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ABSTRACT

This study explored the perspectives and information behaviors of scholars in the humanities. The following general questions were examined: How do humanities scholars think about, organize, and perform their research? How are information sources used throughout the research process? And, how do electronic information sources affect work practices? In addition, the research also looked at two specific questions related to research library collections and services: What functions and characteristics make one resource better than another? And, how can the traditional role of the library as a repository for printed works be reconciled with the provision of virtual, unallocated resources? Participants were 33 humanities scholars from the University of Illinois at Urbana-Champaign and the University of Chicago. Data were collected by project-based semi-structured interviews, selected case studies, and follow-up semi-structured interviews. Findings are reported in the following areas: (1) ways of reading, including chaining to enable reading; (2) collaborative networking; (3) researching and searching, including collections as capital, many states of primary materials, multitude of sources, access tools for speed and scope, diverse skills and strategies, generic searching problems, and browsing across collections and tools; and (4) ways of writing, including information management, accretion, and refinement, as well as oscillating and overlapping synthesis work. One of the last sections is "Trends: The Evolving Information Environment for Humanists." Methods are appended. (Contains 29 references.) (MES)

Scholarly Work in the Humanities and the Evolving Information Environment

by William S. Brockman, Laura Neumann,
Carole L. Palmer, Tonyia J. Tidline

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Laura Neumann is a usability engineer at Microsoft Corporation. She has a Ph.D. in Library and Information Science from the University of Illinois at Urbana-Champaign and has a background in sociology and cultural anthropology. Her research examines how people use, organize, find, and gather information. As part of the Illinois Digital Library Initiative (1994-1998), she studied how scientists and engineers use journal literature in their work. She also studied how scientists and scholars create and organize their personal collections and work space. Her recent research focuses on how humanities scholars accomplish their work through a number of specific practices. Her dissertation is an analysis of humanities scholars' community of practice and how the community works as an information system. She is interested in finding ways to apply field research and library and information science research to real-world problems in the information technology industry.

Carole L. Palmer, the principal investigator on this research project, is assistant professor at the Graduate School of Library and Information Science at the University of Illinois at Urbana-Champaign. Her background is in academic librarianship, and she teaches in the areas of information seeking and use, information services, and library collections. Her research explores how information systems and services can best support the work of researchers. In addition to her studies of the information environments of humanities scholars, she is investigating how information practices and knowledge structures affect researchers' ability to find and integrate information from multiple fields of study. She is also engaged in projects to develop digital libraries and knowledge discovery systems that support and promote diverse research collaborations. Her recent publications include a series of articles on the information work of interdisciplinary scientists and humanities scholars. Her book, *Work at the Boundaries of Science: Information and the Interdisciplinary Research Process*, will be published in 2002.

Tonyia J. Tidline received her MLS from Kent State University and is now a doctoral candidate at the Graduate School of Library and Information Science at the University of Illinois at Urbana-Champaign. She has a background in public relations in the arts. Her research interests include information seeking and use in context, with emphasis on the information processes involved in making and viewing art. She has published papers on the topics of information overload and community information networks.

Contents

Preface

Academic libraries support and promote research, learning, and cultural engagement. In carrying out this role, they are inherently Janus-faced. Their gaze in one direction is focused on assembling, curating, and supporting the use of scholarly information; in another, it is fixed on tracking what information faculty, students, and lifelong learners actually need and on how and where they prefer to discover, locate, and use it.

In recent years, the rapid development of new technologies and the proliferation of new information services and sources have changed the information environment dramatically. Internet search services such as those offered by Google and Amazon have joined library catalogs, archival finding aids, and online databases as vital guides to scholarly information. Reference linking services that are enabled by organizations such as CrossRef promise to revolutionize again the means by which scholars and students discover and locate the information they need.

Faculty and students now have more outlets for scholarly material than ever before. Books, journal articles, scientific data, sound and video recordings, and even some surrogates for archival and rare materials are available online through numerous services, only some of which are offered by or through academic libraries. Online booksellers offer alternatives to brick-and-mortar outlets and to Interlibrary Loan services, and we may soon see much greater use of print-on-demand services. Scholars and students are now able to draw upon an expanding range of reference services, as Internet gateways and "Ask-a" services supplement formal library reference desks and the less formal peer networks upon which faculty and students continue to draw so heavily.

As the scholarly information environment changes, so do the needs, expectations, and behaviors of users. Assessing and responding to those changes is essential for the academic library so that it may continue in support of the scholarly mission. The authors of this report have formally examined how humanities scholars conduct and collate their research. The study was based on a small sample of scholars; nonetheless, the results are powerfully suggestive of ways in which academic libraries can adapt to and develop in a rapidly changing environment. In particular, the findings emphasize how important it is for libraries to chart their evolutionary course in close consultation with scholarly user communities.

The study leaves little doubt that humanities scholars have adapted well to rapid technical change. It demonstrates the extent to which scholars are able to harness information technologies to tried, tested, and somewhat traditional research functions. Such functions include, for example, keeping abreast of a broad secondary literature that surrounds their fields of inquiry;

locating, acquiring access to, and using primary resources that are relevant to a particular area of investigation; and developing personal libraries that enrich and reinforce their scholarship. This finding may have profound implications for the academic library that feels its own efforts to adapt to new technologies are sometimes constrained by faculty who appear to resist change. Working with research faculty, libraries have an opportunity to learn how better to support scholarship with new technologies while encouraging scholarly adoption and use of those technologies.

Another set of findings is equally potent, even if its precise significance for the library is more difficult to predict. Humanities scholars are used to, and in some cases even prefer, information that is delivered to their desktops. This is especially true with finding aids; humanists expressed a common desire for online material that reveals the holdings of research collections and archives worldwide. Humanists are equally enamored of abstract, indexing, and citation services, and perhaps only slightly less so of online journals. Where primary research materials are concerned, however, the scholars have yet to be convinced by digital editions. The scholar's purview is so typically broad that it defies the narrow boundaries that surround the current generation of digitally reformatted collections.

What lessons might the library draw from this? "Catalog first" might be one. Another lesson might be to emphasize the importance of developing virtually integrated services that allow scholars to search across and use geographically disparate digitally reformatted materials as if they made up a single online collection. Of course, such services require widespread adherence to community-agreed benchmarks that ensure that disparate online collections each attain a minimum degree of persistence and interoperability. Consequently, the study encourages libraries to develop and adopt such common standards as a matter of urgent priority. A third lesson might point to digital collections—or virtual uniform collections—that are developed to support specific research aims and thus are formed in close consultation with the scholars who share these aims.

The study is methodologically innovative in ways that should inform supplemental and follow-up investigation. The authors have drawn conclusions about the research process through extensive observation of selected humanities scholars at work. By encouraging their subjects to think aloud, the authors have developed a rich profile of the research process. They have also developed indications of scholars' behaviors and preferences as these research processes are conducted in a complex information environment. The prose, peppered liberally with quotations that reflect the subjects' trains of thought, provides insight into the excitement, frustrations, complexities, and rewards associated with humanities research today.

This study results from the fruitful cross-fertilization between the scholar concerned with aspects of information science and the librarian concerned with delivering operational information services. Clearly the two parties, as well as the professional communities they represent, benefit substantially from this collaboration.

Daniel Greenstein
Director, Digital Library Federation

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We extend our gratitude first to the scholars whose participation formed the foundation of this project. Without their generous donations of time and their insights into their own work, the project could never have proceeded. We thank the University of Illinois at Urbana-Champaign Campus Research Board, whose funding carried our work through the initial phases of data collection, and the Digital Library Federation, whose funding allowed the research team to continue with data collection and analysis. We are also grateful to those who provided constructive criticism of earlier drafts of the report. In particular, Dan Greenstein's close reading of several drafts and patient encouragement enabled us to explore implications of our findings. Allen Renear offered valuable comments, and Kathlin Smith's careful reading clarified numerous points.

INTRODUCTION

> The comfortable stereotype of humanists as technophobic is no longer accurate. The availability of text and images in electronic form, coupled with the processing power of modern computers, allow the humanist to explore hypotheses and visualize relations that were previously lost in the mass of information sources (Wulf 1995, 48).

While digital resources are becoming more visible in the humanities, use of these resources by scholars remains limited. Humanists have come to rely on computers and electronic communication for some of their daily work, but the use of digital information resources has yet to become routine. Digitization projects are bringing texts, data sources, sound, and images to the scholar's desktop; however, the functions on which research in the humanities depend are neither well understood nor well supported by librarians. Digital libraries are still evolving, and librarians and other information professionals are just beginning to understand and exploit the computer's ability to assist in the humanities research process.

The Scholarly Work in the Humanities Project began in 1999 to examine in detail how humanists work, how they are integrating technology into their work, and how future technologies might offer new opportunities in line with the goals of humanities research. The project was based on the premise that future development of research libraries should be informed by the actual practices and needs of working scholars and that it should take into account the value and impact of the technologies that they have adopted thus far. Decisions about how to build collections and services in research libraries should be more responsive to the disciplines that have historically depended on library and archival resources, and they should take into account the many types of resources and activities involved in the scholarly process. As Okerson (2000, 690) notes, "Our profession should do what our commercial information suppliers are doing: focus on the users, their needs, their wants, and the practices of using information." While we need to continue to collect data on the use

and usability of the resources that libraries already own, it is important to recognize the limits of that type of evaluation. Use statistics and usability tests are important for judging the effectiveness of decisions that have already been made, but they are not good indicators of what is lacking in our current service and collection models. For that, we need a fuller understanding of the use environments of our clientele, particularly those whose work depends most on the future of research libraries.

This report provides a foundation for developing user-based criteria for guiding digital library development by articulating what scholars do in the course of their research and how they depend on information to follow their paths of inquiry and write new texts. Through the analysis of scholars' practices we can conceptualize the type of information environment that would best support their activities and begin to clarify priorities for the development of rich information environments that are responsive to the context of scholarly work.

Present State of Knowledge on Information Use in the Humanities

The process of research in the humanities and the fruits of that research are closely intertwined. In fact, the results of research may be inseparable from the activity of research and the writing of its interpretation: "In the humanities, in a certain sense, *the 'discoveries' of research inhere in the writing* of the ultimate published document" [emphasis in original] (Bates 1996a, 698).

Stone's (1982) foundational review of research on the information needs and uses of humanities scholars asserts that humanists tend to work alone, perform their own literature searches, and rely on browsing. They use a variety of research methods that may be drawn from other disciplines. Their research materials are also diverse and are drawn from a wide variety of types of resources. They rely on books more heavily than on journals. They need retrospective materials and often prefer to use original documents rather than facsimiles. Writing at the dawn of the adoption of computer technology into humanistic research, Stone noted a lack of adequate bibliographic tools and databases and cautioned that "it may be part of the humanistic tradition to be anti-machine" (300). She affirmed that libraries are of great importance to humanities scholars and they are likely to use a variety of libraries. "The links between the subjective views of humanists and librarians and the more objective knowledge provided by research and other forms of systematic analysis are weak," she adds (304). "The literature on the whole does not provide librarians with clear guidelines as to how they should proceed in terms of meeting the needs of humanities scholars," she concludes (306).

Wiberley and Jones (1989) followed the research of 11 scholars through the late 1980s and 1990s. Their findings confirmed the spirit of previous research: the scholars relied heavily on libraries, made particular use of special-collections librarians, and used bibliograph-

ic tools to varying degrees. They noted in particular that "because humanists have well-developed habits for finding information in their specializations, they have little need for current awareness services that inform them of the latest literature in their areas of expertise" (644), and felt that the scholars could have made greater use of the assistance of librarians. The authors' 1994 follow-up noted the scholars' sharply increased use of word processing and online catalogs and limited use of electronic mail. Wiberley and Jones attributed humanists' slow adoption of technology to "the difficulty of analyzing their evidence with readily available software, the rarity of coauthorship, and the abundance of references to the secondary literature in the monographs they read" (506). By the time the third report was published in 2000, use of word processing, online catalogs, and electronic mail was taken for granted. The authors noted the growing importance of primary sources in electronic form but also emphasized humanists' frequent use of obscure sources that are unlikely to be digitized, and concluded that this argues for the continuing importance of libraries' maintenance of printed resources.

The Getty Online Searching Project gave a small group of scholars an opportunity to do an unlimited number of searches of the full-text and bibliographic databases in DIALOG over a two-year period in the early 1990s (Bates, Wilde, and Siegfried 1993; Siegfried, Bates, and Wilde 1993; Bates, Wilde, and Siegfried 1995; Bates 1994; Bates 1996a; Bates 1996b). Bates and her associates noted that the search terms used most heavily by humanists were names, places, titles of works, and other proper nouns; that scholars did not make frequent use of online searching; and that they saw online techniques as supplementing, but not replacing, their usual research methods. Perhaps most telling is Bates's conclusion that scholars in the humanities continued to identify citations to secondary materials via books and articles, reviews, and recommendations from colleagues (1994, 334). She concluded that small, specialized electronic bibliographies would meet scholars' needs better than would large, discipline-oriented databases.

More recent work tends to avoid overstating humanists' use of electronic resources. Manoff (1997) criticizes the Getty study because it focused on DIALOG, and few of its databases were relevant to the needs of humanists at that time. In interviews with humanities faculty members at a major university, Massey-Burzio (1999) found a strong ambivalence among humanists toward technology in general. She found that frustrations with equipment were mingled with complaints that resources available on the Web or through other electronic means were poorly organized. Humanists also reportedly found fault with the instability of electronic texts and were uncomfortable reading long passages on a monitor. Antipathy toward electronic materials focused on the inferior quality of reproduction of printed and visual materials on the screen and on the absence of context that would be readily apparent in a printed publication. The scholars did, however, appreciate the ability to perform word searches.

Weintraub's comments of two decades ago may continue to hold true: "Humanists are probably the most book-bound creatures in the world of scholarship. . . . Their most fundamental work depends on the availability of original texts" (1980, 25). However, Sweetland's assertion that "humanities scholars tend to be uncomfortable with technology" (1992, 786) is no longer the case. Although some of the timidity reported by Bates and Wiberley in the use of electronic resources remains, much academic discourse and administrative communication take place electronically. Few writers prefer a typewriter to a computer, and virtually all library catalogs are at least partially available only electronically (Wiberley and Jones 2000). "Humanities scholars are beginning to make use of new information technologies while continuing to rely heavily on practices and materials that predate digital systems" (Palmer and Neumann forthcoming [b]).

The results presented here update our understanding of how humanities scholars conduct research. They provide a fresh look at the role of information in the practice of scholarship and new insights into how scholars are using technologies and the effect that they are having on their research. In contrast to many previous investigators, we have not focused on derivative elements of scholarly work, such as the types of search terms or information sources favored by scholars. Moreover, we have not aimed to analyze broadly the nature of research throughout the humanities. Instead, we examined scholarly work practices in relation to projects being carried out by a sample of humanities scholars and concentrated on the activities and resources required in their work. We found that this narrowing of scope reinforces the broader conceptions of humanities research, for the issue of context remains paramount. The processes of reading and searching, developing context, and rereading and researching are at the heart of humanities scholarship. They are the means by which we may also explore the role of libraries as providers of texts and other scholarly resources. By identifying salient features of the contemporary work of scholars, we provide benchmarks that research libraries can use to make informed judgments about how to support and enhance the process of scholarship.

PROJECT APPROACH

The study employed three general lines of questioning:

- How do humanities scholars think about, organize, and perform their research?
- How are information sources used throughout the research process?
- How do electronic information sources affect work practices?

In addition, we were interested in two specific questions related to research library collections and services:

- What functions and characteristics make one resource better than another?

- How can the traditional role of the library as a repository for printed works be reconciled with the provision of virtual, unlocated resources?

We designed the study to explore the perspectives and information behaviors of scholars in the humanities. Qualitative methods are the most appropriate means for gathering this type of information about individuals or groups, but the demands of collecting and analyzing such data limit the number of participants that can be included in the sample. Although the study did not aim to fit the criteria of statistical generalizability, we believe that the sample is not unique to the particular time and place in which the research was performed. The scholars and the departments in which they work are typical of those found in large research-oriented universities. The library collections at their home institutions are rich in current and retrospective materials, and the electronic resources available to them are similar to those at most peer universities. To ensure breadth and depth in the study, we employed several methods of data collection, and this triangulation allowed us to base our assertions on a broad and varied set of data. For these reasons, we believe that our results are representative of the research practices of scholars in similar situations.

To assemble a pool of participants, we sent letters of invitation to full-time faculty at the University of Illinois at Urbana-Champaign in the departments of Classics; English; Comparative Literature; Spanish, Italian, and Portuguese; French; German; and Music. From these departments we secured the participation of 29 volunteers. Some participants held joint appointments in Women's Studies and African-American Studies, or had administrative appointments in addition to their faculty responsibilities. We diversified the group of participants by adding four humanities scholars from similar departments at the University of Chicago. The final sample of 33 scholars consisted of 16 full professors, 9 associate professors, and 8 assistant professors. Among their wide-ranging interests were nineteenth-century English poetry and painting; ancient Greek poetry and modern opera production; ancient language translation; madness in fourteenth- and fifteenth-century drama and culture; feminism and German cinema; linguistic analysis and feminist theory; plagiarism and influence during the Renaissance; knowledge production in the ancient world; and early twentieth-century African-American poetry. Among our participants we found little overlap in subject area concentration but much consistency in approaches to research and information seeking and use. It is possible that the individuals who volunteered for the study tended to be more engaged with libraries and electronic resources than is the typical humanities scholar; however, we do not view this as a shortcoming, because our goal was to learn about the variety and importance of information activities in relation to libraries and information systems, not to characterize humanities scholarship as a whole or to profile an ideal scholar.

One of the significant accomplishments of this project was the development and testing of new combinations of qualitative methods for studying scholarly work. Data collection was conducted at two levels. First, we carried out two rounds of semi-structured interviews with all 33 participants. The interviews centered on scholarly activities and the information practices and resources associated with these activities. Second, we conducted more extensive case studies of five of the scholars. The interviews from the larger sample provided a broad perspective from scholars across disciplines. The case studies allowed us to explore finer aspects of work process and technology use. The sequence of data collection techniques applied was as follows:

1. project-based semi-structured interviews
2. selected case studies
   a. search session observation
   b. document analysis and interview
   c. workspace observation
3. follow-up semi-structured interviews

The data gathered included more than 70 separate incidents, each of which lasted at least one hour. The observation sessions usually lasted two hours. Further discussion of our data collection and analysis techniques is provided in the Appendix.

PROJECT FINDINGS

Previous work on the research practices of humanities scholars has differentiated research work from the activities of keeping current and preparing to teach classes. We found, however, that the latter activities are an important complement to research and that the three types or work are, in the perceptions of scholars themselves, inextricable and complementary. Research is a process of contextualization and distillation; its scaffolding develops in collaboration with its structure. Therefore, while our study focused on the research process, the results presented here are not exclusive to research work. In examining the day-to-day practices of our study participants, we documented the activities and resources involved in the overall scope of scholarly work.

We present our findings by highlighting key types of scholarly practices, elaborating on particular activities and the supporting base of information resources for each activity. Quotations taken from interviews with scholars participating in the case studies are interwoven with the description and analysis. The four types of activities identified—reading, networking, researching, and writing—were ongoing and interrelated processes in the work routines of the scholars. For example, reading involves wide reading, iterative reading, and chaining, which rely on libraries and archives, personal collections, and bibliographic lists, respectively. These practices simultaneously depend on the practices and resources involved in networking, researching, and writing. In understanding the scholarly

enterprise that our future libraries will need to sustain, it is necessary to recognize not only the centrality of certain activities and resources but also their interdependence.

Ways of Reading

The commonplace that humanities researchers read widely continues to hold: "The scholar who claims to be current and knowledgeable in a field must have read closely and be intimately familiar with a large number of particular works" (Bates 1996a, 699). Scholars spend a large percentage of their time reading. In fact, they perceive a real danger in not reading. Scholars reported that they do background reading (textbooks), comprehensive reading (everything possible), continual reading (simultaneous and associative), and that they "read around" a period or a person. They read books and related primary material closely—"for detail" and to become "immersed" in their area of inquiry. Scholars read in different media, but rarely read extended texts directly from a computer screen. Even old library catalogs, "the really old, icky, hard to read, nasty catalogs," contain valuable information. Reading should not be thought of as a single or homogeneous activity.

> When I plan my day, or when I decide to read something, that decision is always linked with the exact way I am going to read it. For instance, . . . if I only need to extract certain pieces of specific information, I prop it up next to my computer and type . . . If, on the other hand, I really have to study, learn, and absorb what's in it, I make a photocopy and I write in the margin. And I underline, too. But I almost never underline without writing in the margin. . . Otherwise, I can find myself simply underlining, rather than absorbing. . . .Writing in the margin really helps to go back and put things together. Then, if I am reading whole books, for general knowledge, I'll schedule that for reading at home, after dinner in the living room on my sofa. In fact, I've thought . . . at times when I have a backlog of that kind of reading to do, that I wish I had an easy chair here. There is still another way; sometimes I do prop up a book by the computer and type extensive notes, as opposed to a few things. . . . the equivalent of about this much [gestures] for every page, and then I put a page key in the margin. And I end up with a multipage digest of a book. It'd be 10, 20 pages, or something like that.

As this excerpt demonstrates, note taking is an integral part of reading. Scholars produce extensive marginal notes, annotating photocopies or personal copies or attaching adhesive notes to a text. Each scholar has his or her own way of integrating handwriting and computer work. Most scholars use word processing programs to some degree for digesting or transcribing notes and for sketching out preliminary ideas in conjunction with reading.

Primary materials are read and reread to learn them as well as possible and to be able to set them into context—historical, authorial,

generic, or cultural. Reading can be related to a specific research project: "If Jonson is writing trickster comedies, you read as many trickster comedies as you can to see how he is engaged in it," noted one. Sometimes this setting into context integrates the reading of primary and secondary materials. A scholar who had just edited an edition of a Renaissance play reported, "I tried to read as much as I could—literally, everything that's ever been published about that play, and doing stage history and all the rest of it." On the other hand, reading of primary materials can be done as a general professional activity. One scholar reported, "A lot of what I do involves intensive reading of whatever primary materials have survived from early medieval [cultures]. . . . I don't know if I have a particularly systematic way of doing it, I just collect everything if possible and read through it." The solitary activity of reading limits scholars' use of research assistants. When they do use assistants in the reading process, it is generally to cast a wide net to review relevant secondary literature that the scholar may then read closely.

Wide reading is at the heart of much humanities research. Secondary materials are read for background information, to gain awareness of current research in a field, to identify references to related research, and, most importantly, to find a source of inspiration. Reading is also a means of keeping current. Most scholars whom we interviewed cited several core journals that they read regularly; most maintain personal subscriptions to a limited number of journals. However, many reported being frustrated at their inability to keep up with the plethora of critical and historical writing in their fields of interest, which limits the scope of current awareness reading. Interdisciplinary topics require wider general reading than do those in a single discipline.

Libraries are not generally considered to be places in which reading takes place—except, of course, in collections with restricted circulation, such as archives and rare-book rooms. However, libraries are important for the reviewing and skimming activities involved in wide reading. Scholars use materials in the library and borrow books from it on a regular basis. They value the current journal shelves and the title page services provided by the library. This interest in current awareness speaks to the potential of new types of selective dissemination of information (SDI) services that could allow researchers to request user-defined alerts by title or area of interest in defined time intervals.

Scholars build their own personal libraries to support not only particular projects but also general reading in their field. They buy or make photocopies of materials when possible so they can consult them frequently, mark passages, and write annotations on them. When moving into a new field, they add to their collections, usually concentrating on primary texts. One scholar stated that once the standard editions in a field have been bought, there is no need to buy further; another reported spending $3,000 to $4,000 a year on books. Scholars develop private collections from a need for sheer accessibility (e.g., facsimiles of distant manuscripts) or convenience (photo-

copies that are portable and may be annotated). They take pride in their collections; one referred to his personal library as a "credential catalog." Despite the privacy of such personal collections, there remains a potential role for libraries in helping scholars build their personal collections. For example, on-demand digitization services (applied within fair use standards of copyright law) could take the place of some photocopying or book buying and give scholars more flexibility with the texts that they purchase.

Chaining to Enable Reading

Humanities scholars establish a context for their research by reading widely, and the demand for such a context is what makes footnotes and subject bibliographies important tools for humanities researchers. Bibliographic listings, particularly those found in scholarly books and journals on target topic areas, are the scholar's most trusted tools for developing chains of reading. Scholars perform directed "digging," "raiding," and "mining" of other peoples' bibliographies to shorten research time and keep up in their fields.

In contrast to the prospective direction encouraged by the *Arts and Humanities Citation Index*, scholars characteristically trace references retrospectively. It is not the simple fact of citation that is important but its placement—embedded in the text at the back of a book as part of a list of references, or in a footnote to an item against which the text can be tested. The literature on footnote chaining by humanities scholars largely fails to mention the qualitative evaluation that is integral to this practice: Who wrote the piece? Where was it published? Is it any good? Chaining helps scholars maintain a conceptual network of the field into which they envision their own work being placed.

> You really kind of owe it to the profession to know everything that has been said, and to test your ideas against it, and to give credit to those who have said the same or similar things before, and to explain how you agree or disagree or differ with them. And then also to give the readers of your scholarly article or book some perspective on what others have said. I know a lot about who's strong and who's good, I have really now a good instinct, and I am not interested in 50 items. I am interested in going immediately to the strongest items, which is maybe one reason why I don't use the *MLA Bibliography* when I have a clearly defined project. I have spent my life evaluating not just literary criticism, but history and anthropology, and so . . . either it is because I know the journals that have the best articles, I know the presses that publish the best things, I know the people that are most reputable. And hence, for me, that is . . . why it is very valuable to go to a very strong recent book on the topic. . . . I start with their footnotes that lead to other footnotes. Now this may seem ludicrous, but . . . it actually enables me to skim off the top the very best things.

To supplement the tracking of isolated footnotes, scholars may use a system of triangulation, according to which the same item cited in several distinct sources carries more weight than does a single citation.

> If somebody that you're interested in quotes something and you haven't seen it yet, you go and you find it, and then it quotes something else, and eventually you find that the circles start closing. And then when you realize that the new thing that you've just found is quoting only the old ones that you've read already, you start to realize, "I do have this under my belt now. I'm getting there."

Footnote chasing can be challenging. Some scholars encountered mistakes in references, which are seemingly simple annoyances that can lead to complex problems.

> You know, the weirdest thing about all of this is that the reference that initially sent me to this project was a quotation from Cherry about people going and visiting the monuments in Saint Paul's. And it is supposed to be on page 390. I mean, the modern book says this quotation is supposed to be from Cherry, page 390. And I have looked at it like three times and have gotten really frustrated, because it is clearly not on page 390. So I am going to let that go. Now . . . I need to do the kind of thing that really just takes a lot of time, which is [to] just look for interesting passages, but it's . . . an 800-page book, no a 900-page book. It's a little hard. 390, what would that be a typo for . . . 320? 39 is the introduction. . . . Well, I'll check it though [flips to that page and begins looking in that area]. Hm. 41 [finds it and laughs]. Yeah, 41.

Some situations have simple solutions; others do not. For instance, a scholar was trying to follow a trail of a manuscript that was unavailable to her in any form. She knew that the most definitive source on it was an eighteenth-century catalog. She had seen this catalog and believed that it was in the library's collections, but she could not find any record of it in the card or online catalog. She turned to other catalogs that might have mentioned another source of information on the manuscript, but found that the shelf number cited for the manuscript made no sense in comparison with descriptions of this particular library's manuscript holdings. After two hours of searching, she did not have an answer to her question. The source of her problem could have been an error in the original citation; on the other hand, what she sought could just have been an esoteric text in a relatively unknown collection. But at the point at which the observation ended, she had no way of knowing that. Footnote chasing, a seemingly trivial search strategy, can be anything but trivial.

Bibliographic lists are heavily used by researchers but underused by content providers. Author-created bibliographies are essential pathfinders through the mass of scholarly knowledge and evidence. Scholars work back and forth among multiple bibliographies and

often repeat or recompile the bibliographic work of others. Some scholars are beginning to use quasi-footnote chasing techniques on the Web to trace "mentions" of terms using search engines or searching available full-text documents for keywords. The prominence of chaining behavior points to the potential of reference linking services that allow scholars to move from the reference (whether cited in online book, journal, or database) to the underlying text (if available online), or to the library catalog, OCLC *WorldCat*, and other catalogs to locate a physical copy.

Collaborative Networking

Closely related to footnote chasing is the maintenance of collegial networks for correspondence and collaboration. Previous research in this area has underestimated the importance of collaboration by humanities scholars. Research projects in the social sciences and hard sciences are commonly funded and executed by a team and presented in articles coauthored by team members. By contrast, individuals write virtually all articles and books in the humanities. This has given rise to the impression that humanities scholars work alone. And in some senses, they do. Reading is a solitary activity, as is, generally, searching databases or browsing. Circulation of drafts, presentation of papers at conferences, and sharing of citations and ideas, however, are collaborative enterprises that give a social and collegial dimension to the solitary activity of writing. At times, the dependence of humanities scholars upon their colleagues can approach joint authorship of a publication.

The "grapevine," as one scholar termed it, is crucial for supplying references to recent books or articles that might not yet be indexed or cited. One respondent noted the importance of maintaining contact with colleagues in different disciplinary communities. The scholars discussed various levels of interaction, citing instances in which colleagues had provided extensive comments on drafts of papers, offered suggestions for further avenues of research, or supplied them with bibliographic citations.

> A lot of the mechanisms of vetting are actually also teaching mechanisms, I think. That is, you write a paper for a conference, and they say "I'll accept it if you shorten it," or "I think this is the strongest part of the argument, why don't you bring that out?" and they suggest additional resources. The conference which I go to annually and has made me engage more with [my research] is a very progressive conference in which people circulate papers in advance, and in some cases comment on them in advance. There is some sort of more collaborative movement going on.

Moreover, there is a sense of generational obligation to assist younger scholars.

> The older people who are . . . at my level now were extremely encouraging. They wanted new younger people in the field; they were very supportive. They would help you by helping to place

> your conference paper, by inviting you to a conference, by asking you to publish an article in something they were doing. And of course I am trying to . . . turn around and do that for people who are not as senior as I am right now.

This high level of interaction offers intellectual challenges beyond what one encounters solely in writing or in library research.

> After you give a talk, there are all sorts of questions. And I think the less people know about the field, the more interesting the questions. Because they're sort of challenging. They don't ask you any standard question. They ask you what they find interesting or odd about your work. And that always makes you think of something new, see it in another way.

The rise of e-mail has fostered collaborative practice among humanities scholars. "It's a kind of a sorority," one scholar explained in reference to a closely knit group with whom she regularly communicates. Most scholars reported frequent use of e-mail, although several avoided using it at home, finding that it intrudes on their private lives. They associated it with administrative communication that was more appropriate to the campus office. "I don't need that every day, because e-mail is chatter. I get into chattering doing it, and I like that sometimes, but it's distracting. Why have it in the place where I'm really writing?" asked one. Other factors that limit the use of electronic communications were its occasional inappropriateness for formal communications and the lack of connectivity in some international locations. Nonetheless, the scholars praised the speed of e-mail and the ease with which it enabled them to transfer bodies of text. One participant recounted learning of a scholar at a different institution who was working in a field of interest.

> So I sent him an e-mail right then and there. I found out his e-mail address by using the Internet, and I told him what I have told you. I said, "there must be some discipline of linguistics that concerns itself with this." And he wrote back that same day and he said, "You are absolutely right. I am attaching a file with a 500-item bibliography in the field of intonational phonology."

E-mail is also favored for frequent back-and-forth exchanges, such as collaborative authorship, or for communication with publishers during editing of a publication.

We found less enthusiasm for electronic discussion lists. Scholars relied on such lists more to gain current awareness of broad aspects of their fields or to identify other scholars working in the same field rather than to track particular topics or publications. "There is an awful lot of chaff in addition to the kernels of substance," asserted one. Another agreed, but felt that belonging to a discussion list that included nonacademics could offer a sense of what people in the larger world were thinking. "But I wouldn't go to that listserv to find out what people are doing in scholarship, necessarily. I would use a journal, go to a conference, that kind of thing." Others were more

strident in their criticism: "They tend to get very petty and caught up in stupid details. . . . It can be quicksand to your time and energy," complained one. Several, including one moderator of his own discussion list, disdained the practice of posting factual or bibliographical queries, feeling that scholars should do their own research.

It is not clear how libraries can assist in scholarly collaboration, because e-mail and discussion lists tend to take place in personal networks that derive from association within particular scholarly communities. Nonetheless, the fact that humanities scholars do work together in closely defined areas among like-minded specialists is an argument for supporting the development of customized subject portals tailored to those communities and for broadening services beyond the virtual campus to the larger community of those who share a similar discourse.

Researching and Searching

Humanists define the word "research" in different ways; in fact, a single person will use the term in varying senses, depending upon the circumstances. On the one hand, research is seen as an activity that precedes writing. In this case, information seeking is primarily purposive, although it may have an exploratory element. It is the thing that takes humanists to libraries and that defines what one does in a library—a literature search, a search for factual or historical information, or a search for primary sources and archival texts. The same sense can be used to refer to research done at home with a personal library or a database. In a second sense, research blends into writing. This occurs when it incorporates the deliberation on primary and secondary texts into the final product. This sense is often used in an institutional setting to distinguish the work that faculty humanists do beyond their teaching. The subsections that follow report on important facets of researching in the first sense of the term.

Collections as Capital

When the scholars in our study spoke of libraries, they conceived of them first as collections and second as places in which research—in the purposive sense—takes place. The scholars prized the collections at the institutions with which they were affiliated; several talked about them as the envy of their colleagues elsewhere. Such collections drew them to their universities and enable them to pursue high-level research. All the scholars reported using local libraries to some degree. They turn to the library after their personal collections and describe themselves as "heavy users," "knowing their way around," or using the library in "great bursts." Computers and online access are distinct in their minds from collections, which encompass documents that may range from musical manuscripts to CD-ROMs to newspapers to novels. The digital materials that are available are not "prized" in the same way as are print collections. The print collection is invaluable because of its physical volume and its potential for browsing.

Although a few participants said that they did not perform historical research, all used particular historically based library collections in some part of their work. The local availability of relevant primary source collections is surprisingly good for many and "hit or miss" for others. With some exceptions, primary sources are intimately linked with the collections in which they are held. Despite numerous projects under way to post finding aids to special collections on the Web, none of the scholars reported having consulted them. Scholars identified collections through colleagues' suggestions or by making informed guesses as to where collections of relevance might be located and then corresponding with the presumed repository. This was true more often in regard to European than to American institutions, because the former are more likely to be of regional significance. One scholar specifically cited the use of *World of Learning* to identify likely repositories.

The strong collections of manuscript catalogs and guides to archives are a critical foundation for the research that scholars conduct at distant sites. Scholars must travel regularly to work with materials in numerous libraries, archives, and museums. "If everyone goes to this collection, then I know I must go," asserted one scholar. National and international travel was about equal across the group, and prominent U.S. research collections and regional and national libraries abroad were frequently mentioned destinations. Researchers dedicate weeks, summers, and entire sabbaticals to site visits. Trips can add up to years for some projects, as scholars return to the same collections multiple times to fill in gaps or extend the original project. Most trips require extensive preparation, but some are relatively undefined. As one scholar noted, "I don't know exactly what's there, but I know there will be something."

Research at distant collections is hard intellectual work, and it can be expensive and mundane. While many scholars talked about the necessity of handling and studying original documents, some have grown weary of the travel and tedious work. As one participant stated, "You know, there is nothing like being there. But don't get me wrong. It's not easy." They spend time collecting piles of photocopies or "suitcases full of microfilm," that constitute their "work for the year." At some institutions there may be restrictions on access and use of materials. The "red tape" involved in working with special collections is "tiring," and library hours and staff shortages limit what can be accomplished in a day's work, especially in European libraries. Laptop computers and handheld devices have been a boon to those who use archives with restrictions on photocopying.

Surely this is an area in which libraries could provide better service. Moreover, there is evidence that the scholars underestimate what could be done on their behalf by librarians and staff at distant libraries. That scholars will continue to travel to collections is a given, but the digital services that libraries can provide to support distance research can be substantial. The Digital Library Federation's registry of digital projects and the continued production of Web-based finding aids are areas of development that can reinforce the

role of libraries and their subject specialists in the online environment. Scholars' slow adaptation to using finding aids, noted above, could be mitigated by a different approach to online finding aids: "People research and read differently on the Web than they do when sitting with an illustrated catalog or finding aid at a reading desk. Descriptive practices need to be reconceptualized for presentation online" (Smith 2001, 20).

Many States of Primary Materials

Humanities scholars are interpreters of documents—documents that may include videotapes or musical scores or clay tablets. Primary materials are the focus of many humanists' work; secondary texts inform that work. Throughout the research process, scholars maintain a conceptual and procedural distinction between primary and secondary texts, though this distinction may blur from time to time. Traditional searches in libraries or databases can venture in a variety of directions: biographical, historical, critical, textual, or archival. These avenues can cross each other and traverse the theoretical boundary between secondary and primary sources.

Although most primary sources are in text form, other types of materials, such as films, paintings, and various artifacts, are central for some scholars. Even when research is focused on one particular text, the questions asked of this text often require interaction with an array of other primary works—bodies of literature published during a given time period or a trail of scattered manuscripts, letters, diaries, and archival records. Some projects require that the scholar examine original documents firsthand. The case study interviews revealed the excitement, and physical rigor, of digging through piles looking for evidence.

> Archival work is the . . . grunge work of research. . . I was looking at court accounts, and looking for payments to people, to artists, for having built a stage or having designed a costume—that kind of thing. And then, Christian IV's letters, thankfully, they're quite well indexed, for names, not necessarily for things. So I intensely studied his letters over a time period where I thought there would be preparations for this wedding . . . and kind of hooked into it that way. But the archival sources I used in here . . . that was just real—in German you'd say *Sitzfleisch*. Sitting on your rear and digging through stuff. And some of it was real ugly. And some of these things have been, well, not bound together, but put together in these big piles. And I remember one time, sitting in the Royal Archives, and a guy said "Oh, there's a wash basin around the corner. You can use it." And I thought, why is he thinking I need to use a wash basin? So I walked around the corner and they have a mirror and I had dirt balls on my face from reading—you know, dust balls, because people hadn't been reading these court accounts for a long time, and I'd gotten dirt all over my face!

Some projects permit the use of facsimiles or microfilm. The scholars whom we studied used commercially available microfilm sets as well as custom-made and archival films. One researcher expressed dissatisfaction with the illogical sequence of titles in large microfilm sets that, he maintained, are driven by the demands of mass production rather than by those of intellectual content. We heard ambivalent comments regarding microfilm. Some scholars complained of the erratic quality of microform readers, the poor quality of films, and the difficulties in reading microfilmed newspapers and other complicated images. Those whose research involved details of printing history, such as bindings, watermarks, or marginal notes in various colors of ink, were disappointed with the quality of most microfilm copies. But others also expressed appreciation for the portability and reproducibility of microfilms, which enabled research on texts that would be otherwise inaccessible for follow-up consultation. A surprising find was that several of the scholars owned their own microfilm readers and regularly borrowed films or maintained their own small collections.

At the time interviews were performed, the scholars all had access to a number of full-text databases published by Chadwyck-Healey, the Women Writers Online project from Brown University, and full-text journals from Project Muse and JSTOR. Few scholars mentioned using these full-text resources, but those who did were extremely pleased with them. They particularly appreciated products that provided access to primary sources. In addition to the use made of the large commercial databases, a few scholars recounted using small, noncommercial Web-based projects devoted to individual authors.

The thoroughness with which searching is possible across any of the corpora covered by these databases means that once they have been recognized by a group of researchers in a particular field, their use is obligatory. This suggests that in developing their own online information services (e.g., user profiling, online reference) and information sources (e.g., finding aids, digitized special collections), digital libraries need to work with individual senior scholars from representative research communities. Libraries that can cooperate on projects being done by established figures in the academic fields are likely to be more effective than those that do not. In addition, promoting full-text resources will require more than simply announcing their availability.

Information professionals generally feel that resources made available electronically will become more visible, and therefore more widely used, than other resources. Our observations indicated that this already happens with the existing differences in accessibility. Upon finally locating a needed resource after some 15 minutes of searching in the online catalog, and then seeing that it was on microfilm, a respondent exclaimed "Oh, [expletive], it's microfilm! But I will put it down and see if I have any other ideas." He continued searching until he was able to find what he needed in print. Another scholar spent a good deal of time trying to find a less-optimal re-

source in order not to have to wait for an item to be brought out of storage. Media and ease of access will continue to be key factors in how scholars choose materials.

Scholars also spend a good deal of time locating and exploring items that may not be central to the project at hand but that are potentially useful or that might promote creative thinking. In one observation, a scholar worked in a rare-book room, where she spent several hours poring over a late-Renaissance text about funeral statuary. She skimmed through the volume and made notes about what portions of the text to photocopy from the microfilm version. She did not yet have a clear idea of how she would use the text in her project, and she was watching for things of general interest to her.

> Oh, wow. This is really interesting [laughs]. But completely irrelevant. I'll have to copy it, anyway. . . . You know he's very nervous about the fact that all of these monuments are from the era when everyone was Catholic. I already told you that. But he is talking here about these monks who abuse men's wives. What is that doing in here? I don't know, but we'll have to take a copy of that if we have enough change. It connects to *Measure for Measure*, another play by Shakespeare. Okay, that was a little bit of an aside.

In working through this book, this scholar had at least three sessions reviewing it in the rare-book room and two sessions using a microfilm machine to photocopy pages from it. In a document-analysis interview focused on the paper produced during this research project, she explained the importance of going through primary sources carefully and using historical materials, even if they are peripheral to the project under way.

> I was just interested in it. I mean, it is later than the text I am writing about. In strictly historicist terms, it is not relevant. But it just seemed really interesting. I was just amazed that this book existed. So, there, I think, you can put that at the opposite side from the "Oh, let's slap in some Foucault to let him explain it for me." But the [rare book] thing, that is more like a real scholarly thing to me.

Multitude of Sources

Because humanistic expression exists in biographical, bibliographical, social, and historical contexts, research in any of the humanities may employ a wide variety of types of sources. Although scholars in the interviews described a range of resources upon which they drew, our document analyses showed that in terms of type, age, and subject, even more varied sorts of materials were being used. For example, one scholar talked about standard items such as monographs, journal articles, and edited volumes, but also cited an edited collection of letters, seventeenth-century festival books, a seventeenth-century school yearbook, entries in dictionaries and encyclopedias, a library catalog, and paintings and etchings. It was surprising to see

the many types of sources that were brought together in a single paper and the broad range of subjects and disciplines represented, even in the case of scholars who did not appear to be particularly interdisciplinary in their research. Such wide-ranging research implies a need for libraries to do much more to assemble information resources in a way that allows scholars to search across them, rather than digging down into separate, exclusive "silos"—some accessed through the online public access catalog (OPAC), others through a database, and still others through finding aids.

The scholars used their sources in a broad range of ways. An item could be used as "data"—a central item that is analyzed in the text. Referenced works might also be "evidence"—items used to support or show agreement for a scholar's analysis. Even an unsuccessful search may be noted as negative evidence. Sources used as exemplars were also common. Other uses of citations were to note facts (e.g., used to structure a time line), to point to items that contained further information on the topic, and to indicate the source for a framework of analysis or theory. The case-study document-analysis interviews also identified "absences"—materials that were used but not explicitly referenced or sources that the scholar would have liked to use. When asked what was essential to the paper, one scholar explained that she had never directly cited a book that had provided inspiration for her paper.

> And one of those actually got cut out of the footnotes, which is bad, and that is a book by Jonathan Bate called *Shakespeare and Ovid*. At the point I was just cheating to make the length limit. That reference will go back in. So that was a really central book that didn't show up.

Scholars talked about leads or work that could not be pursued because of time limitations.

> But, again, there are some cases where, if you want to write an article about something, you can't just go reedit all of Alcuin in order to enable it. And I wouldn't have the time, anyway. With world enough and time, I would have gotten the manuscripts of Alcuin's texts and checked them against the printed edition just to make sure there was never any variation, but . . .

The trade-offs made as a result of limitations of time and space are not usually visible in the articles themselves, yet they are choices that are made all of the time.

We found that the truism that humanities scholars prefer books to journals is an oversimplification at best; in fact, it may be downright wrong. The specific uses that scholars in the humanities make of books, as opposed to journals, are not easily defined; the distinction that some have seen among formats is less vital than is the distinction among activities. Many browse through both bookshelves and periodical shelves to keep current or gain exposure to new ideas, and the type of analysis performed on primary texts is by no means reserved for books. In some cases, the age of historical secondary

sources allows them to be considered as primary. As more texts become available in electronic form, searches and readings that have been common in the analysis of primary texts may be frequently applied to secondary materials.

Access Tools for Speed and Scope

The humanists in our study were seldom seeking a definable fact. Often they sought a critical perspective that they might find relevant or stimulating. They take for granted the electronic versions of standard reference works, such as indexes to periodicals and bibliographies of primary works and online library catalogs. All scholars use some combination of these sources regularly. Most prefer electronic tools because of the speed and ease of searching.

All the scholars whom we interviewed were familiar to some degree with the primary indexing and abstracting sources in their fields, such as the *MLA International Bibliography, RILM Abstracts of Music Literature,* or the *International Medieval Bibliography.* The *National Union Catalog* and OCLC *WorldCat* were mentioned several times for two particular applications. One application was to locate specific items in other libraries; the other was to get a general sense of the previous secondary literature when engaging in research in an unfamiliar field. Three scholars talked about *Voice of the Shuttle* as the Web site that provided them with the most valuable links. Six cited Amazon.com as an important resource for developing basic bibliographies and for keeping up with new publications—even more scholars cited *WorldCat.* Other reference works, printed and electronic, that were mentioned included *American National Biography, Arts and Humanities Citation Index, Humanities Index, Bibliography of British History, Dictionary of National Biography, New Grove Dictionary of Music,* and *Westlaw.*

Beyond the major tools, the group made reference to few specific titles. Among the traditional kinds of reference works mentioned were concordances, primary bibliographies, dictionaries, quotation books, and directories. Most important to our scholars were specialized resources in their subfields, such as an index to first lines of manuscript Latin texts. Our data also verify what previous research has asserted about the age of scholarly resources: older materials continue to be used and valued by humanities scholars.

Frequently, the scholars cited titles erroneously or confused titles; one, for example, made reference to the "*Humanities Citation Index.*" Such minor errors are common among librarians as well. It matters little when one heads for a familiar shelf or a set of volumes of the same color to which one has become accustomed. In an online environment, however, these secondary, nonbibliographic clues are absent. Several scholars reported that when online searches were mediated by librarians, it sometimes was not apparent which database they were searching, or how. Such an issue points to the need for landmarks that can help guide scholars to appropriate materials and for "smart" search tools that use thesauri to expand search terms or that can build profiles to help users with searches based on their known behaviors and preferences.

Diverse Skills and Strategies

Paralleling the different levels of certainty in using databases was a disparity among the scholars in searching abilities. Some were quite conscious, or self-conscious, about what they perceived as a lack of searching skills. Some recited the widely held perception that skills in using electronic resources are generationally based; however, it seemed to us (though we never asked scholars' ages) that age had little to do with skill. Few of the scholars knew thoroughly the scope and functions of the important abstracting and indexing services in their fields. For instance, several had confidence that a search of the *MLA International Bibliography* would offer them comprehensive coverage of the secondary literature on a given topic in literature, but seemed unaware of that resource's scanty coverage in such areas as edited volumes of essays or book reviews. They understandably encountered problems when they attempted to employ search strategies appropriate to one source when searching another. For example, in describing the online catalog of his university's library, one scholar reported that searching phrases enclosed in quotation marks was more effective than searching keywords, but he was unaware that the particular catalog did not include the former feature. There is an important role for libraries and database producers in ironing out the heterogeneity of user interfaces to provide common visual and functional features across a range of information sources and services.

In contrast to the general level of confusion about the scope and function of systems, we observed the humanists using a variety of sophisticated searching techniques, such as applying the subject headings assigned to a catalog record to locate related works, limiting online searches to fields, or using Boolean combinations. The scholars perceived online searching as a transaction radically distinct from the interactive approach to research through footnotes and reading, in which context is evident. A few scholars used both the printed and online versions of the *MLA Bibliography*. One consulted the online version to make a "pass to see what's out there," but preferred the printed volumes for "in-depth" research. Another appreciated the importance of serendipity—the "associational work" possible with the printed version: "With the electronic version your eye can't mistakenly. . . fall on something that turns out to be relevant in an odd way," said one interviewee. Searching for unindexed terms stymied at least one scholar who was unaware of how to consult the thesaurus. "I had heard of the work, but I couldn't get the *MLA Bibliography* to give it to me." Some scholars view searching as a mechanical procedure—more than one used the phrase "plugging in" to describe online searching, as if the process were akin to inserting a coin into a slot machine in hope of hitting the jackpot.

All of the scholars used online catalogs, which are now the only means of access into modern collections at research libraries. Nonetheless, some retained an appreciation for the card catalogs and book catalogs that may include supplementary information, such as full titles of older books or notes on the occasion for composition of a particular text. One pointed out the constraints that standardization

and modern spelling exert for searching electronic catalogs and noted the other inefficiencies of searching through records online.

> With old spelling texts, frankly, the electronic catalog is a real problem, because if you don't spell it right, the computer won't show it to you. So I much prefer the card catalog for some kinds of searching. I much prefer the card catalog for searches of holdings of literary authors who have a vast corpus. It is much easier to flip through the cards, especially if there is some kind of subheading, than it is to scroll through everything ten titles at a time. I find that electronic searching is not, in fact, always the most efficient kind of searching.

Despite their rigidity of sequence, card catalogs following standard American Library Association rules and using local adaptations could make numerous accommodations for variant spellings (e.g., interfiling "Mac," Mc," and "M," providing cross-references from ligatured letters, alphabetizing umlauted vowels as if they were followed by an "e"). Electronic databases could make similar adaptations when demanded by their contents.

The search observations revealed how different search resources are used together as scholars carry out and experiment with multiple overlapping tasks. One scholar demonstrated his ability to use many different tools and his understanding of the vast resources at his disposal. He followed one particular query through a variety of different resources and tools and, at the same time, addressed other information needs based on the tools he was using. The scholar began with the use of the general card catalog, moved to several national bibliographies, a catalog of Latin church manuscripts in Italy, then to another catalog of church manuscripts in France. The next move was to the local online catalog and, when that proved unfruitful, to a search of the online catalog for the entire library consortium. This was followed by returning to reference works, this time one describing the cataloging and classifications of various Italian libraries. He next moved back to a group of reference works covering Latin church manuscripts in Italian libraries. Finally, he used a CD-ROM system that covers literature on Latin manuscripts from many fields. Over the course of the search, he was looking for many different items relating to one project in particular. He did not find most of the specific items he was looking for, but as the search progressed he collected several references to materials that were of general interest or that related to other projects.

Another universal practice was the handwriting of notes to keep track of searching needs, activities, and results as research proceeded. Scholars did this at the same time they were sending search results to themselves by e-mail or printing out records and search histories. They kept the handwritten notes together and frequently reviewed them. Scholars could clearly benefit from tools that could automatically track searches and link them to OPAC records or to full text, lessening their back-and-forth activity and making note taking more efficient.

Generic Searching Problems

Scholars did not have problems relating to specific systems; instead, their difficulties were common to virtually any electronic searching tool. They struggled with such issues as sources covered by a database, chronological coverage, function of keyword searches, phrasing of searches, and (in Web-based systems) what is "clickable." They had a vague understanding at best of how electronic systems worked together. These problems are not new to anyone designing search systems, but, for even search-savvy scholars, good solutions have yet to be found.

Electronic systems that we observed used were largely the local and consortial online catalogs, the *MLA International Bibliography*, and *WorldCat*. Aside from these, we observed a single incidence each of the use of a CD-ROM system and of a foreign library's online catalog. That was the full extent of the use of electronic systems observed in the 14 hours spent on search observations. During the period of time that the search observations took place, a new, telnet-based OPAC was put in place at one library as a precursor to a graphical Web interface that was being phased in. Additionally, a new function for searching a consortial group of libraries was put into place. For these reasons, it is understandable that there was some confusion in the use of the search systems. One scholar who encountered the new Web interface for the first time was baffled by it—its look and feel called into question everything he knew about how to use an online catalog. Frustrated with the Web interface, he reverted to the telnet interface, with which he felt more comfortable.

The scholars were making an effort to sort things out for themselves, short of reading the manuals. They tried multiple spellings and commands to test out language and function issues, and re-ran searches varying small elements to see changes in the results. One scholar was using the new CD-ROM version of the *International Medieval Bibliography*:

> Oh! Now there's one. Now why didn't it give me that? It should have. See, there's a problem here. The search I ran should have got this, right? Now I am trying to figure out why it wouldn't. That doesn't make any sense. [Interviewer: So "keyword" doesn't search the entire record?] That would be very stupid. So I am going to try with the number after it.

The scholar mentioned above who felt lost in the Web interface did not give up. After successfully performing his searches in the old system, he went back to the Web version, ran the same searches, and compared the results. This sort of controlled experimentation indicates that scholars are working to gain an understanding of what is happening. The process, however, takes time and might not create a full or accurate picture of how a resource functions or the extent of its capabilities. Although a number of online vendors construct "Help" screens that apply to searches across different databases, the difficulties observed point out the need for online help in individual systems. The help screens should be written in a language that typi-

cal users understand or that may be tailored to the needs of scholars in different subjects or at different levels of experience. While databases (e.g., *MLA International Bibliography*) produced by professional societies may be constructed to answer the needs of their primary audiences, online vendors of such systems frequently fail to offer researchers easy access to data regarding scope, abbreviations, and editorial policy that one might find in a printed version.

In most observations, scholars used their limited knowledge of the search systems and their extensive knowledge of the search topics to milk every bit of information available. For example, when trying to find a specific reprint of an older work, one scholar expressed frustration with the inconsistencies in the catalog records, such as either noting or not noting the editor and the reprint status. She used her knowledge of the history of the online catalog to deduce that since the record was particularly brief, it was probably entered before the online system moved to full bibliographic records. She was correct in her guess that this was not the edition she wanted. Eventually she found the correct edition through a search of the consortial catalog at another institution.

In contrast to the use of electronic search systems, scholars had few problems with the specialized printed resources we watched them use. These resources included the Wing *Short-Title Catalogue*, several national biographies, indexes of English printers during the Renaissance, several manuscript catalogs, collection guides, national bibliographies, archival catalogs, and subject bibliographies. The scholars' use of these tools was much more varied than was their use of the electronic resources. It was clear that these scholars were familiar with many of these tools by the way they located them (most often by sight) and answered questions pertaining to, for example, the coverage of a particular national bibliography. They found answers quickly by flipping to correct sections in the volumes. Points of confusion related to the topic being researched, rather than to how the tool worked or what it was doing. One simple conclusion that could be made from these comparisons is that it takes time for any researcher to develop facility with a particular tool.

Browsing Across Collections and Tools

Related to collections and searching is scholars' fondness for browsing as a form of information gathering and stimulation, whether in connection with an established project or a new one. Browsing is fundamental to humanities scholars. One scholar praised browsing for its role in making "connections that you wouldn't make normally through databases . . . [or] through any kind of purposive search." Others referred to the activity as "rooting" or "poking around." Browsing is commonly associated with physical library collections or with printed materials: "You should always be able to walk inside [the stacks], I think. Look at the books and make the weird sort of accidental connections that come from looking at the spines of books." Several voiced a perception of generational differences in the practice of browsing.

> I can't understand how our graduate students and some of our younger faculty just sit at computer terminals and only summon up books that way and have somebody else deliver their books to them. On the other hand, I am not good at using all of the Web.

This statement contradicts our findings that virtually all of the scholars reported browsing in the library to be of value to them in their work. As a metaphor for browsing, the spider web has become particularly apt in recent years, and one of our scholars likened browsing directly to Internet use.

> I have found going on the Web to be not only useful in locating sources, but . . . equivalent to just roaming around the stacks and looking for titles of books and stumbling upon things that you never knew you'd find. And . . . following other peoples' links is really the same thing as I was doing . . . [in] following other people's footnotes and references.

Ways of Writing

Scholars read, follow citation paths, examine primary sources, maintain files of notes, and investigate leads through indexes, catalogs, and Web resources. Questions evolve through the perusal of resources. Their writing integrates these activities, both as the fruit of their research and as the trunk and limbs that embody the research. While research in the purposive sense of the term brings to the scholar's attention texts and facts, it is interpreting or structuring these pieces that creates meaning. Interpretation is key in any field. In the humanities, however, meaning is inherent in the rhetorical qualities of the writing and is inextricable from a text: though not purely subjective, it is strongly so. One of the scholars whom we interviewed went so far as to refer to writing as "play," emphasizing the creativity and subjectivity of the "work" of writing.

Information Management, Accretion, and Refinement

Part of the synthesis that goes into writing is mechanical—for example, integrating physically the notes and marked-up photocopies that have been accumulated. Scholars' organization of their materials follows their research. A few told of having used file cards for decades and continuing to use them, praising their portability and simplicity. At least two scholars employed a bibliographic program to manage citations; one of them reported having developed a database of more than 20,000 entries. Others rely on specialized applications for their areas of research, such as programs for speech analysis, musical instrument digital interface (MIDI) programs for storing and manipulating musical materials, and scanners in conjunction with optical character recognition programs to produce their own searchable texts. One scholar maintains an archive of his work on a writable compact disk. Even these kinds of preliminary, personal files are valuable intellectual property, and a library or an archive interested in safeguarding such assets might consider supplying repositories

for scholars' personal files that, given the rapid upgrading of hardware and software, are at risk.

One scholar described his method of organizing his ideas as a process of writing short pieces of text that he stored as word processing files and then organizing and amalgamating them into more extended pieces. Others reported a more deliberative process: "I spend a long time ruminating before I sit down and write, write, write," reported one. Another commented on the important progress made in the middle of the writing process: "[Synthesis] happens in that space between the reading and the note taking and the writing, because it's what precipitates the writing, the need to write. The ability to write. The possibility of writing. And then it happens again, sometimes, on a revision." In terms of developing new ideas, some considered revision as important as is reading or pure research.

We questioned the scholars about the process of discovery that accompanies research and writing. Most found discoveries to be fortuitous, though dependent upon extensive preliminary work.

> I don't think that . . . in the humanities those breakthrough things are moments. They're more like a six-month period . . . where I start to see how things fit together in a way that I didn't before, because so many different texts have to be pulled together.

All the scholars to whom we spoke employed word processing to some degree, though some preferred to write preliminary drafts by hand. We found that the facile editing afforded by word processing programs is one of the outstanding influences of technology upon the work of humanists. From the organization of files, to the maintaining of personal databases, to the employment of automatic citation-formatting programs, to the simple mechanics of cutting and pasting of text, word processing has achieved for humanists an unparalleled fluidity of technique. One scholar was quite explicit about the process.

> I find the computer helps me hugely in writing. I used to try to write by hand on yellow sheets rather than doing typewritten drafts. I found I was obsessional about erasing and writing in, and rewriting. I wrote very badly at that stage. The computer is a much more fluid mechanism. I usually come back and start each day by rewriting what I had done the day before. That gets me back into it, mentally. I make editorial changes, I improve my sentences, add points that need to be expanded, and so on.

Few scholars prepared outlines in advance of writing; most described in some way a process of accretion and editing promoted by word processing.

Word processing facilitates the mutability of texts that is common in writing in the humanities. Several scholars spoke of preparing different versions of papers for different purposes, casting the same material in slightly different molds for different conferences, or expanding upon a conference paper to produce an article. One scholar noted the common practice among humanists of proposing papers

to be presented at conferences before an idea has been fleshed out. Several spoke about the honing of a paper that occurs through presenting it at a succession of conferences and responding to the constructive criticism of colleagues. With word processing, texts can be readily altered as topics and questions evolve. Most of the scholars reported that during the years that go into preparation of a book, they publish individual chapters separately as articles to achieve consistent, collective evaluation through the comments of peers.

Scholars create their texts in electronic form, but they are uncertain about publishing in digital media. Despite the promise of electronic publication, all the scholars intended that their work be published in traditional printed venues. Many had reservations about the reliability and longevity of electronic publishing. A desire to publish with prestigious publishers or journals and to retain ownership of their work was prevalent. One scholar, wary of the Internet's reputation for frequent violations of copyright law, warned, "Nobody's going to venture a really good idea on the Internet, because then it's in the public domain and they don't get credit for it." One scholar, however, could foresee that an alternative medium for publication might offer a more direct means of engaging her readers.

> I'm not as convinced that writing articles in professional journals is an effective way of stimulating those [discovery] moments for other people, but, you know, I would like to believe that working on the Web and designing learning spaces and resource spaces on the Web for these type of projects might allow me to stimulate those moments for other people.

The potential of preprint and reprint services in the humanities is unknown, but libraries could capitalize on unpublished assets in ways that promote research, teaching, and learning. Libraries can safeguard these materials and mobilize them, through approaches such as the Open Archives Initiative, to allow locally managed repositories to be aggregated with distant collections to represent richer and deeper collections, or through higher-level services that may be developed elsewhere.

Oscillating and Overlapping Synthesis Work

Although we were studying seasoned scholars, their writing processes were often not smooth. Even after they gathered resources and identified the general ideas to be discussed, putting together a paper was not simple. This scholar described one important paper with which she had struggled for some time.

> This one was a little more difficult, because, as I said, I am trying to link these other projects with the map-making to these pageants and the wedding and so forth. And to what I see as another project of national identity. And so, I remember reorganizing the paper several times after I'd written it for flow, the order of the topics. . . . I remember finding that kind of hard, to make sure that I had it in an order that was readable. It didn't

> flow at first, I thought. But I think it flows better in the published version.

This paper was a complex mix of archival data and evidence combined with postmodern theory about identity formation. It further evolved into the central argument of this scholar's book. This process of reorganization or reconfiguration of pieces of a paper can be key to sorting out what a paper says. Choices about what is to be included and excluded can radically change the character of the argument.

In the observation sessions, we saw how activities were woven in the course of typical daily work and got a contextual sense of real workflow. Almost all the scholars were near the end of a writing project; they were editing final drafts, filling in footnotes, and making minor changes, rather than creating new texts. They performed a few quick searches in the course of adding these final touches to their work. As they did, the scholars also took notes (by hand and on the computer) about further work to be done or things to remember on papers at hand. E-mail was used throughout, which reinforces the observation we have made earlier that tasks are carried out in a complex matrix made up of competing priorities of convenience, interest, and timing. As scholars were finishing one document, they made notes of ideas they had to expand for another publication. They ran searches to fill in gaps in their bibliography or quickly checked something, communicated with friends in other places who were helping them gather information, or kept up with departmental discussions about administrative issues.

During the final stages of writing and editing, scholars must have most of the materials on hand for the paper being written. Scholars in the study had accumulated library books, photocopies, microfilms, journal articles, handwritten notes, and annotated drafts, and they kept these materials nearby as they revised. They frequently referred to other papers they had written to find information needed in their drafts, such as full citations to materials being referred to, the particular wordings of quotes being reused, or page number information for specific arguments. In fact, they frequently turned to their own earlier publications, rather than to the original works, explaining that the needed information was easier to find in their own writing.

Because all the case-study observations took place near the end of the composition process, we could see the nearly completed documents giving rise to subsequent projects. Each scholar had his or her own way of taking pieces of an idea or passages that were excised for editorial reasons and putting these into new files or documents to feed into new papers.

> So what I have here is—this is like my guilt paper. These are the things I didn't take care of. These are things that came up during the final revision, but I was about to mail it off and just decided I couldn't deal with, in terms of time.

Ideas that would not fit into the almost-finished manuscript were also filed for future use.

> And then I've got all sorts of notes on this and that that are relevant, so I start tossing in ideas. It is like ideas that people used to use a piece of paper for or a note card or a napkin—that they have scribbled something . . . I've got papers I've delivered on the topic now. I've done a couple in the last few months, and I've got another one I am doing in two weeks in California. So I've put all of that together.

TRENDS: THE EVOLVING INFORMATION ENVIRONMENT FOR HUMANISTS

In the preface of its catalog of emerging information technology resources in the humanities, the American Council of Learned Societies identified numerous obstacles to humanities scholars' adoption of technologies (Pavliscak, Ross, and Henry 1997). Some of these obstacles are determined by institutional constraints (e.g., funding or physical plant design), and some are related to characteristics of the humanities that resist technological adaptation (e.g., a perceived "insularity of the humanities community vis-à-vis technological advances in other disciplines" [2]). We found this not to be the case; instead, we observed a wide adoption of technology by humanists in ways that are enhancing many of their traditional work practices. Their reservations regarding technology—and there are several—are specific and rooted in the inability of present technological capabilities to address research activities unique to the humanities. There are no equivalents in the humanities to the large, technology-driven advancements in the sciences; however, developments in text encoding and multimedia promise to change significantly the materials and methods of certain kinds of humanities research.

Following are some of the ways in which humanities scholars have incorporated technology into their work practices:

- Electronic mail fosters collaboration among scholars. This phenomenon is not limited to the humanities, of course. What is noteworthy is the way in which this collaboration contradicts the stereotype of the solitary scholar. We have found a wide appreciation among humanists for the way in which electronic mail and, to a lesser degree, electronic discussion lists can foster a vibrant interchange that parallels the energy that can occur at professional conferences. Although some of the participants in our study expressed a disdain for discussion lists, all were at least familiar with them.
- Bibliographic programs, MIDI, and voice-recognition devices provide new ways of organizing personal resources. Selected scholars had used particular applications to develop sophisticated systems for storing data and notes and for archiving personal files.
- Remote access to library catalogs and finding aids integrates travel efficiently into scholars' programs of research. Scholars are able

to find out what is available—and not available—much more easily than in the past. The consultation of directories and exchange of letters of inquiry could take months as a scholar was planning a trip to other libraries. OPACs and Web-mounted finding aids to special collections can allow scholars to locate specific documents and identify unknown documents more easily.

- Word processing has altered the technique of writing, simplifying the revision of drafts and the preparation of texts.
- Views on the quality and utility of Web resources vary greatly. The Web is used more for teaching than for research.
- Text markup allows texts to be treated as research tools in themselves. That is, digital texts lend themselves to much more than retrieval and reading; they can help scholars do other kinds of research work. The limited use that humanities scholars have made thus far of encoded texts is not due to an insularity in their point of view but to the unavailability of the needed texts and to unrealized possibilities of new opportunities for research offered through encoding.
- Full-text resources offer three clear benefits: (1) the simple provision of otherwise scarce texts; (2) keyword or Boolean searches either to identify particular motifs or words or to establish their absence in certain texts; and (3) the ability to collate different editions of the same work for variants or to identify editorial changes.

There is a sense among humanities scholars, except for those who work almost exclusively with obscure primary sources, that use of technology makes the research process easier, faster, and more up-to-date. Although many scholars no longer have exclusive confidence in their "tried-and-trusted" methods, only a few are turning to libraries for assistance. Some scholars voiced criticism about present-day technologies:

- The lack of uniformity among systems complicates the process of searching and the manipulation of results. Although some individuals have developed sufficient aptitude in online searching to move—either confidently, or at least experimentally—between systems, they found that keeping track of the variety of search protocols used by various online vendors for identical tasks was frustrating. The variety of ways in which operators and commands are used is difficult for experienced professionals to keep up with, let alone scholars who may search even a familiar system only sporadically and may be dissuaded from trying others because of the eccentricities in using the systems. Similarly, the variety of formats in which comparable results such as bibliographic citations are represented complicates what should be a simple task of copying results into a word processor or bibliographic program.
- Choices of editions used in full-text databases may not be the best for particular scholars. Copyright laws have constrained publishers from making available recent editions of full-text works in favor of editions that, though of lesser accuracy, are in the public domain.

- Features to which scholars have become accustomed in word processing programs are lacking in some databases. Needs identified by users of electronic text corpora included provision of a "notepad" in the program for taking one's own notes or for temporary copying of text; "wildcard" searching to identify variant spellings (particularly important with older texts); and provision for side-by-side comparison of texts.
- Concerns about the archival stability of digital resources have made scholars wary of electronic publication and of the maintenance of personal files in electronic form. The potential instability of electronic texts threatens humanists' fundamental assumptions about the reliability of their resources.
- A sense of the economy of scale is driving many of the full-text and indexing products that are available in the humanities. The encyclopedic point of view has its uses; nonetheless, in commercial products the marginal and the esoteric are frequently ignored in favor of the canonical and the influential. Research in the humanities, as shown in the projects cited by some of our participants, frequently focuses on lesser known primary documents or unusual approaches to secondary resources.

Looking at the various uses of references in the texts written by the scholars in our study reinforced our earlier observation concerning the difficulty of distinguishing primary from secondary texts. Primary documents are often defined as nonderivative documents, those that are analyzed in a study. However, our scholars were analyzing all sorts of derivative documents. In at least two situations, secondary texts could be considered as primary texts. In the first, the text being discussed could be unobtainable, either because of distance or because it had been destroyed or was missing. Substituted for the text itself would be other documentation about the text, analyses of similar or related texts, or even documentation of documentation. Second, the now-common "metacritical," contextually rich studies of the meaning and understanding of texts over time uses the analysis of many kinds of "secondary" research about a text. This evidence of the multiple roles of texts was strengthened through the interviews based upon the document analyses.

Electronic texts are potentially the most radical element in the construction of the evolving technology environment in the humanities. The explosion of electronic texts promises to alter the way in which scholars conceive of the activity of research in a way paralleled only by similarly major developments in the history of printing—the paperback revolution of the post-World War II years, the development of mechanized printing in the nineteenth century, and the invention of moveable type in the fifteenth century. Opinions of the cultural significance of electronic texts vary widely, from the unfettered enthusiasm with which Lanham (1993) extols their virtues as a new rhetoric that could reenergize Western culture, to the pessimism of Birkerts (1994), who bemoans the dissolution of culture threatened by a decline in the reading of printed books. Humanities

scholarship has only begun to integrate electronic text. One telling example showed up clearly in the uncertainty among scholars about how to cite electronic text corpora: is the user consulting a database or the primary text reproduced therein? Encoding is both a form of textual interpretation and a format of presentation of a text. This raises issues beyond those of establishing a standard citation format and cuts to the core of the assumed distinction between primary and secondary sources. Scholarly practice will continue to evolve in deliberate and interesting ways as software advances such as encoding develop in conjunction with new hardware such as handheld devices.

CONCLUSION

Technology has enhanced scholarship in a number of important ways. We have seen an acceleration of certain processes and an extension of inquiry into a larger base of resources. For instance, searching is now faster and easier and can cover larger bodies of text. Scholars can work with and consult more material and better verify ideas or claims. Writing, revising, and reworking texts, and getting feedback from colleagues throughout the various stages of a project, are standard rhythms of work that thrive on the ubiquity of computers and telecommunications.

At the same time, the digital shift has sometimes produced confusion. Scholars feel less in control of their searching, chaining, and browsing practices. They are not totally confident in their ability to make digital resources work for them. It is rarely clear to them what protocols exist across systems, what a particular database contains, or what it can do.

Each research library will need to weigh how it can respond to its constituencies, but we believe some concerted action is also due. As James Marchand, a technologically sophisticated humanist, has stated, "At present, the individual scholar who wishes to make use of the tremendous possibilities the computer offers him must collect his own base of CD-ROMs, electronic texts, bibliographical software, presentation software and hardware, font software, and OCR software. All of this is managed at present at most universities by a system of unorganized gurus. It ought to be done by the library" (1994, 145). Research libraries have generally not expanded their notion of service to respond to this position; as a result, they may be falling short of their mission. A blithe comment from one of our respondents is worth reflection: "I want everything at my fingertips." This may seem like an unattainable goal; nonetheless, it is the job of researchers and information professionals to figure out the best ways to make progress toward this end. "Everything," in this scholar's words, does not really mean everything; it means those things that make a difference in the scholar's ability to do work well. What it means to do work well can be studied, understood, and responded to in the information systems we develop.

Palmer (2000) has suggested that we should shift away from *critical* mass as a defining element of digital research libraries toward a

principle of *contextual* mass—an approach that bases criteria for development on essential features of scholarly work. She replaces the word "critical" with "contextual" to de-emphasize the notion of size and to set priorities for what scholars use and do—the resources and activities that are central to a scholarly community. The application of the concept of contextual mass requires analysis of the layers of work and materials that surround the research process, which can then be followed by principled decisions on development based on the sources and tools that would be most likely to infuse research. For example, an effective contextual mass might consist of a small digital library collection of secondary and reference texts, services that support personal acquisition and markup of key primary texts, and sophisticated functions for recording and tracking the intellectual work involved in rereading the acquired texts. This study provides a foundation for developing preliminary high-level criteria for contextual mass in the humanities. Our ongoing research in this area will further articulate the concept of contextual mass and define attributes for creating context in digital libraries. On the basis of the results presented here, we will need to address how to provide proximity and collocation in the digital realm and to facilitate scholarly browsing. We will also need to determine how contextual mass differs for various intellectual communities. For example, there will be important differences between scholars such as those studied here, who rely heavily on primary source material, and social scientists, who collect and work with social indicator data or perform meta-analysis. For humanities scholars, we can now see how certain kinds of initiatives could make real headway in supporting research practices. Two starting points might be (1) the development of collection criteria that reflect scholars' research strategies and paths of inquiry and that, in turn, attach less importance to opportunistic collection of large corpora, and (2) services that assist in the development and federation of scholars' personal or localized collections and that tap and mobilize the communal expertise of users and collectors of texts.

This research was based on the premise that digital and hybrid libraries can improve their collections, systems, and services by learning more about the information environments of their most dedicated users. The actual patterns of research practice offer valid guidelines for research library development because they disclose the context of the scholarly process and the essential role of texts in that process. Humanities scholars understand the primacy of their interactions with texts. Their position is well stated by Jerome McGann (1998), a renowned scholar of romantic poetry and editorial theory who has recently become involved in text encoding. He writes, "Textual studies is ground zero of everything we do. We read, we write, we think in a textual condition. Because that is true, the new information and media technologies go to the core of our work. As humane scholars we should not leave the development of these tools, which includes their introduction into our institutions, to administrators, systems analysts, and electronic engineers" (609). Research libraries should be no less devoted to the development of new technologies that really work for scholars.

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APPENDIX: Methods

In earlier work (Palmer and Neumann forthcoming [a]), two of the authors of this report learned how difficult it is to get rich, descriptive details on the scholarly work processes, particularly those that involve the use of technology. People do not talk readily about tools that they take for granted or activities that are intellectual in nature. Work done with information resources is difficult to describe, and scholars look at their own techniques as specific to them and uninteresting to others. We dealt with these roadblocks in this study by focusing on scholars' recent projects and combining a strategic mix of data collection techniques.

We followed the tenets of theoretical sampling, which specify that data should be collected on the basis of their ability to inform the central research questions. We also used the literature to assist in making connections between research questions and data collection and analysis (Glaser and Strauss 1967; Burgess 1984; Lincoln and Guba 1985). This tactic is based on an interest in process rather than in distribution or generalizability (Becker 1998). Applying these guidelines, we assembled a purposeful sample of humanities scholars drawn largely from the full-time faculty at the University of Illinois at Urbana-Champaign. We diversified the sample by adding participants from the University of Chicago.

Interviews were conducted with each of the 33 participants on at least two different occasions. The multiple interviews made it possible to build a richer understanding of their work than would have been possible with a single interview across the sample. We added a longitudinal dimension to some of our discussions by asking, during a subsequent interview, how research problems described in an earlier interview had been addressed. In the initial interviews, conducted between January and May 1999, we asked scholars to describe their recent work and to discuss the information processes involved in a specific recent project: what materials were used; how the materials were gathered; and how the interviewee worked through the project, including the final stages of writing. During follow-up interviews, conducted six to nine months later, we examined how projects had progressed, sought clarification on questions asked during the initial interviews, and investigated further the use of digital resources. The multiple-interview approach allowed us to customize the subsequent interviews and to obtain a fuller picture of the scholars' research practices. The project-oriented interview approach was successful in helping participants think about and describe their work in specific terms.

Case studies of five of the scholars provided more coverage of a longer period of time and allowed us to check on the fullness of the picture of research presented in the interviews. Case-study participants were selected with points of comparability in mind, yet each addressed distinct research problems. All observations were documented through field notes; when possible, we made audio recordings of scholars' comments. Because of differences in availability of the participants, each case varied in the amount and kinds of data collected, but each case included data from interviews, observations, and document analysis.

Two kinds of observations were performed for the case studies. The first type was devoted to a search session. Scholars were asked to search for materials they needed at that particular time. We deliberately left the search methods, topics, and venues up to the scholars. These sessions included everything from watching a scholar perform a database or a Web search to observing participants using rare books. The sessions almost always included a visit to the library. At the library, scholars used a wide variety of materials and tools, including electronic databases, card catalogs, reference works, manuscripts, microfilm readers, and general book and journal collections. We were able to document the relationship between the systems and resources in the library, the ways in which scholars carried out their tasks, the factors that influenced the search process, and the difficulties they encountered.

The second type of observation was carried out in the scholars' personal workspaces. We observed research work in progress and recorded how the scholars organized and used the materials they kept there. Scholars were asked to "think aloud" as they worked. Although we attempted to remain unobtrusive, interviewers did interrupt with questions when scholars' activities became unclear. We made notes and sketches of the offices and the organization of books and other belongings on shelves, in files and piles around the room, and in files and bookmarks on computers.

As part of the case studies, we also developed a document-analysis procedure for identifying the variety of resources a scholar draws upon and the ways these materials are applied in the creation of new texts. Using selected texts, we compiled a description of each item referenced by the author. Figure 1 provides a few sample lines from one document-analysis table.

The document-analysis process was then followed by a "critical incident"-style interview on the production of the paper analyzed. These interviews helped us fill in explanations for patterns we saw in the papers and obtain stories about the intellectual and physical work that went into the text. The interviews were also a useful mechanism for learning how the scholars identified and located specific sources and the attributes and relative significance they attached to them, and for gaining a sense of why they were valued. Moreover, we were able to document how the scholars constructed the arguments in the written piece, how they envisioned their audiences, and how they viewed the importance of their work.

In summary, the observations, document analyses, and critical incident interviews involved in the case studies allowed intensive investigation of humanities scholarly work from multiple perspectives. By combining data from these case studies with information from the broader sets of interviews, our study provides a rich picture of scholarly work.

Source #	Type	Format	Date	Subject/ Content	Role in Text	Location of Reference
1	Film		1935	Comedy	Focus of paper, cited throughout	Introduction
2	Collection of association records	Case files	Undated	Internal documents	Historical grounding	Footnote
3	Newspaper column		1943	Book review	Evidence–reception of book/author; quoted	Footnote
4	Book		1990	Film studies	Context	Footnote
5	Journal article		1991	Film studies	Background; self-citation	Footnote
6	Legal code	Reprinted in film encyclopedia (1980)	1930	Law	Example	Footnote
7	Dissertation		1990		Explanatory; self-citation	Footnote
8	Memorandum	Internal corporate record; part of case file	1936	Administrative; editorial oversight	Evidence; quoted	Footnote

Fig. 1. Document-Analysis Table

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