a resource for the UIC Hospital and other affiliated hospitals and health care institutions. The library is composed of four physically separate libraries, with the parent library in Chicago and the other three sites in Rockford, Peoria, and Urbana. Under a contract awarded by NLM, LHS serves a ten-state region in the National Network of Libraries of Medicine. There are many regional outreach activities within the ten states, such as Grateful Med training, exploring document delivery options, and identifying Internet providers. The UIC library already has a commitment to post-M.S. training through its academic resident librarian program, which includes professional development seminars and opportunities to take coursework. A new focus in recent years has been the active recruitment of minority librarians. In another educational program supported by the library, selected support staff have pursued an M.S. in library and information science at UIUC through participation in the Fridays Only program.

School of Library and Information Science, Indiana University

Jana Bradley, Ph.D., assistant professor at Indiana University School of Library and Information Science
on the campus of Indiana University Purdue University Indianapolis (IUPUI), is that institution's primary participant in the planning project. Indiana University has two degree programs at the master's level: the master of library science (M.L.S.) and master of information science (M.I.S., introduced in the fall of 1995). The school already has a number of dual degree and specialization programs in place. Advanced degree programs include the Specialist in Library and Information Science degree for students already holding an M.L.S. (thirty credit hours of course work of which at least fifteen must be taken in LIS) and the Ph.D., which includes both a major (an area of library service or information science) and a minor of twelve to fifteen credit hours related to the student's research interests and taken outside the school.

Both the M.L.S. and M.I.S. programs require a course entitled "Computer-Based Information Tools," which covers computer literacy, basic concepts and procedures in information retrieval, and basic concepts and procedures in networked technologies and resources. Students in both the M.L.S. and M.I.S. programs must complete at least three of four common core courses: User Information Needs and Behavior in Theory and Practice, Organization and Representation of Knowledge and Information, Management of Information Environments, and Introduction to Research and Statistics. The M.I.S. degree requires four of the following six additional M.I.S. core courses: Introduction to Human Computer Interaction; Strategic Intelligence; Information Technology Standardization; Systems Analysis and Design; User-Centered Database Design; and The Organizational Information Resource. The M.L.S. degree requires three of the following five additional M.L.S. core courses: Bibliographic Access and Control; Perspectives on Librarianship, Literacy, Communication and Reading; Information Sources and Services; Library Automation; and Collection Development and Management.

Both the School of Library and Information Science (SLIS) and Indiana University as a whole are very technology-intensive environments, offering numerous opportunities for learning and working with technology. The Indianapolis-based program is housed in the recently built library. Computer technology and networked electronic and multimedia resources are available throughout the building, side by side with print resources. There is emphasis on using electronic communication to increase interaction between students in Indianapolis and Bloomington.

Washington University

Project personnel at Washington University in St. Louis include Mark E. Frisse, M.D., director of the Bernard Becker Medical Library and associate dean for academic information management, and Michael G. Kahn, M.D., Ph.D., assistant professor of medicine and medical informatics. The Bernard Becker Medical Library integrates several components: the Medical School Library, the Archives and Rare Book Collections, the Media/Computer Center, and the Medical School Computing and Networking Services. These groups offer a variety of computing and special information services in addition to traditional library service. The library oversaw an NLM-funded training program in computer librarianship for several years during the 1960s and early 1970s.

Washington University School of Medicine and its health care system partner (BJC Health System) are one of the nation's largest medical schools and one of the region's largest health care delivery systems. The School of Medicine and its hospital partners are jointly developing a unified, comprehensive, longitudinal medical record to encompass all clinical settings and serve the needs of the patients, care providers, administrators, and financial officers. Project Spectrum is a joint technology development consortium for the creation and deployment of advanced clinical information systems. The School of Medicine and university have a number of very strong informatics research groups, including the Section on Medical Informatics within the Department of Internal Medicine's Division of General Internal Medicine, the Electronic Radiology Laboratory of the Mallinckrodt Institute of Radiology, the Applied Research Laboratory of the Department of Computer Science, the Institute for Biomedical Computing, neuroimaging efforts, and a number of major initiatives in genome mapping. Work in collaboration technology began in 1986 and includes initiatives in hypertext, World Wide Web development, digital botanical libraries, spatial databases, collaborative classrooms with wireless notebook computers and LiveBoards, and new initiatives in computer-based education.

PLANNING ACTIVITIES

Personnel from the collaborating institutions are carrying out a number of activities in order to accomplish the aims of the project.

The evolving role of the health sciences librarian

Aim 1: Investigate the evolving role of the health sciences librarian as the basis for LIS course and curriculum development and for the design of practicum, internship, and research opportunities.

Work on aim 1 serves to inform those activities seeking to adapt degree programs, internships, and
research opportunities to be more responsive to the emerging roles of health sciences librarians. This translation of our traditional knowledge and skills into the emerging information environment requires shifts in focus: from books and journals to a broad view of information; from a library focus to an institution-wide focus; and from a focus on the structure of the library to a focus on the knowledge, skills, and activities of the individual—the LIS professional. Several activities are associated with this aim. A literature review has identified trends in health care delivery and the need for health sciences information as well as changes in roles of health sciences librarians that are already documented. Focus groups have been organized by Leigh Estabrook and Edward Lakner in three metropolitan areas (Chicago, Indianapolis, St. Louis) in order to intensively interview health sciences librarians from a variety of settings and elicit information on emerging roles. Communication with a wider range of health sciences librarians will follow completion of the focus group sessions. Jana Bradley is developing an Electronic Archive of Evolving Roles for LIS Graduates.

The electronic archive takes as a given that the conceptual work about the evolving roles of the profession is well advanced and that practitioners in the field are experimenting with evolving roles in increasing numbers. The need, therefore, is not for more rhetoric but for more understanding of new roles as they are actually being realized—and for easily available exemplars of these roles. A Web site of extended descriptions is being developed to make available exemplars of evolving roles. The descriptions are authored by the role incumbents through a forms-based structure that provides a semi-structured narrative and ensures that each description addresses the same issues. The archive will provide three approaches to searching and browsing: (1) keyword searching; (2) browsing by field, i.e., by individual question; and (3) browsing by contributor indexing. Contributors will choose index terms from a controlled list when they complete the archive forms. The effectiveness of contributor indexing will be evaluated once the archive reaches a sufficient size. The underlying structure of the archive—the questions or “fields”—is being developed through an analysis of approximately fifty questionnaires describing evolving roles completed by role incumbents. Key dimensions from these descriptions will form the basis for the archive structure.

**Analyze degree programs**

**Aim 2:** Analyze existing programs of study at all levels (M.S., C.A.S., Ph.D. at Illinois; M.L.S., M.I.S., and Specialist degree at Indiana) to identify possibilities for enhancing education for health sciences librarianship through revisions to courses, the introduction of new courses, the incorporation of coursework from related fields, and the development of joint degrees.

The enhancement of education for health sciences librarians can be implemented rapidly if it takes place within existing degree programs. Work on this aim is proceeding in parallel at UIUC and Indiana, with input from UIC on the possibilities for coursework and joint degrees in the programs associated with the School of Biomedical and Health Information Sciences. Activities associated with this aim include the exploration of opportunities for course content enhancement, identification of needed new courses, incorporation of coursework from related fields, development of joint degrees, and investigation of existing health informatics curricula to identify areas of concentration that may need to be addressed.

Knowledge and skills relevant to health sciences librarianship could be integrated into many existing courses. Course outlines and typical assignments are being reviewed to identify ways in which the student interested in a health sciences specialization could have more opportunities to gain exposure to that content within the framework of existing courses (e.g., learning to search health sciences databases in an online searching course; learning about the NLM classification in a cataloging course; exploring health resources on the Internet in a telecommunications course). Coupled with the enhancement of existing courses, there is a need to identify gaps that can be filled by the introduction of new courses into the LIS curriculum. This will involve proposals for the development and scheduling of new courses. Once gaps are identified, an alternative approach is to identify coursework already offered in other departments, whether in the home institution or one of the cooperating institutions. New joint degree programs have a longer timeline for implementation, but they would allow more intensive preparation in LIS and a related field. Initial exploration between UIUC and UIC will involve consideration of the degree programs offered within the School of Biomedical and Health Information Sciences at UIC, which are being revised under the leadership of Walter Panko and Annette Valenta. As part of the curriculum revision process, they are using the results of brainstorming sessions involving participants that represent various employment sectors in health care, such as biomedical visualization, health information management, and medical laboratory management. Because there are already a number of programs for research training in medical informatics, an investigation of existing health informatics curricula is also being undertaken by Gail Langer to identify approaches that may be relevant to the enhancement of health sciences librarianship education with a stronger medical informatics component.
At Indiana University Jana Bradley is developing a proposal for a Health Information Specialization (HIS) on the IUPUI campus. The HIS could be taken in conjunction with the school’s M.L.S., M.I.S., or Specialist degree. It is anticipated that courses in the specialization will also be attractive for continuing education students and for doctoral students wishing to specialize in health information. The proposed HIS will build on the core of the M.L.S. and M.I.S. As the HIS program is envisioned, it will attempt to incorporate the following features: (1) a broad-based definition of health information; (2) two to five electives in health information; (3) a focus on producing health information specialists who can address critical information problems of health care; (4) emphasis on tailoring for specific domain interests through advising and mentoring programs; (5) an emphasis on experiential learning (e.g., projects, internships, directed research projects); (6) support for a special health domain focus in required courses; (7) electives developed in a distance-friendly manner; and (8) encouragement to take courses outside SLIS. The development of the HIS is being undertaken by members of the SLIS faculty with broad input from faculty in various schools on the IUPUI campus, including the School of Medicine, the School of Nursing, and the School of Public and Environmental Affairs. Practitioners in libraries and clinical settings are also involved. Special assistance is being sought from the informatics personnel at Sigma Theta Tau, the National Nursing Honor Society. The final proposal for the HIS, when completed, will be considered for adoption by the full SLIS faculty.

Explore technologies for collaborative and distance learning

Aim 4: Explore the possibilities of computing and communication technologies to support collaborative learning among students at different sites and involvement of experts in instructional activities at distributed sites

Practicums, internships, and residencies offer enhancements by allowing the individual to work in the environment of a specific institution. An additional way to enhance cooperation, especially on a regional level, is to investigate technologies supporting collaborative and distance learning. Such technologies offer many possibilities, such as (1) making full courses available at remote sites; (2) involving guest lecturers from a different location; (3) providing “mentors” (for example, health sciences librarians working in different settings) as resource people who can be consulted via electronic mail; (4) encouraging collaborative projects among students at different sites. The technology allows a shift from one-to-many distance learning to an infrastructure within which collaborative learning can take place through shared group experience and peer group insights [20].

We are identifying distance and collaborative learning technologies available at the cooperating institutions to determine what technology could be exploited. A literature review by Gail Langer on the use of technology in graduate professional education will supplement our own experience with the strengths and weaknesses of this technology for instruction. With approval of LEEP3 at Illinois, a site-independent M.S. degree option with the first group of students beginning summer 1996, we are intensively exploring the role of technologies in support of M.S. degree courses. Experience gained through this program can benefit the health sciences specialization.

Identify research opportunities

Aim 5: Identify mechanisms to encourage LIS faculty and graduate students to participate in medical informatics research projects, with particular emphasis on encouraging doctoral students to select research topics in medical informatics for their dissertation research.

While research projects may be undertaken at any level of graduate study, they are particularly important at the C.A.S and Ph.D. levels. We will identify examples of research opportunities that could be pursued at the cooperating sites. This is an initial step in encouraging specialization in health information research topics by making students aware of these opportunities and encouraging them to complete the necessary coursework to prepare for such collaborations. At UIUC a recently revised doctoral program offers more flexibility in course selection and development of specializations.
Recruitment

**Aim 6:** Create recruitment strategies to achieve better representation of currently underrepresented groups (e.g., ethnic minorities) in LIS degree programs at all levels.

Enhanced opportunities for specialization are of little value if there are no students to pursue them. Anderson stresses the importance of recruiting individuals into the profession who have (or have the potential to develop) such attributes as technical literacy, research competence, service orientation, management abilities, leadership qualities, and organizational knowledge [21]. One group typically underrepresented in LIS student bodies is ethnic minorities [22-24]. The project will address this problem in two ways: (1) by developing strategies to identify and recruit a larger number of students from ethnic minorities and other groups that are needed among the next generation of health sciences librarians; and (2) by developing ways to involve alumni and other health sciences librarians in recruitment of talented prospective students for this specialization. In addition to considering issues associated with recruitment to LIS degree programs, we are looking at recruitment for employment with a specialization in health sciences.

Development, evaluation, and revision of the planning document

Although the plan will take shape within the context of the collaborating institutions, it will benefit from wider review for two reasons: (1) it can serve as a model for other regional cooperative efforts to enhance education and training for health sciences librarians; and (2) there may be identified needs that cannot be addressed with the resources available to the collaborating institutions but that could be met through the involvement of other individuals and institutions. In order to secure this wider review and evaluation, we will confer with alumni and recipients of other NLM planning grants, as well as making the document available for electronic distribution to and review by interested parties. Comments received in response to the draft plan will be incorporated into a revision, and a timetable will be developed for implementation.

CONCLUSION

Like our planning project, some of the other projects based in LIS schools are considering all levels of graduate education as well as the potential role of praticums, internships, and residencies. The project involving UIUC, UIC, Indiana University, and Washington University is distinctive in our efforts to address the identified education and training needs through an interdisciplinary, multiinstitutional approach. This approach reflects the founding principles of the Committee on Institutional Cooperation, an academic consortium of twelve major teaching and research universities (including the University of Illinois and Indiana University): that no single institution can or should attempt to be all things to all people, that interinstitutional cooperation permits educational experimentation and progress on a scale beyond the capability of any single institution acting alone, and that voluntary cooperation fosters effective, concerted action while preserving institutional autonomy and diversity.

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