



In Search of Practical Applications: A Public Services Research Agenda for University Libraries

by Barbara I. Dewey

Public services in university libraries are shifting to more proactive and collaborative models directly linked to the university research and teaching mission. This article reviews selected research studies with practical application to service models and offers suggestions for a research agenda supporting the advancement of strategic services.

A review of university libraries' strategic plans reveals ambitious and challenging goals related to new models of information access, retrieval, and user education.¹ Dramatic changes in technology, changing roles of librarians, limited resources, and increasing demands for accountability, combined with a growing awareness and interest in client-based program planning, point to a need for librarians to seek out evidence of a scientific nature to inform decisions and create innovative service programs. This article focuses on the practical applications of selected recently published research, and proposes areas needing further study.

THE PRACTICAL VALUE OF RESEARCH

Usefulness or the practical value of research is often most evident at the point of need. Practitioners with a problem, issue, or program at hand may look to the literature to find research papers related to that topic or, by scanning journals, notice articles on topics in relevant areas. How often this occurs is not known. Practitioners, themselves, are part of the knowledge creation community within library and information science and have a variety of motivations for creating and making use of research studies. However, the body of published research available at any given time is not based, particularly, on point of use need. This situation might be because the need (as defined by a problem) is ahead of available published research, the available research is ahead of the need, librarians seeking research on specific topics are not looking in the right place or in the right discipline, or are simply not simply referring to research studies at all.

Barriers to Effective Research Programs

While this article does not deal with research productivity it seems clear that not enough practitioners, in particular, are engaged in active research programs that might specifically address some of the challenges facing academic libraries attempting to pursue more relevant service models. Certainly additional research or affirming data are considered important in the academic environment where the scientific method is valued and even revered. Research is conceptually understood by the most pedestrian of university or college administrators and, therefore, has great practical value for librarians seeking additional funding or attention to their programs.

In reality, a number of barriers slowing the pace of research exist in academic and research librarianship. Motivation and incentive are a problem in institutions that do not reward, in some way, the research effort. And, though many librarians engage in an active research and writing program because it is seen as a rewarding activity and for practical on-the-job reasons, others do not because they perceive that support in terms of time and funding is not strong enough for them to justify the effort. The issues related to faculty versus non-faculty status are also a possible factor. Perhaps librarians in those institutions requiring publication for a positive tenure or promotion decision are more productive. Another problem is the real and perceived difficulty of accomplishing a research study. Are many practitioners familiar with the range of methodologies available to them for research projects? How does one get started? Where does one discover ideas of good projects? What kind of local support is available?

*Barbara I. Dewey is Director,
Information and Research Services,
University of Iowa Libraries,
Iowa City, Iowa 52242
<barbara-dewey@uiowa.edu>.*

Overviews of Library and Information Science Research Efforts

At least two general books provide some answers to these and other questions related to use and creation of research in the academic setting. *Library and Information Science Research: Perspectives and Strategies for Improvement*, edited by Charles R. McClure and Peter Hennon, presents a wide variety of issues, strategies, and perspectives related to creation and application of research in library and information science.² Many of the chapters have direct relevance to public service research in university libraries, especially Charles Townley's "Opportunities and Challenges for LIS Research in Academic Libraries: Elements of a Strategy."³ *Academic Libraries: Research Perspectives*, edited by Mary Jo Lynch and Arthur Young, constitutes one of the few books to attempt to accomplish a research review in a global fashion for academic libraries.⁴ The book includes essays on a number of topics relevant to this article—instructional services, bibliometrics and library use studies, access services, application of technology, and organizational structure. Essay authors surveyed the literature for applicability and also posed questions for future research. The book is a valuable record of research before 1990 and suggests relevant areas of research for the current and future academic library environment. The Association of College and Research Libraries has dealt with research application in its "ACRL Research Agenda" published in a 1990 issue of *College & Research Libraries News*.⁵ Both this agenda and the Lynch/Young work, though quite useful, should be supplemented with recent literature taking into account the many changes affecting issues and the higher education environment since 1990.

The Importance of Methodology

In addition to a focus on research topics, discussion of appropriate or relevant methodology for library and information science research is also critical to the future state of research related to public services in university libraries. Researchers are demonstrating growing interest in qualitative methods and perhaps combining methods to provide the most effective framework for research of complex issues. For example, Lynn Westbrook provides a review of the basic tenets of qualitative and naturalistic methods and their value to library and information science research. She notes that the sheer volume of factors

that finally lead a user to an interaction with some part of an information system is complex (a primary aspect of public service research), and that naturalistic approaches seek to review as many of these aspects as possible.⁶ The trend towards a more comprehensive study of the research topic context, combined with appropriate research methodology, is promising. Librarians and information scientists are reexamining research strategies and starting to consider, in addition to cognition and hermeneutics, the usefulness and richness of hypothetical-deductive approaches. This creative view towards research methodologies is particularly important for researchers examining relationships and behaviors relevant to public services initiatives.

Research Impact: The Need for Assessment

Assessing the actual impact of studies related to public services would be particularly useful, but these assessments are rare in library and information science literature. A special issue of *Evaluation Review* notes that "although the methods used in the performance of research continually advance the state of the art, the methods used for its identification and selection have changed little in decades" and "the numbers of organizations that used any but the most rudimentary methods also remain a handful."⁷ Certainly the time and costs of implementing research impact assessment is considerable, however, a more comprehensive approach to assessing the practical value and impact of research on library services would be productive in developing a solid research agenda. Articles such as this general paper can examine only a few aspects of the research picture in an anecdotal fashion.

RELEVANT PUBLISHED RESEARCH AND ADDITIONAL TOPICS FOR PUBLIC SERVICES APPLICATION

A comprehensive determination of the recent research record for public services is a challenging task and one not comprehensively accomplished here. However, several strategies were used to identify selected areas of research. A relatively broad definition of what constitutes "research" was employed. Basically papers or presentations that included the study (statement of problem and employment of a methodology) and/or evaluation of a relevant topic were included. Those simply describing a service or a problem were not included, however these "case study" kind of articles have important

practical value. Studies and articles published recently (over the past three or so years) from research-oriented journals and selected presentations from research-oriented conferences were examined to obtain a sense of current and recent research. Obviously, this approach is subjective. Many other sources could have been included such as research literature from a wide variety of disciplines as well as research in the form of dissertations, theses, and occasional papers.

Selecting research articles pertinent to public services activities in academic libraries proved to be somewhat difficult because a clear definition of "public services" is not apparent. Many activities and functions of technical services departments, for example, are public services oriented—activities relating specifically to the public versus internally-based activities. Furthermore, university libraries' staff these days often work in a team-based environment replete with cross cutting functions, and, thus, public services goals and agendas are integrated into activities of departments not traditionally devoted to the library user. Given this situation, articles noted in this article specifically do include the existence of a client or user as a focus.

Public services librarians and administrators from the academic environment do occasionally articulate areas where additional research as well as case study publication would be extremely helpful. During the fall of 1996, the American Library Association Public Services Heads of Large Research Libraries Discussion Group members (the 30 largest research libraries in North America) were polled regarding areas they considered important for further examination within the current hybrid environment of print and electronic services. The modest agendas noted at the end of each section take into account their comments, and, in the near future, scholars and practitioners should consider pursuing topics revealed from the literature covered in this article.

INFORMATION-SEEKING BEHAVIOR

Researchers and practitioners have long been interested in behavior related to library users' information-seeking activities, and this area remains critical for current and future research. Using content analysis, Heidi Julien summarizes many of these studies in an important recent survey article on information needs and uses literature published from 1990-1994.⁸ Concrete answers to questions regarding

how scholars and students from different disciplines seek information and apply this information to research projects and ultimately to knowledge creation continue to be sought. Additionally, we need to consider more carefully the librarian's role in developing effective information-seeking strategies readily communicated to users. Many studies focus on effectiveness of *existing* information retrieval systems to inform creation of improved systems. These studies are important for investigating general and discipline-oriented information-seeking behavior. More studies are needed to examine, based on users' "natural" information-seeking behavior, whether new systems need to be developed.

Current research in the user behavior area recognizes the rich interdisciplinary nature of methodology that can be applied to this topic from fields such as communication studies, anthropology, and organizational behavior. In addition to the many studies cited by Julien, a recent article by Pamela Sandstrom⁹ examines information-seeking behaviors exhibited by scholarly researchers in such activities as selection of research problems, creation of new knowledge, and achievement of other research and scholarly production goals. Sandstrom draws on optimal foraging theory (derived from evolutionary ecology) for aspects of hunting and gathering to describe and operationalize scholarly communication. She compares strategies such as known-source chaining using citation indexes and subject-heading searching, both labor intensive information foraging skills employed by more independent "loner" scholars to gathering techniques employed by informal exchange and regular reading/scanning. This kind of research focuses on the scholar's "natural" behavior.

The university environment is, by definition, discipline or subject-based. A number of research studies related to public services recognize the importance of examining services and user information-seeking behavior in terms of specific subject orientation. Useful in this regard are topics, theories, and issues generated by other disciplines such as sociology (e.g., sociology of knowledge) and behavioral psychology. Sydney Pierce discusses the concept of subject areas and disciplines in the scholarly community.¹¹ She notes that "disciplines are social institutions within which researchers pursue common goals through similar work, and their boundaries reflect the interests and practices of these

researchers."¹² An understanding of what or who constitutes an "authority" in any given discipline is important for librarians seeking to work collaboratively with teaching faculty in the learning and research activities of the academy, and be skillful in selecting and adding value to information resources for various disciplines.

Humanists' knowledge-seeking behavior has also been addressed in the literature. Stephen Wiberley and William Jones examined humanists' adoption patterns related to information technology. A fundamental supposition in this paper is that the less control over primary evidence the scholar has, the harder it is to utilize information technology (scientists and social scientists have more control over their primary evidence). Wiberley and Jones found that the 11 scholars studied over a period of several years, were slow to adopt various information technology-based research methods and attributed at least some of this slowness to the relatively small percentage of the scholars' primary sources of evidence available through a technological base.¹² Marcia Bates, Deborah Wilde, and Susan Siegfried examined the research practices of humanities scholars in an online environment where visiting scholars at the Getty Center for the History of Art were able to do unlimited online searching. They found that online searching was seen as useful particularly for interdisciplinary research but would not fundamentally change research habits.¹³ More research is needed to determine how humanists actually use information resources, including other electronic and print resources, to support research and teaching.

"Research librarians must also be concerned with how faculty and students in the professions use information."

A number of other useful studies have been conducted related to the user information-seeking behavior in the disciplines. Scientists, in particular, have been the focus of such investigations. Julie Hallmark examined information-seeking behavior of scientists by looking at how they become aware of and gain access to journal articles of interest. Her findings, along with those of other previous studies, provide insight into both the awareness

level of library services and other methods of information seeking that bypass the "traditional" library setting altogether. Given the high cost of scientific journals and other materials, a fuller understanding of these issues is critical if scientific research libraries are to maintain some degree of effectiveness in the future.¹⁴

Adoption of a specific innovation related to information retrieval is the topic of a study by Eileen Abels, Peter Liebscher, and Daniel Denman.¹⁵ Among other things, the researchers found that training for use of networks (e-mail, discussion groups, electronic databases, run programs, and file transfer) needs to be geared to more specific topics instead of focusing on beginner use. Most of the faculty in the science/engineering disciplines covered in this study consider themselves proficient in general use, but are interested in learning more about specific subject areas, tools, or exploration of the use of network services for specific tasks. Additional studies related to public services libraries' role in the diffusion of innovations are needed.

Julie Hurd, Ann Weller, and Karen Curtis studied the impact of new information technologies on the behavior of scientists such as the use of electronic databases, of other libraries' catalogs available of the home institutions online catalog, and of electronic mail and the Internet. The data from these longitudinal studies will be used for planning purposes in acquiring resources and developing services related to these technologies.¹⁶ More research on how online services are used, perhaps differently, by researchers in various fields is important for determining the best format for information resources, informing the structure of user education programs, and developing services tailored to the new formats.

Research librarians must also be concerned with how faculty and students in the professions use information. Gloria Leckie, Karen Pettigrew, and Christian Sylvain developed a model of information-seeking behavior based on engineers, health care professionals, and lawyers. The authors, in developing a model that emphasizes outcomes of information seeking, stress that the conceptualization of why and how a professional seeks information cannot be discovered through examination of sources alone, but involve a greater understanding of the various roles that professionals perform, the environment in which they work, and associated activities that prompt a need for

information.¹⁷ Research should take into account curriculum shifts in the professions such as case based learning in medicine and problem centered learning in engineering. Greater understanding of these issues can result in improved services and facilities planning for libraries whose primary clientele are related to the professions.

The impact of information technology on academic research activity is an aspect of diffusion research. Christine Barry found that existing studies typically examined OPACs or CD-ROMs. She noted that future research should focus on five critical issues including determining users' knowledge of operating variables, complexity of information-seeking processes, the largely implicit nature of research and information skills, the difficulty of detecting impact of new systems on research activity, and the difficulty of adoption of IT-assisted information systems.¹⁸

Another important group of academic library users are university administrators and professional staff. Mary Sprague studied their information-seeking patterns and found that they tend to use print sources, but are willing to pay for accurate and current information in other forms. However, few use online access tools to retrieve data themselves. A number of respondents in

this study noted that they did not need the library for meeting their information needs and, at the same time, they were unaware of services offered that might be useful. She concluded that more marketing of services and improving access to information for this group was essential as well as was increased participation by librarians in campus planning efforts where they could improve data gathering in critical situations.¹⁹ These results underscore the need to design research which truly discovers what sources and services are important to particular information requirements and not just query people to indicate which ones they think they need or would use since they may not be aware of what is available.

Additional research on how library users seek and use information is critical to the development of current and future service models (See Table 1). Such studies can provide important data for the creation of information navigational tools in the Web and online catalog environments. Context-rich studies on how faculty and students with different backgrounds and from different discipline orientations seek information can provide direction on improved integration of services with the teaching and research missions of the university. Most importantly, well designed studies examining user behavior related to

the use of information resources (and not just those found in "traditional" university libraries) will provide a solid basis for building more effective and relevant methods for information research, and instructional services.

USER EDUCATION, INFORMATION LITERACY, AND LEARNING TECHNOLOGIES

University libraries are placing increasing emphasis on activities related to providing educational services for students and faculty. In many institutions user education is considered *the* primary focus for the library. Increasingly, issues relating to the application of new technologies are playing a large role in development of rich learning environments for students and active support mechanisms for integrating critical thinking and effective information-seeking skills into the university curriculum. However, with greater choice of platforms, pedagogical methods, content, and emphasis comes confusion and increased need for direction. Solid research related to user education and the application of learning technologies in the university setting can provide greater direction for practitioners in this area.

Studies are beginning to emerge examining the effectiveness of educational efforts using electronic formats. Carol Hert, Howard Rosenbaum, Samantha Skutnik, and Steven Backs explored the Internet learning process from the learner's perspective. They found that students needed help locating information, using applications, and determining the utility of information found. They also discovered that group training was effective as a method of delivery because students could resolve many of their problems with their colleagues.²⁰ Karen Finlay and Thomas Finlay examined individual differences among librarians related to enhanced use of the Internet. They found, not surprisingly, that those more knowledgeable about the Internet were also more innovative in using it, especially within a supportive environment.²¹ However, much more research needs to be completed related to quality and effectiveness of the application of learning technologies and innovative pedagogy.

A rapidly emerging area within user education is the development of computer-based instructional tools. Joan Cherry, Weijing Yuan, and Marshall Clinton examined the effectiveness of a tutorial for training OPAC users. They found

Table 1
Information-Seeking Behavior: Areas for Further Study

Investigate:

- Information-seeking behavior based on "natural" knowledge navigation as well as behavior using existing systems;
- The nature of information-seeking behavior within the context of multiple formats (e.g., print, electronic, networked, and multimedia);
- Behavior using context rich methodologies focusing on users' total environment (e.g. how undergraduates approach information gathering and analysis versus faculty versus researchers from a variety of disciplines);
- The relationship of library service marketing techniques to effective information-seeking behavior;
- What heightens awareness and, therefore, use of information resources;
- Assumptions about the information-seeking behavior of students and faculty resulting in more fact-based views of behavior;
- How students and faculty adopt technological innovations and implications for diffusion techniques by public services librarians;
- Political and strategic implications of university administrators' information-seeking behavior for libraries;
- Differences between unmediated and mediated information-seeking behavior or a combination of both on user success; and
- Information-seeking behavior of non-library users from various campus constituencies.

Table 2
User Education, Learning Technologies, and
Information Literacy: Areas for Further Study

Investigate:

- What constitutes effective pedagogical methods for library user education programs;
- Impact of learning technologies on the reshaping of academic programs and implications for library user education programs;
- Effectiveness of combinations of learning technologies with other kinds of technological innovations in creating "virtual" instructional programs;
- Definitions of critical thinking skills related to effective location, selection, retrieval, and application of information resources; and
- Effectiveness of integration models for information literacy and critical thinking skills within the university curriculum (e.g., Web-based templates).

no difference in the abilities of participants who received training via the tutorial and those who did not in using the OPAC.²² Studies need to be conducted regarding the effectiveness and use of, for example, self-guided instructional tools available through library Web pages. These tools are incredibly labor intensive and expensive to develop so it is increasingly essential to discover what works and what needs refining.

The development and testing of model educational programs are another important focus for research. The University of Iowa Libraries has implemented a three-year program called TWIST (Teaching With Innovative Style and Technology) whose goal is to develop a model training program on networked information resources and new methods of information delivery. Working with the University of Iowa Communication Studies Department initially, the TWIST program will develop a set of Web-based tutorials that are transferable to other disciplines. Practical applications of carefully planned and evaluated pilot projects such as TWIST can have broad-based practical applications.²³

Heavy reliance on assumptions related to how users learn, particularly undergraduates, can be a barrier to the development of effective teaching methods and content. Perceived behavior is the topic of a study by Gloria Leckie where faculty assumptions about the undergraduate research process were examined. Their assumptions about undergraduates' information-seeking skills and sequential behavior are inaccurate, according to Gloria Leckie, and she proposes the application of a stratified course-integrated approach where students work through a number of stages in identifying and narrowing a topic, understanding and using appropriate

sources as well as learning about scholarly research and its potential application to their projects.²⁴ It is critical for librarians working towards integration of information-seeking skills into the curriculum to understand the gaps between perception and reality by key populations in the academic setting.

All of the areas noted above are really part of the broader area, information literacy. According to Behrens,²⁵ the range of skills and knowledge required for information literacy are expanding to accommodate the growing requirements of effective information seeking and selection. She notes that, although information literacy is regarded as a combined educational and library-oriented issue, most published research is solely in the library and information science area. This implies a major challenge to librarians actively in seeking ways to advance information literacy within the academic curriculum and in other ways, not just as a separate library effort. Collaborative research on the importance of information literacy as critical for lifelong learning will help advance development in this area.

Additional research in these areas will provide clearer direction for effective development of educational programs, especially programs seeking to reach larger audiences found on university campuses (see Table 2). Increased knowledge about workable content and presentation methods for critical thinking skills will have far reaching benefits for life-long learning. Application of research supporting the advancement of information literacy programs may enable public services librarians to forge even more active partnerships with other campus constituencies to enrich the learning and research environment.

Scholarly communication includes a broad array of topics and issues that have a potentially heavy impact on the future structure of academic library services. Research related to scholarly communication methods and pressure points will enable librarians to have a basis in which to plan their role, not only for service provision, but also in knowledge production. Charles Schwartz reviews the potential for structural reform vis-à-vis the scholarly communication process and points out the challenges for a tighter coupling of librarians and scholars in the communication process.²⁶ Not just a collection management concern, scholarly communication implies major service issues also related to effective access to information resources by large communities of students and scholars.

The focus on "knowledge bases" as a way to examine discipline-oriented research needs has been applied, for example, to restructuring services and functions in medical libraries. Richard Lucier discusses knowledge management as a process that "embraces the entire information-transfer cycle, from creation, structuring, and representation of information to its dissemination and use." More research is needed, to inform decisions related to integrating librarians and researchers' expertise into the complete cycle. Lucier contends that these partnerships lead to the creation of highly valuable scientific sources.²⁷ Thus, the public service librarian's current and future role in the cycle should be examined.

An important recent aspect of scholarly communication is the increasing number of journals in electronic format. Stephen Harter and Hak Joon Kim examined the impact of electronic journals on scholarly communication through a study of the behavior of scholars using them at a certain point in 1995. They found that scholars were not yet citing from the journals with roots in traditional disciplines, and most citing was taking place from journals in the fields related to electronic communication.²⁸ However, the situation is likely to change as more journals considered critical in a wide variety of disciplines are published in electronic formats. This shift carries with it changes in ways navigational skills and tools are developed and taught.

Studies are now appearing that deal with user behavior related to newer infor-

Table 3
Scholarly Communication/Digital Resources: Areas for Further Study

Investigate:

- Knowledge bases for different disciplines and how these bases relate to shaping scholarly communication methods;
- Service models appropriate for the “dual” environment of print and digital resources;
- New roles for librarians and information specialists in the creation, structure, and dissemination of information;
- Effective new services related to the digital environment such as electronic text and data centers;
- Service provision within global research and learning communities;
- Partnering with teaching faculty, researchers, and other institutions to identify appropriate architecture and communication structures for digital resources; and
- Use studies related to digital resources including implications for design and training.

mation formats. For example, the April 1996 *Journal of the American Society for Information Science* focused on full-text retrieval. In one particularly relevant article Diane Nahl and Carol Tenopir examined searching behavior of novice end users. Results, though from a limited number of subjects, indicated that the searchers applied a number of innovative uses, in addition to retrieval and print-out of specific articles. These included browsing for background information on a topic, locating articles including certain words for a language class, and serving as intermediary for others needing information. Results also pointed to improvements in the way that the screens can be designed and provide insight into strategies for development of user education programs dealing with full-text retrieval.²⁹

Studies related to all aspects of scholarly communication have potential value for public services librarians as roles and responsibilities shift from passive service providers to more active participants in the creation and dissemination of information on and beyond the campus (see Table 3). Studies related to scholarly communication within multiple formats, especially print, multimedia, and electronic, are important as research libraries try to provide more seamless interfaces for information navigation. Additionally, research needs, such as those being identified by the Digital Library Initiative (DLI), need to be implemented as more digital resource centers carrying heavy service implications are planned and developed.³⁰

USER/LIBRARIAN INTERACTION

While the information-seeking behavior studies previously reviewed generally

look at the user in isolation, research on user/library staff interaction examines the intersection between the users and library staff. For example, many researchers have been interested in studying what is typically known in the literature as the “reference encounter.” Traditionally this has been defined as what occurs when a library patron seeks information from a reference desk (usually in person). Recently these kinds of studies have expanded somewhat to include interactions of all types. Increasingly, studies are needed to identify areas of successful interaction and to provide a greater understanding of how communication processes affect the outcome quality of the interaction.

“Do differences in cognitive abilities between academic librarians and library users affect information retrieval behavior?”

Do differences in cognitive abilities between academic librarians and library users affect information retrieval behavior? Bryce Allen and Gillian Allen studied librarians and library users comparing four cognitive abilities chosen because of their predictive qualities related to successful information retrieval performance. They found that librarians had higher local and verbal comprehension than students, and students exhibited higher perceptual speed. The authors conclude that information retrieval systems should be built with these differences in mind.³¹ Of impor-

tance is the recognition, and need to explore more thoroughly navigational skills needed by library users, and to design service delivery systems accordingly rather than basing the architecture on the way librarians retrieve information.

As with user information-seeking behavior research, other disciplines’ studies can be utilized in interaction studies, particularly communication studies, psychology, and business. Marie Radford applies communication theory to the reference encounter in a recent *Library Quarterly* article.³² She uses critical incidents recalled by library users and librarians to identify dimensions of interpersonal communication related to success or failure in academic reference interactions. Radford correctly notes that, although progress has been made in utilizing more user-based approaches to interaction more research is needed. In particular, the application of relational communication, how the message is conveyed, rather than focusing solely on content, is valuable. The study showed that users reported more incidents centering on relational aspects. Librarians focused on content in their assessment of success or failure of an interaction. She suggests that a primary practical application of her research is more emphasis on interpersonal dynamics incorporating users’ point of view. She also notes areas for future research including the study of nonverbal approachability of librarians and applications of the theory of impression management, how people present themselves and the affect of their presentation on the self esteem of others.

Discipline-based studies have also been used to compare librarians to other professionals. Rachel Naismith looked at the commonalities between physician-patient and librarian-library user interactions through the application of communication models and concluded that a number of strategies would benefit both professional groups in improving the interactions (e.g., limit use of jargon, integrate awareness of clients’ knowledge base, and reduce complexity of explanations).³³ Studies objectifying interactions should help public services librarians determine effective approaches and inform the focus of staff training programs.

Using another approach, Felix Chu looks at the assumptions of reference service in the context of bounded rationality, the notion that rationality is limited because of external factors (e.g., time and human capability), and uses ideas gener-

ated by economist Herbert Simon. His paper provides a framework for understanding the interaction between the librarian and the student in a situation where both do not go through all aspects of rationale decision making to come up with the answer or even to pose the questions. The answer is often the result of a merger of the two frameworks (that of student and that of librarian). And, he concludes that more than one answer will probably often suffice.³⁴ More research on interpersonal contact, both formal and informal between librarians and the various campus constituents, is key to improving communication and quality of interaction.

Research related to interpersonal relationships focuses primarily on physical one-on-one contact. Today increased numbers of reference encounters occur "virtually" without the benefits or disadvantages of face-to-face interaction. Research studies and investigations are beginning to address these environments. The spring 1996 issue of *RQ* focused on electronic mail as a medium for reference interactions. Eileen Abels analyzed e-mail reference interviews conducted by student intermediaries with library users.³⁵ After examining the various approaches to e-mail queries by students she found that the most successful and effective approach is systematic, and concludes that a search request form be used to initiate the reference process assisting clients in providing the most complete information.

An electronic mail study performed at the State of University of New York at Buffalo focused on users asking the questions.³⁶ One important finding was that library users were not enthusiastic about using the phone to contact the reference desk. This reality has been enforced by displeasure with voice mail systems (another area lacking in researching). Also, contrary to librarians' general concern that reference inquiries by e-mail will be less effective, library users in this study indicated satisfaction with the effectiveness. Another finding was that uses were not clustered around times when the libraries were closed, but occurred throughout the day. A key conclusion was that remote access, itself, is useful to users. The article noted some important areas for future research, including comparing patterns of e-mail reference and traditional on-site reference to determine differences and similarities. Results could be used in planning reference services tak-

ing into account different audiences and uses.

Effective librarian/user interaction is of primary importance for public services librarians (see Table 4). Often, we are so focused on providing good service to each user that we lose sight of how the user perceives our behavior and how this affects the success of the encounter. Even with "virtual" interactions librarians need to be concerned about the format, content, and style of each encounter, and the relationship of that encounter to quality and satisfaction. Additionally, more studies on profiles or characteristics of librarians, students, and faculty will provide useful information on how interactions need to be structured or altered. Finally, advancement of research in this area will reinforce user-oriented approaches to services.

MANAGEMENT ISSUES: QUALITY AND SERVICE EFFECTIVENESS

Accountability looms large in the higher education environment of the 1990s. Following suit, academic library administrators have a high interest in demonstrating the quality and effectiveness of services. Budget justification, fund raising, and institutional credibility depend on it. Review of key aspects of the topic can be found in Joseph McDonald and Lynda Micikas' *Academic Libraries: The Dimensions of Their Effectiveness*³⁷ and in the work of Nancy Van House and Thomas Childers.³⁸ Management issues such as effective training and development programs also have a major impact on service programs and should be the focus of research.

Librarians serious about improving services based on user needs require knowledge about appropriate and valid scientific methods in order to assess the needs adequately. For example, Danuta Nitecki examines the application of a diagnostic

tool to measure service quality in a large research quality. She examined the instrument, SERVQUAL, which essentially provides an organized way to examine five dimensions—tangibles, reliability, responsiveness, assurance, and empathy. She found that interpretation of the data gathered by SERVQUAL offered insight into the relative importance of service quality performance and could be used to inform staff training.³⁹ Eileen Abels, Paul Kantor, and Tefko Saracevic looked at applying functional cost analysis to information services in five research libraries. Their study is useful in reviewing costs of current and alternative modes of providing reference and information services.⁴⁰ The existence of a recent ARL workshop devoted solely to user needs assessment and service evaluation points out the widespread application of formal services assessment activity. Hopefully some of these efforts will be published in the literature so that tools can be tested and replicated.

Sometimes mathematical models are applied to effectiveness-based research questions. William Lang and Mary Grigsby recently developed a statistical model to measure the effectiveness of information searching.⁴¹ Most practitioners do not have the background to apply, for example, the researchers' method of tetrachoric correlation to measure efficiency of computerized information searching. The knowledge and expertise required to grasp these mathematical concepts fully is not widespread. Thus, the applicability, at least for the vast majority of practitioners, is questionable unless assisted by a knowledgeable information scientist. One interpretation of this problem is the need for greater understanding of mathematical approaches and real world applications by librarians. Another possible solution is greater collaboration

Table 4
User/Librarian Interaction: Areas for Further Study

Investigate:

- Cognitive and communication styles (similarities and differences) between librarians and users and their effect on service success;
 - The "generation" effect on critical thinking and information processing and implications for service structure and format;
 - Alternative physical and "virtual" communication models between librarians and users in terms of service effectiveness; and
 - Characteristics of librarians and their relationship to service provision in a changing environment.
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Table 5
Management, Quality, and Service Effectiveness Issues:
Areas for Further Study

Investigate:

- Relationship of needs assessment programs to service system innovation and improvement;
- Organizational structure impact on effective service delivery;
- Effects of strategic planning on library-wide public service's performance from a longitudinal perspective;
- Relationship of continuous quality improvement or total quality management programs to improved service delivery;
- Effectiveness of staff development programs for improved performance of public services staff; and
- Relationship between librarians' professional development activities and users' success in information seeking.

between information scientists and practitioners on simplified or alternative ways of presenting mathematical and statistical data so that applications could be more likely.

Selected research has taken place related to specific public services operations as well as to overall library operations. Kenneth Crews looked at various aspects of research related to reference service quality although this article was published in 1988.⁴² Arnold Reisman and Xiaomei Xu examined operations research over the past 25 years in libraries. They discovered few studies in the operations research and management systems area and concluded that more research would be valuable in an environment where the need for verifiable cost effectiveness and resource scarcity are givens (see Table 5).⁴³

Although significant attention is given to a range of management issues related to library services, more studies need to be pursued to provide concrete data related to the way that programs and services are assessed. Also, more research is needed to inform us about effective training and development programs for staff who must carry out current service programs and plan and implement innovative new service models. Organizational considerations also require closer scrutiny in a rigorous way so that libraries have service-based rationales for restructuring or reengineering efforts. Studies related to management and quality will benefit other topics noted in this article since all have a quality/effectiveness aspect to them. Thus, research related to management issues is of high priority.

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RESEARCH APPLICATION AND CREATION: OPPORTUNITIES AND BARRIERS

The current environment holds rich and extensive opportunities to apply lessons learned from research already completed in academic libraries' public services. The intent of most studies and the reality of at least some is, at a minimum, improvement of services as they now exist and inspiration for the development of new or redesigned services. The literature holds much needed information about how people use and apply information. However, it appears that much research does not reach its intended audience and, therefore, is not applied or used in a practical way. Librarians are not keeping up with the expansive universe of relevant literature currently available in print and electronically and may not be aware of many of these studies. And, not enough work is being done to replicate or expand on published studies. Furthermore, if we are to achieve a heightened level of understanding in the many areas of need outlined, even in this brief article, a great deal of new research needs to be undertaken.

Improved support and preparation in skills necessary for solid research efforts are needed. Partnering between practicing librarians, library and information science researchers, and faculty from other disciplines would help in advancing research agendas described here. Clearly, more communication is required to make these partnerships happen and to encourage and motivate those who are excited by the research process. It is hoped that this article will encourage further discussion and movement in advancing research relevant to service improvements in academic libraries.

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