Editorial:
A Research Agenda Beyond 2000

With contributions from: Mary Burke, Min-min Chang, Charles H. Davis, Peter Hernon, Gary Marchionini, Paul Nicholls, Candy Schwartz, Debora Shaw, Alastair Smith, Stephen E. Wiberley, Jr., and Ann Wolpert

Early in 1997, members of the Board of Editors were asked to submit a short list of areas which they felt would or should be the focus of library and information science (LIS) research into the next millennium. The responses of each individual are presented below, and evidence a diverse range of topics, but with identifiable commonalities. Some topics focus on the profession and on the nature of research conducted in LIS. Others center on the principal activities or processes in the field (information seeking and retrieval, representation, storage and preservation, and technology) or on underlying phenomena (information quality, or the information life cycle, for example). There is also a concern with the need to explore social and economic issues. Some items point to the desire for practical, action-oriented research to resolve everyday problems, and others look to the need for examination of fundamental theoretical constructs. In essence, this "mixed bag" reflects the diversity of our Board of Editors, and identifies targets worthy of future research and of inclusion in the pages of *Library & Information Science Research* as we move to 1998 and our 20th anniversary.

Mary Burke (University College Dublin, Ireland) is influenced by the ideas raised in Ian Cornelius' (1996) *Meaning and Method in Information Studies* and sees the following issues as worthy of closer examination.

- *Research*—The relevance of hermeneutics and interpretation in LIS as a basis for theory and research.
- *The Discipline*—The place of LIS within the social sciences and its relationship to other social sciences such as law and politics; the view of the field as an integrated series of evolving conceptions rather than as discrete paradigms (information science, librarianship, etc); the claim that it is possible to have two contrasting views about the importance of the Information Society for LIS, and that both are legitimate attitudes for LIS; the view of information

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science and information management as having roles inside and outside the LIS tradition.

- *The Profession*—The claim that research is part of practice, not separate from it, and that practice is a matter of personal as well as professional identity. Also, the claim that our presentation of ourselves as librarians or information managers, and so forth, is part of a professional program to convince others (society, fund managers) of our command of resources and tasks.

Min-min Chang (Hong Kong University of Science and Technology, Kowloon) identifed key areas of concern in discussion with the staff at her library.

- *Economics*—The rising costs of journals, and whether electronic publishing is a viable solution for reducing a library's costs. Does the faculty tenure process and "publish or perish" unnecessarily inflate the number and cost of journals? Can a new tenure model be developed to reduce this pressure?
- *Information Retrieval*—Is a common user interface for information retrieval still a dream? Are search engine models appropriate—the more powerful searching algorithms increase recall, but do they do enough for precision?
- *The Internet*—What is its impact on library public services, and what role do the theory and practice of classification and cataloging have to play in the bibliographic control of Internet resources?

Charles H. Davis (University of Illinois at Urbana) looks at broad issues concerning the field.

- *The discipline*—What parallels can be found with other academic or professional fields in terms of examining their raisons d'être? Chemistry, for example, is interdisciplinary, not especially easy to describe, and yet has been defined from the bottom up through empirical studies, not from the top down by philosophically-inclined theorists. Is epistemology worth the effort, or should we get on with our lives? Speaking of parallels, I am not aware of any serious current comparisons between library science and journalism, and I think something useful might come of such a study. Both involve communication and intermediaries; both have professional pretensions; and both are faced with dramatic changes brought about by new technologies.
- *The Profession*—Has there been a recent study of the types of persons entering our field, however defined? I am thinking of the early work by Rosemary Magrill and others who looked at this a generation ago. Is this the time for an update? In a similar vein, what kinds of research are being undertaken in doctoral dissertations? I am thinking about longitudinal studies like that initiated by Gail Schlachter. Any follow-through?
- *Research*—Now that even the National Science Foundation is encouraging mission-oriented research, what evidence is there that today's research in

library and information science is relevant to anyone's needs? How about some impact studies?

Peter Hernon (Simmons College, Boston, Massachusetts) feels that research looking at the first five of the following points might involve the development and testing of models.

- *Services*—What to offer, how effective and efficient (within and outside a cost framework). Research on services should also examine "service quality" and "satisfaction," with the interconnections and differences between the two.
- *Information Needs*—Those of "lost" and "never-gained," or potential, library customers. What role can libraries play in gaining them as customers? How do we study these individuals—what research designs and methodologies are appropriate? Also, there should be more research looking at the information needs of culturally diverse communities and those individuals with disabilities. Research might relate to compliance with the Americans with Disabilities Act (ADA).
- *Managing Organizational Change*—The changing role of library directors; coping with the present fiscal and political climate; implications of new organizational designs on staff, resources, management, and customers; creating a team-based culture; coping with increased work load of staff; rising incidents of staff burnout and occupational stress; and so forth.
- *Measures*—Examination of different types of measures: input, output and performance, quality assurance, outcome, and impact. What measures are appropriate under what circumstances? How do we develop a qualitative component?
- *Information Policy*—What is information policy? What aspects of life-cycle management for government information relate to library collections, services, and management?
- *Digital Information*—There is need to extend the methodology of unobtrusive testing to library provision of electronic resources.

Gary Marchionini (University of Maryland, College Park) sees the challenges introduced by the changing relationships between people and information.

- *Human-System Interaction*—We should encourage research in human-system interaction from a LIS perspective. This includes technology-augmented interactions among individuals, groups, individuals with institutions, and interinstitutional interactions. Our field has important contributions to make in user needs assessment, task analysis, conceptual interface design, and interface evaluation. (This is an argument I make to my students and anyone else who will listen.)
- *Learning*—I believe we should encourage more research related to learning, especially the roles that information plays in the cognitive, affective, and

physical aspects of learning. Most of our field is concerned with the needs of scholars and workers frozen in time, that is, quests for specific information products. I believe we should become more concerned with information and information needs that change over time—just as learning is a change of state, so studying how information and human information needs change is particularly important in a dynamic, Web-based milieu. Related to the learning theme, we should encourage work that examines temporal information and mobile information; information that is fluid and context dependent. To do so we must focus our efforts on paths rather than destinations. New techniques for analysis of sequential data are needed to augment the techniques we have for describing distributions and collections.

- *Digital Information*—We should encourage more research in creating, retrieving, and using digital objects beyond text. There are significant challenges for handling digital libraries that include video, images, sound, virtual realities, and software of all types. All the things we now do with text must be extended to such objects and new principles and techniques must be discovered.
- *Social Impact*—There is need for research on all aspects of the social effects of information structure and availability. This certainly includes the economic value of information which is receiving considerable attention, but also should include roles of information (especially given the digital information explosion) in equity, political power, and cultural values.
- *The Information Life Cycle*—I believe we are too centered on retrieval and must encourage research related to the entire information life cycle: including creation, use, and dispensation, as well as the traditional organization, management, and retrieval. Such research might be manifested in several ways. One general area is research related to information engineering/design, including topics (from most theoretical to most practical) such as information quality (accuracy, consistency, completeness, timelines, and contextual utility); intentionality of creator(s) and users; new levels of representation for digital information; new mechanisms for controlling those representations (interface devices and methods); and new techniques for capture/acquisition, layouts of digital media, maintenance, delivery, and destruction.

Paul Nicholls (NewMedia Canada, London, Ontario) is, appropriately, interested with the impact of new media on traditional services, and on the applicability of models developed for the bibliographic world.

- *The Profession*—As the walls fall from the library, is the systems specialist or "Webmeister" going to be all that is left? In the electronic remotely accessible library, how much danger is there that there will be no physical desk for the reference librarian and therefore no reference librarian any more? The Internet is a wonderful thing (at least in part), but indexing and general access are not well-developed, not merely for multimedia but for general textual

content. We are not at the point where access can be effectively automated and expert intermediaries dispensed with, but I think this is an increasingly common temptation. LIS graduates with access to commercial online services may be able to find answers, but patrons of the Web are naïve, and must deal with poorly indexed sources of very variable quality.

- *Electronic Publishing*—Electronic journals need attention, especially with respect to quality control. With print publications disappearing at an alarming frequency because of the associated costs, many are tempted to just put up a Web page. Whether peer-reviewed, near-peer-reviewed, or not peer-reviewed at all, there is more scope with electronic journals for a breakdown in quality and authoritativeness. This is not to mention the many other electronic publications that range from terrible to mediocre in quality. When mounting a Website costs $10 per month, anyone can be an "expert," or can purport to be. There are also preservation issues which come into play.
- *Bibliometrics*—The Web represents a very substantial literature (not all of much value). Basic Web statistics are widely available and well known to be rather flawed; they also are mainly confined to hit rates. If this medium is regarded to have importance, then basic bibliometric measurements on the nature of the content and its use will be of general interest; and examining those results in light of traditional print literature may show useful similarities or perhaps differences. Also, someone should take a substantial body of text, for example, Melville's *Moby Dick*, and see whether Zipf's Law applies to the word frequency distributions chapter by chapter, several chapters at a time, large portions at a time, and the whole text, in order to see whether the model applies, and especially how large the sample has to be before it *does* fit. This would bear not only on the basic validity of the Zipf model, but also on sampling methodology for bibliometrics in general. Normally we would regard the Zipf model as the very basis of other main bibliometric models, so this work would really lay a necessary theoretical and empirical groundwork that simply does not exist at this time.
- *Technology*—While probably not research as such, a technology backgrounder and forecast would be useful at this time. CD-recorders will become a common peripheral during 1997 and ubiquitous in 1998. Derivatives of CD-ROM such as CD-RW and the new DVDs will have a substantial impact on library collections and office automation. The whole area is quite an alphabet soup that could use both sorting out and some expert opinion on what the future implications might be.
- *Representation*—We now have multimedia materials that even the most skeptical among us regard as a very positive revolution. But, while it is possible to throw media together in a very rich resource, I think we have very little idea as to how to index multimedia and how people use (or should use) these resources. How do you index a picture, a piece of audio, animation, and so on, and how does a user search for them? For example, indexing the textual titles of pictures is not enough—we should be working on pattern recogni-

tion, indexing with images, and no doubt concepts we have not even developed. We ought to return to Cutter's principles about indexing/cataloging, as well as the traditional methods of analytical bibliography, and apply them specifically to the new electronic and multimedia materials. What is an "edition," "issue," or "state" of a CD-ROM or of a Web page? Are these bibliographical distinctions still of use? I think so. Does the 1997 edition of Microsoft's Encarta encyclopedia efficiently provide the three types of access that Cutter regarded as essential and which underly the operation of all contemporary libraries? Perhaps the print-based bibliographical methodology can be brought up to date to be more effective in the new context. If we needed it before for the print materials, it is doubtful that we do not need it now for the new materials.

Candy Schwartz (Simmons College, Boston, Massachusetts) would like to see research efforts directed to resolving problems of information retrieval, representation, and service in a networked world.

- *Networked Resource Discovery*—How does what (little) we know about information discovery in other environments apply to the World Wide Web and digital library settings? Which models of object description ("metadata") work well in which settings, and which do not?
- *Retrieval*—I hope to see continued improvements in natural language access (whether through the application of statistical or linguistic methods, or artifical intelligence, or combinations thereof). Also, I am interested in seeing more research on visualization as a method of summarizing and characterizing information spaces, and especially interaction in visualized environments.
- *Human-System Interaction*—Research is needed on the "technology" of the human computer interface—that is, screen layouts, voice command input, desktop models, live video interaction, 3-D, and so on. What are the implications for LIS?
- *Social Impact*—What are the effects of Internet access in information-poor communities? Issues include whether it is important to provide access, and, if so, then how to bring it about (from a learning as well as technological point of view), and what impact it will have.
- *Education*—A handful of LIS programs have engaged in remote learning (I prefer "remote" over "distance," since the activity could take place in a room next to the instructor's office). We need to know what works (pedagogically) and what does not, including consideration of the socialization and professionalization of new information professionals.

Debora Shaw (Indiana University, Bloomington) calls for research which could have an impact on everyday information services, and might cause a reassessment of some of our basic tenets.

- *Research*—Where does LIS research show up in our everyday lives? Lots of smart people have invested careful thought and considerable time in generating research in our field. Are we "researching smart" (investigating the right problems)? What differences do our research efforts make?
- *Information Seeking*—In particular, what does it mean to need (seek, covet, desire, want) something one does not know. Does cognitive science have anything to contribute to our understanding? Can we get a better sense of serendipity, or browsing, to actually increase the chances of successful information seeking? (And what is success?)
- *Visual Information*—How can nontexts be most usefully described, stored, and retrieved? Do we need words? If so, how chosen? How can visual displays assist in identifying desired information? As resources become increasingly complex and suppliers increasingly diverse, how can humans' powers of visual discrimination help us cope with complexity and overload?
- *Value of Information*—Including and beyond economics, what do users invest to locate, use, or even avoid information? Also "meta-investments"—what trade-offs do we make in learning to use or adapt to information resources?

Alastair Smith (Victoria University of Wellington, New Zealand), with a few well-chosen words, identifies central and sweeping areas in need of research.

- *Networked Resource Discovery*—What resource discovery mechnisms work on the Internet/World Wide Web? Also, research is needed on information quality in this setting.
- *Economics*—What are the economic benefits of libraries?
- *Electronic Publishing*—How should conservation/preservation be approached in the context of electronic information?
- *Social Impact*—Attention should be focused on creating a place for minorities and non-U.S. cultures on the Internet/World Wide Web.

Stephen E Wiberley, Jr. (University of Illinois at Chicago) also favored simple statements harboring complex themes.

- *Preservation*—Technical requirements for preservation of digital information, and, in general, the economics of preservation of information.
- *Information Seeking*—Models of information seeking and use in different subject domains.
- *Retrieval*—The language of information retrieval in different subject domains.

Ann Wolpert (Massachusetts Institute of Technology, Cambridge) has identified areas of concern to library managers.

- *Economics*—Comparative economics, especially with respect to print and digital resource acquisition and management.
- *Research*—Library consumer surveys and the design of effective protocols for same.
- *Services*—Meaningful metrics to measure and assess the impact of libraries.
- *Representation*—The assessment of emerging tools (e.g., metadata and PICs) as organizing options.
- *The Internet*—The effectiveness of the World Wide Web as an information resource.

Surveys such as these (and there will be many as the year 2000 approaches) are taken to identify important areas of research, and to advocate the conduct of such research. The Editors encourage readers to submit their own research agendas or comments on those presented above, so that we might expand upon these reflections.

REFERENCE

Cornelius, Ian. (1996). *Meaning and method in information studies*. Norwood, NJ: Ablex.

Errata:

In the table of contents in *LISR* 19(2), Arthur P. Young's name and the title of his guest editorial, *Library Research Seminar I: Partners and Paradigms*, were not listed, nor was the full title of Hope Olson's article, *The Feminist and the Emperor's New Clothes: Feminist Deconstruction as a Critical Methodology for Library and Information Studies*. In Charles H. Davis' review of Ian Cornelius' *Meaning and Method in Information Studies*, the third sentence (p. 201) should have read: "Moreover they bring with them the intellectual baggage that has made them whatever they are: librarians, computer scientists, psychologists, and so on." The opening of the fourth paragraph (p. 202) should have read "What are these methods? *Meaning and method* ... provides some answers in what amounts to a grand circumlocution."