Time and Technology: A Decade-Long Look at Humanists' Use of Electronic Information Technology

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A ten-year study of a group of humanists reveals that temporal factors had a significant impact on their adoption of electronic information technology. This article identifies and describes four types of time that influence humanists' behavior. Three are types of time spent: anticipated start-up time, actual start-up time, and use time; the fourth is time of life, that is, the stage of a scholar's project or career. Because the content of electronic resources is closely related to use of time, this article also discusses how content affects whether a scholar adopts an electronic resource. Librarians who are sensitive to humanists' temporal considerations can better help them utilize technology.

Online catalogs, word processing, electronic mail, bibliographic databases, statistical software, and spreadsheets all date from the 1970s. Electronic mailing lists appeared in the 1980s, and the World Wide Web began in the 1990s.[1] In 1987, when the authors first interviewed a group of eleven humanists about their use of libraries, information, and technology, all had used online catalogs and seven did word processing, but only two used e-mail. None had searched a bibliographic database, used statistical software, constructed a spreadsheet, or subscribed to an electronic mailing list. And, of course, none had used the Web.[2] The careers of these eleven coincide with the revolution in electronic information technology, so all the innovations it has brought have been available to them, some for many years. What they have chosen to utilize and how they have done so helps librarians better understand one of their largest user groups.

Conversations with humanists reveal several perspectives on electronic information technology. A recurring theme is the way that temporal factors affect what scholars do. Earlier research also has found time to be an important influence on the adoption of electronic information technology. This article addresses the question: How do temporal considerations influence the use of electronic information technology by humanists? It explains four different conceptions of time that librarians can use to understand how humanists interact with electronic information technology. The article then looks at different information technologies and shows how consid-

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erations of time influence humanists' use of them. Also, because content is often fundamentally related to decisions humanists make about expenditure of time with electronic information technology, this article addresses issues of content of digital sources in the humanities. Before beginning discussion of time and technologies, it is necessary to characterize the group of scholars studied, say something about the salient characteristics of their environment (that is, their home campus), and describe the conversations the authors had with them.

The Scholars Studied

At the time the authors conducted the bulk of the conversations on which this report is based (1997–1998), the ten humanists first interviewed in 1987–1988 were in mid- to late career. The median number of years since obtaining the Ph.D. was twenty-seven and the average was twenty-five, with a range of fifteen to thirty-four years. Because this was an older group and because it is widely assumed that younger scholars adopt electronic information technology more readily than older ones, the authors also spoke with three scholars who had received their Ph.D.s fewer than seven years earlier to learn how they might differ from the senior scholars.

The net result is that humanists work alone more than other kinds of scholars do.

In all, then, the authors talked with thirteen scholars (one of the original eleven had left the institution and was unavailable for interview). The ten from the original cohort came from six departments: anthropology (two), English (three), history (two), history of art (one), political science (one), and women's studies (one). All now were full professors. The three younger scholars were assistant professors in English, German, and history. All thirteen were humanists in that their work fit within the definition of the humanities developed in the course of this research: those fields of scholarship that strive to reconstruct, describe, and interpret the activities and accomplishments of men and women by establishing and studying documents and artifacts created by those men and women. The political scientist and both anthropologists, to be sure, had collected some evidence themselves through fieldwork and interviews as other social scientists do. But the bulk of the sources they used were documents and artifacts created by the men and women whom they were studying.

The senior faculty among the thirteen continue to be productive scholars, although some are active in academic administration and scholarship rather than scholarship alone, as had characterized all but one of them in 1987–1988. Also, some are taking advantage of their senior, tenured status to devote themselves to a big project, where they defer publication of parts of their work with the aim of presenting their findings in one major book. Those with significant administrative commitments and those deferring publication differ from most humanists of lower academic rank who must devote themselves primarily to scholarship and produce publications in the near term in order to achieve tenure. On the other hand, significant groups of senior humanists probably fit the patterns the senior fellows cut.

The university where all these scholars work is a Carnegie Research University I, in a major American city that is extremely rich in library resources. Their home campus has been the site of significant innovation in humanities computing. Both H-Net and the Text Encoding Initiative originated at the scholars' institution. And there is significant strength of the campus's humanists by more traditional measures. This is perhaps best seen in twenty-five National Endowment for the Humanities or Guggenheim fellowship winners between 1987 and 1999. At the center of the humanities community is an institute for the humanities where the authors met all the scholars described here. In the mid-1990s, the university made sure that all faculty members had a high-quality computer in their offices. This was especially significant

for humanists because in the late 1980s and early 1990s, although almost all had at least one computer, usually they had purchased their computer(s) themselves and some had only one machine, which was in their homes.

The interviews followed a set of questions given to the scholars in advance of the meeting with them. The scholars were asked to focus on the past five years and the project(s) they pursued during that time. The authors inquired about the sources they used; their reliance on personal and institutional libraries; the audiences they write for; coauthorship; attendance at scholarly meetings; and advice they sought from other scholars. In particular, they were asked about the use of electronic information technology, including electronic library resources, computer hardware and software, networks, and the effects of libraries and information technology on their disciplines.

The Humanist's Time and Electronic Information Technologies

Others who have studied how humanists work have noted the importance of time to these scholars. Deborah Lines Andersen, in a longitudinal (1992–1998) study of ninety-four historians found that lack of time and "fear of lost productivity through time spent learning and using electronic technologies" were among the primary barriers to use of electronic information access technologies.[3] In Debora Shaw and Charles H. Davis's 1994 survey of members of the Modern Language Association, respondents reported that one of their greatest needs was more time to learn to use computer-based tools.[4] Similarly, in a 1992 survey of faculty at the University Centers (Albany, Binghamton, Buffalo, and Stony Brook) of the State University of New York, Judith A. Adams and Sharon C. Bonk found that lack of time was a notable obstacle to use of electronic information and resources for humanists and other scholars.[5]

Warren Thorngate has written important analyses of the role of time in the life of scholars.[6] Among other things, he pointed out that although one can save time by doing two tasks simultaneously, this is frequently impossible (lecturing to a class and attending a committee meeting); often difficult (comprehending Derrida while breathing); and sometimes counterproductive (crashing a car while talking on a cell phone). It could be argued that the more paradigmatic a discipline, the more possible it is for a scholar to do things simultaneously through surrogates. This is because paradigms allow operationalization of tasks that can be divided and delegated. One indication of this is that fields that are more paradigmatic—those in the sciences and, to a lesser extent, those in the social sciences—have a higher incidence of coauthorship.[7] As Anthony Biglan wrote, "the paradigm permits research problems to be efficiently broken into subproblems with confidence that the results for each part can be reintegrated."[8] For example, agreed-upon procedures in computer modeling of plant growth allow biosystems engineers to delegate work to undergraduates.

Similarly, operationalized demographic categories, such as birth and death, allow social scientists to assign some aspects of data gathering and analysis to research assistants. In contrast, it would be highly unconventional for a literary scholar to ask research assistants to deconstruct scenes from *King Lear* and then insert those deconstructions into an overall interpretation of the play. Likewise, interpretation of works of art is so individualistic that it would be difficult for four or even two coauthors to agree on an analysis of a particular artist's work.

The net result is that humanists work alone more than other kinds of scholars do. Certainly, humanists consult with other humanists to obtain references to the literature and primary sources and to learn what their colleagues are doing. They also turn to humanists and intelligent laypersons as sounding boards for new ideas and as readers for drafts of their writing.[9] And a few have research assistants. But these aides largely fetch and photocopy. Ultimately, as rates of coauthorship show, the

humanist, more than any other kind of scholar, works alone.[10] Recent data support previous studies. In the 1997 volumes of *PMLA* and *Art Bulletin*, 98 percent of articles have a single author; in the 1997 volumes of the *American Sociological Review* and the *American Journal of Political Science*, 38 percent have single authors.

The scholars the authors talked to use word processing for everything: class notes, correspondence, research notes, and manuscripts intended for publication.

In the humanities, then, there is less room than in the sciences and social sciences for the delegation of work and, therefore, the use of surrogates to employ various forms of electronic information technology. Use of such technology can continue to grow in the sciences and social sciences with little or no change in the practices of scholars themselves because these scholars can delegate its use to assistants. But, in the humanities, the behavior of humanists themselves must change to increase the use of technology. Consequently, if librarians are going to increase electronic information technology use in the humanities, they are going to have to help humanists adopt and incorporate different technologies into their personal routines. Humanists' thinking about how technologies impinge on their time is crucial to their deciding whether to begin—and to continue—to use them. Librarians who want to help humanists take advantage of electronic information technology can benefit from a discussion of how temporal considerations affect what humanists do.

The humanists interviewed for this study spoke in several ways of the relationships of their time to use of electronic information technology. Although there are variations in what each said, essentially they talked about four types of time. Three of these types were similar in that they involved work time, that is, time the scholars expended. The fourth kind of time is not a matter of time spent but, rather, time of life—that is, historical time, referring to where scholars are in their careers and their research projects and how this position along the temporal continuum influences their attitudes toward, and use of, electronic information technology. *Anticipated start-up time* is the time that scholars estimate they will spend to use a system, source, or service. For example, if scholars consider the possibility of installing a computer at home, the amount of time they estimate installation will take is anticipated start-up time. *Actual start-up time* is the time required to set up equipment and systems and to learn to use them. For example, scholars who acquire a new computer for their homes expend time to set up this computer and learn its unfamiliar features. The time needed to set up and learn new features is actual start-up time. *Use time* is the time that scholars spend actually using a system, source, or service they have learned. Thus, if scholars spend three hours at home using their computers to write and send e-mail, those three hours are use time. Finally, *time of life,* or stage of research or career, means the stage or point in time in a particular project or a scholar's career. Where scholars are in their research projects or their careers influences their desire or need for systems, sources, or services and how they anticipate start-up time, respond to actual start-up time, and expend use time. For example, toward the end of work on a book, a scholar will be so focused on finishing, he or she may refuse to consider learning new electronic information technologies. On the other hand, at the start of a new project, the scholar may be eager to try new technologies in the hope that he or she will save time in the long run. These contrasting attitudes reflect differences in time of life, or stage of career or project. The next section of this article describes the interviewees' use of electronic information technology in terms of these four kinds of time.

Interviewees' Time and Use of Electronic Information Technologies

Given that, with few exceptions, they worked alone and depended almost entirely on themselves, the humanists inter-

viewed for this study showed great sensitivity to use of their time. They were conscious of when they worked most effectively and, whenever possible, structured their schedules accordingly. One recognized that he needed variety in his work and looked forward to administrative assignments after he had spent a large block of time devoted primarily to research. Another observed that, unlike most productive scholars, he was ineffective when he tried to do research or write for just a few minutes at a time.[11] When he took administrative assignments, as he did frequently, he always negotiated for one weekday off for research. By devoting ten or more hours on that day and on Saturday to research, he was able to advance his scholarship. Both these scholars, then, structured their lives so that they were fresh and focused and used developments in their careers to maximize their productivity during use time.

The desire to make the most of use time has made word processing the most heavily and widely used electronic information technology. With two exceptions, over the past decade, the senior humanists in the cohort had incorporated word processing into their lives more fully than any other technology. The two exceptions had the equipment at hand, in one case for five years and in the other case more recently, but they had used it selectively, relying more on memory typewriters. These two had been so comfortable and effective with other means that they anticipated that start-up time with word processing would be so great that it would decrease their productivity. For the other eight senior humanists, however, word processing was absolutely essential, an old friend, and was used wherever possible. And junior scholars took it completely for granted. Because word processing is so well established, the authors did not hear as many enthusiastic testimonials in tenth-year interviews as they did in initial and fifth-year interviews, when the joy of discovery was still fresh. What the authors did hear was evidence that there is no nostalgia for pencil, pen, or typewriter. Scholars use word processing because they are convinced it reduces use time for composition and revision. Because the write-up is crucial in the humanities and humanists prize good prose, the ability to revise easily is particularly important. The scholars the authors talked to use word processing for everything: class notes, correspondence, research notes, and manuscripts intended for publication. Use in these areas has been largely stable over the past five years, except for taking research notes. Here, the gradual acquisition of laptop computers has enabled almost all the scholars whose research is with archives, manuscript, or other noncirculating materials to word process their notes. After they begin to do this, they tend to move away from writing notes on paper, although some print their notes in addition to maintaining them on disk.

The second most heavily used electronic information technology is e-mail. Junior scholars took e-mail, as they did word processing, completely for granted. For senior scholars, however, e-mail seems to have had a special relationship with administrative duties. For senior scholars—to use terms of the present discussion—use of e-mail has more often than not been related to time of life. First, some became proficient with e-mail during administrative assignments. Second, those scholars active in administration had notably more e-mail traffic than those without administrative assignments. Some administrator/scholars' reported use of e-mail rivaled or surpassed persons in business, where middle managers receive and send about fifty messages per day.[12] One administrator said she received about a hundred messages per day and sent twenty to thirty. Another said he did "tons" of e-mail. At the other end of the spectrum was one senior scholar (the only one) who was not an e-mail user. She explained that she did not use e-mail because it brought a lot of "garbage," and this was dangerous because it consumed time. Another scholar expressed dismay at colleagues who checked their e-mail three times a day. He used it primarily to facilitate borrowing books from the library

but otherwise dismissed it as a waste of time. To be sure, the last two scholars are extreme, but they highlight how expenditure of time is key in humanists' thinking. In general, there was moderate use of e-mail among the scholars studied. The three junior scholars described their e-mail activity as "twenty to thirty messages per day," "daily, but no obsession," and "ten minutes" per day. John P. Walsh and Todd Bayma have suggested that the more collaborations scholars have with persons outside their home institutions, the more likely they are to use e-mail.[13] Because humanists have few collaborations with persons outside their home institutions, they make limited use of e-mail for their scholarship. Limitations on use are not caused by humanistic technophobia—the heavy use by humanist/administrators shows humanists are not technophobic—but, rather, by e-mail's limited value to advancement of their scholarship.

The third most-used electronic information technology is the online public access catalog (OPAC). Sometimes the scholars expressed frustration with changes related to OPACs. Two junior scholars commented that they missed card catalogs. But, given that today the only means of access to library collections is the OPAC and all the humanists relied on library collections, all of them used OPACs. Although OPAC use is not as frequent as word processing and e-mail, the interviews of the late 1980s showed that OPAC use generally preceded that of any other electronic information technology, even word processing.[14, 15] A scholar can delegate OPAC searching to a research assistant, but many humanists lack such help. Lacking an assistant, scholars usually search the catalog themselves. The alternative would be to ask a librarian, but few humanists seem to have developed the habit of asking questions of general reference librarians. Furthermore, asking a librarian, unlike delegating to an assistant, entails an in-person visit to the library, an e-mail, or a phone call. All take more time than searching an OPAC by the scholars themselves, once they have mastered the system.

The interviewees use the Internet principally for e-mail, but also for searching library resources, especially OPACs. Given that most of the humanists interviewed have one desktop in their office and another at home (and perhaps a laptop), regular use of the Internet is not surprising. However, what is surprising is that although the humanists have computers readily at hand, some do not have Internet access both at home and in their office. In all cases, the scholars had one computer with Internet access, usually in their office. But some said that their other computer lacked Internet capability. Although it can be argued that technological or economic factors were responsible for this lack of connectivity, the humanists themselves explained it in terms of time. For most, it was a matter of use time. One whose home and office computers were both Internet ready said she never used the Web at home because she did not have the time to wait for the screen to display. One can contend better technology will solve this. But this scholar did not talk about such an adjustment. This is noteworthy because in other circumstances she did not let barriers that others might tolerate stand in her way. She spent her own funds on a research assistant and substantial sums for books and journals.

To other interviewees it was a matter of use time in the most fundamental way. Two said they did not want to be hooked up at home to protect themselves from the potential interference of e-mail and Web use to their family life and their scholarship. In another case, limited Internet access was a matter of anticipated start-up time. In this instance, one of the three younger scholars said that at the start of a research leave the computer in her office was upgraded, and this gave her access to the library's catalog primarily through a graphical interface with which she was not familiar. She did not anticipate that she could afford the time, while on leave, to master the steps needed to connect to the catalog to use the command-driven interface with which she was familiar nor did she want to spend the time to learn to use the graphical interface. Consequently,

when she needed to use the catalog, she went to the library where she could use the old interface. She speculated that had she not been on leave, spending most of her time writing, she would have taken the time to learn to use the catalog from her office. In a sense, then, this was an issue of time of life too. Given the stage of her work, expending the anticipated start-up time was out of the question.

Other than word processing, e-mail, and online catalogs, there are no universally (or almost universally) used information technologies. Five of the thirteen subscribe to electronic mailing lists. Interestingly, only one of these is a junior scholar and the list she subscribes to does not relate to her discipline. It is a bit surprising that so few subscribe because H-Net is so prominent in the humanities. Two find full-text primary sources in digital form: one, a senior scholar, on the Web of materials, digitized originally; the other, a junior scholar, on CD-ROM of materials, originally print on paper, that had been digitized retrospectively. A senior scholar also uses a Web-based guide to primary sources she studies. Two senior scholars do statistical analyses with the help of assistants. Two senior scholars have relational databases. Six scholars reported using bibliographic databases themselves, three of whom are the three junior scholars.

Time and Content

The interviews confirmed something that Stephen Lehmann and Patricia Renfro pointed out in the early 1990s: content is crucial.[16] Without relevant content, no system is worth the humanist's use time. There are several examples of this. First, a historian of the early modern period of a country that uses a non-Roman alphabet revealed no fear of computers and concluded her conversation with the authors by predicting that technology would have a great impact on her specialization. In this regard, she pointed to some projects that provided searchable databases of primary sources about the country she studies. However, she did not use them because they were for a time period different from the one she studies.

Perhaps even more interesting was a second scholar whose use of electronic information technology had declined over the previous five years. Ten years ago, this person was at the lowest level in use of technology among the interviewees. Then, he used OPACs, but not word processing or e-mail. In the ensuing five years, he became arguably the group's heaviest user, building a relational database while in the archives using a laptop, sending and receiving e-mail, and word processing everything he could. But in the past five years, the press of administrative assignments and a shift in his research interests had greatly lessened his use of computers. Now, he was studying two topics where the key documents were, for one, on microform, and, for the other, reports of local government agencies and committees that were available only in paper. Neither of these was digital, he explained, so he did not bother with electronic technology except for word processing, e-mail (which, as an administrator, he was using heavily), and searching library catalogs. The evidence in the local government documents was such that he did not use any software to summarize it.

In contrast, the scholar in this round of interviews who was most enthusiastic about digital sources was one who had been quite negative toward electronic information technology ten years earlier. She had complained that technical difficulties with word processing had slowed her work and she was not sure it was worth the effort. Now, however, she was sure of its usefulness. Her research investigates events in another country, and she is able to keep up with them by reading newspapers, official documents, and other sources posted on the Web.

One major reason for heavier computer use in the sciences and social sciences is that much of the content—that is, the primary data—of those two areas is quantitative and computers are best at manipulating and analyzing quantitative data. In the humanities, however, it is not clear whether software that helps quantitative analyses, such as relational databases and

statistical packages, will ever receive much use. It is difficult to find much evidence of quantification in the humanities. In the 1960s and 1970s, quantification was a growing force in the study of American history, but that growth ceased and then interest declined. It is reasonable to use the presence of tables in journal articles as an index of use of quantification in the field covered by that journal. The 1974–1977 volumes of the *Journal of American History* had seventy-two tables in fifty-one articles; in contrast, the 1994–1997 volumes had fifteen tables in thirty-seven articles. One can look beyond history to literary studies and art scholarship and compare indicators of quantitative work in them with social science fields such as sociology and political science. In the 1997 volumes of *PMLA* and *Art Bulletin*, there is one table among forty-one articles. In contrast, there are 353 tables in 105 articles in the 1997 volumes of the *American Sociological Review* and the *American Journal of Political Science*. Electronic information technology is used more readily and profitably for quantitative rather than qualitative work. If the humanities naturally pay less attention to quantitative content than the social sciences and sciences, they will always use electronic information technology less than the social sciences and sciences do.

If the humanities naturally pay less attention to quantitative content than the social sciences and sciences, they will always use electronic information technology less than the social sciences and sciences do.

Ultimately, the most important development will be the extent to which humanists use electronic information technology to access the primary sources—the content that is the basis of their work. Right now, two of the interviewees use digital primary sources. On the one hand, compared to five years ago when none used digital primary sources, this is a noteworthy increase. But, on the other hand, this represents only 15 percent of the cohort of both junior and senior scholars. Compared with scientists and social scientists, this is a small percentage. In this, a fundamental distinction between the humanities and the social sciences and the sciences looms large. Humanists use primary sources of information that have been created by other people, whereas social scientists and scientists use sources they have helped to create, whether by fieldwork, surveys, or laboratory experiment. And because the scientists have a role in creating their sources, they can record them with the best technology at hand—today, computer technology. For example, even qualitative social scientists, the scholars generally considered to be closest to humanists, seek software for entering and manipulating data they gain from interviews and other fieldwork.[17] And quantitative social scientists and physical scientists started using computer technology as soon as it became available. Indeed, Morton Hunt argued that the advances in quantitative social science would have been impossible without the computer's ability to manipulate huge data sets.[18] In contrast, most of the primary sources in the humanities were created before digitization, so machine-readable versions are not readily at hand.

Given the way humanists do their research, and the nature and volume of the primary sources they use, it is unlikely that more than a few will comprehensively digitize the sources they study. The authors' interviews suggest that more and more scholars are digitizing small portions of sources when they take notes on a computer. But none of the interviewees was scanning bodies of sources in the archives or converting groups of printed texts to machine-readable form. If these scholars were concentrating on a small body of material, it would make sense for them to digitize. But, in fact, the cohort studied, like most humanists, read through substantial—and in some cases, massive—quantities of primary sources. They read through all these sources to gain a general sense of their topics and, more important, to identify particular

passages that are especially relevant to the questions they are asking. They take notes on the key passages. Usually, the notes are textual, but in a small number of cases they may be quantitative.

Because the crucial activity of the humanist is reading the sources, for the individual scholar, there is, with one major exception, little advantage to digitizing them. Digitizing takes time and then, unless printed out, digital sources must be read on a screen. And, currently, screen display is normally far inferior in readability to almost any print or handwriting on paper on which it is based. Humanists would not be making good use of their time if they spent it digitizing sources so that they could read the digitized versions with more difficulty than they read the originals.

Reading source material on paper, then, is better than reading it on a screen. However, this assumes that a scholar can get to the paper. Much of the source material that humanists use exists in unique or rare copies and may be distant from those who need it. In these cases, if the scholar cannot afford to go to the material or pay to have it copied, digital versions available on the Web can be indispensable. After being digitized, such unique sources can be transmitted anywhere. Transmission, not display, is one of the values of digital sources in the humanities. In short, though digitization by the individual scholar is unlikely, digitization by depositories can be highly advantageous.

Unfortunately, so little is digitized currently that it is unlikely that a source originally on paper is available in machine-readable form. Only scholars in classical Greek studies can in some way claim that most of their primary sources are available in digital form. And even for them, the *Thesaurus Linguae Graecae* has only one edition of each known work and, as Karen Ruhleder has stressed, currently lacks the critical apparatus that gives scholars who use print sources greater depth of understanding of those sources.[19] One indicator of how little has been digitized retrospectively is the use of such sources by the thirteen scholars interviewed. Only one is using a retrospectively digitized source, which was the complete works of a major author who has long been part of the Western canon.

Despite the inferior readability of computer screen display compared to print on paper and the very limited number of digitized sources, these sources may well grow in importance in humanistic scholarship. As the one humanist who uses retrospectively digitized sources pointed out, scholars can no longer make specific claims about the absence, presence, or frequency of certain words in the writing of the major author she studied without first establishing the accuracy of their claims by searching and citing the CD-ROM version of the author's work. They have to do so because the computer is much faster and more accurate than any human reader in identifying particular instances of a given word. As more sources become digitized, using the digital version probably will become the norm for humanists who make assertions about specific, especially quantifiable, characteristics of the sources they study.

Conclusion

Conversations over ten years have revealed that senior scholars, even those without much interest or inclination, are gradually—if in fits and starts and with some backsliding—using more and more electronic information technology. They normally began with the OPAC in their home library; then adopted word processing; next, while on administrative assignment, became regular e-mail users; and finally, did their own (occasional) searches on bibliographic databases. On one side of this norm are those who have used, regularly, only one or two of the first three technologies. On the other side are those who have personally used these normal technologies and much more (sometimes with the help of assistants). In virtually every instance, how technology use affected a scholar's time influenced—sometimes greatly—whether he or she adopted it.

In some contrast to the senior humanists are the junior scholars. The younger humanists have been using OPACs, word processing, and e-mail throughout their careers. Yet, despite this rather basic difference, the junior scholars, like the senior scholars, will not adopt a technology that does not promise to save time or contains no content relevant to their work. Furthermore, no junior scholars subscribed to electronic mailing lists in their specialization, used the Web for source material, did statistical analysis, or built a relational database, whereas at least two senior scholars had done each of these. The three junior scholars, but only three of the ten senior scholars, used bibliographic databases. This suggests that bibliographic databases may eventually join online catalogs, word processing, and e-mail as baseline competencies for humanists. Nevertheless, given the relative use in the past of print versions of these databases, it is unlikely that they will be used anywhere near as heavily as OPACs, word processing, and e-mail.[20]

Moving beyond generalizations about the rate of adoption of electronic information technology by humanists, it is possible to discuss implications for policy by academic libraries and practice by academic librarians. To a significant extent, policy making entails predicting the future and how an organization can best be involved in that future. This study's findings suggest that humanists gradually will become more involved with electronic information technology, but that their involvement will always be influenced by considerations of time and will always be less than that of scholars whose fields are paradigmatic and who direct the creation of the evidence they use. Recognizing this difference is important. Discoveries in the humanities depend on sources not previously brought to the attention of a discipline. If it is the case that sources that are most heavily used are most likely to be digitized, then, conversely, those least used are least likely to be digitized. Given this, any library that supports humanists must give priority to its paper sources. This is easy to forget in an environment where the digital is new and exciting.

In terms of practice, academic librarians should keep in mind the four types of time that affect how a humanist views or uses electronic information technology. Carol Collier Kulthau, drawing on Lev Vygotsky, has pointed out that in the reference process with students there are potentially fruitful "zones of intervention."[21] These are the times in a student's stages of work where recommendations, assistance, or instruction may help advance a research project. Kulthau argues that librarians need to be alert to these stages so that they can provide help when it will do the most good. Similarly, there are points in a scholar's life when recommendations about information technology can be particularly helpful. At other times, pressure to adopt technology can be counterproductive. By being sensitive to when scholars have the time (and think they have the time), librarians can be most helpful in assisting scholars to adopt electronic information technology effectively. Rob Kling and Lisa Covi have shown how easy it is for librarians, technologists, and scholars to fail to see the bigger picture of technology and the other's viewpoint when working together.[22] A key element in appreciating another person's viewpoint is having categories for listening, having a sense of what the other might say. Librarians who are already aware of the ways that time can be important to humanists will be better able to hear what the humanists say.

Notes

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