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Academic Historians, Electronic Information Access Technologies, and the World Wide Web: A Longitudinal Study of Factors Affecting Use and Barriers to that Use*

Deborah Lines Andersen

School of Information Science and Policy, Rockefeller College of Public Affairs and Policy, University of Albany, Albany NY 12222

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.01. Abstract (back to table of contents)

Longitudinal research conducted between 1992 and 1998 followed the technological progress of 94 academic historians at the four University Centers of the State University of New York at Albany, Binghamton, Buffalo, and Stony Brook, concentrating particularly on their use and non-use of electronic information access technologies. A combination of mailed surveys and on-site interviews uncovered lack of time, instruction and information as the primary barriers to the use of these technologies, while fear of lost productivity through time spent learning and using electronic technologies also surfaced as a barrier. Academic historians nonetheless felt almost universally by 1996 that electronic information access technologies such as word processing and electronic mail were critical to their missions, especially when these technologies allowed for verification of bibliographic citations or documents in particular archival collections. Furthermore, while use of World Wide Web resources for teaching was nonexistent in 1992, plans existed at all four sites in 1996 to create home pages not only for departments but for individual instruction, and sites were in place by 1997. Critical success factors that surfaced from the research included the need for departmental mandates and support, as well as the need to provide specialized instruction and information to historians in their academic, research and administrative roles.

.01.a. Introduction (back to table of contents)

The following paper is actually a story about research conducted from 1992 until 1998 on the four University Center campuses of the State University of New York.

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* Research reported in this paper on web sites is as of April 1998. Interestingly, due to the rapid rate of technological innovations, some of the results presented here will not reflect the actual state of the web sites in the future.

Academic historians participated in two survey research projects and two sets of interviews which assessed their use of electronic information access technologies and their barriers to that use. A body of information and organizational theory helped to explain the empirical data which arose from these projects. In particular, theory about diffusion of innovations, technology gatekeepers, and critical success factors was important in understanding historians' use of information technologies.

In order, the sections which follow introduce the methodological issues for this project, background about the State University of New York, previous research about historians' information use, and theoretical foundations. The empirical discussion focuses on the quantitative data that were collected in a 1996 survey of academic historians, and upon a 1998 pilot study of four departmental home pages. The final sections look at pertinent findings and critical success factors that arose from analysis of the data. By looking at technological applications that historians have successfully used, and by studying the roadblocks to technological success, it should be possible to derive a series of lessons that inform the introduction of current technologies into the work of academic historians, and also present more general lessons that will advance the adoption of future technologies.

.02. Methodology (back to table of contents)

This research came out of a series of studies between 1992 and 1998 that initially surveyed academics across the four University Center campuses of the State University of New York at Albany, Binghamton, Buffalo, and Stony Brook. The first research project, started in 1992, looked at all faculty members on the four University Center campuses. This study centered on the electronic information access technologies that were available to faculty members across the four centers, since the express purpose of the study was to assess the feasibility of using electronic document delivery instead of duplicating journal subscriptions across the four campuses (Adams & Bonk 1995). A small number of historians (n=29) returned questionnaires for this survey.

In 1993, a new project looked at historians on just the Albany campus, interviewing them about their use of electronic information access technologies, and about the barriers they perceived to that use (Andersen 1993). Their stories, taped and transcribed, formed the pilot (n=6) for a much larger research project in 1996 that both interviewed a sample of 28 historians across the four University Center history departments and surveyed the entire population of 94 academic historians. The purpose of this study was again to look at use of electronic information access technologies, and also to record stories of the use of information, including electronic information, in historians' research and teaching. The interviewed historians were chosen in a purposive sample to take into account gender, subject specialization, administrative functions, and reported technological expertise. (In each department there was at least one individual identified as the "technology gatekeeper" of the department, the person others went to with problems and questions. These individuals were purposely selected as informants for the interview section of the research (Andersen 1996).)

Finally, in 1998, an experiment was conducted to assess the web presence of each of the four history departments. In 1996 all four chairpersons had indicated that their departments were planning a home page. The question remained as to how many of the four departments had succeeded in their plans. In mid February, and again in mid April 1998, a web search was conducted for each of the university home pages, looking for links to the history department at each campus center. When a link was located the history home page was analyzed for content and currency.

.03. The State University of New York (back to table of contents)

Although this research focuses on history faculty on the four University Center campuses of the State University of New York, these faculty exist in a much larger organizational context of the State University of New York, the four University Center campuses, and the four departments of history in which they work. The State University system is composed of 4 University Centers, 13 University Colleges, 2 Health Science Centers, 6 Colleges of Technology, 4 specialized colleges (environmental science and forestry, maritime, optometry, and technology), 5 statutory colleges (4 on the campus of Cornell University and 1 at Alfred University), and 30 community colleges (State University of New York fact sheet, undated, 2 pp.). The four University Centers, formally designated in the 1960s, conduct research and advanced graduate and professional studies, and confer baccalaureate, master's, and doctoral degrees, and were selected for this study because of this student mix and their size, necessary for maintaining undergraduate as well as master's and doctoral programs. In 1996 the four history departments had between 21 and 25 tenure track faculty members each for a total of 94 academic historians across the four campuses.

.04. Historians as Consumers of Information (back to table of contents)

The work patterns of historians, the process by which they move from topic, to evidence, to argument, have been studied and discussed by a variety of researches. Uva used a five-stage process to describe this work including (1) problem selection (including preliminary work and hypotheses), (2) detailed planning of data collection, (3) data collection, (4) analysis and interpretation of data, and (5) presentation of findings (1977, p. 16). Similarly, Stanford developed a five-state logical (but not necessarily chronological) model of the historian's work which consisted of (1) the choice of subject, (2) the selection and, where necessary, the preparation of the evidence, (3) an alert and thorough reading, or other study, of the sources, (4) the tentative construction of a mental picture or model to fit the subject, and (5) a firm version of this model, constructed in

a way that is fit to be made public (1994, p. 148). These models were designed to look primarily at the information needs of historians in the context of their research, not in that of their teaching or departmental duties and communications.

Environmental factors additionally affect the work patterns of historians. Ebert created a laundry list of such items, including denied access to collections, crowded or non-existent work areas, closed stacks, limited hours, low availability of microform readers, and loss of materials by theft and mutilation (1971, pp. 22-23). Hanham, emphasizing the importance of hands-on access, stated that "the historian is rarely happy to see a single page.... He clings to the notion that browsing through a book in a library may suggest just the idea he needs to solve a problem that is worrying him" (1971, pp. 512-513). Both written 27 years ago, these descriptions portray a historian who is closely tied to print media, not electronic sources, for her research. Nonetheless, in 1991, Igartua, in noting shifts in historians' perceptions of information technology, stated that "it seems to have become current for history departments to view their 'quantifier' or 'computer expert' much as they view feminist historians, that is, as people at the edge of the historical profession rather than insurgents aiming at its core" (p. 73). Central to the research presented here is the shifting view of information technology among historians. How far have they come toward becoming "insurgents aiming at the core"?

Electronic information access technologies have undergone an enormous revolution during these 27 years. Not only have personal computers become nearly a saturated technology in the university environment, but software programs and the graphical user interfaces designed to create access to them have eliminated the need to know the basics of computer operating systems and DOS-based commands. Since "an information system will not be used when it is more trouble than it is worth" (Mooers 1960, p. ii), those who create and teach technologies have decreased the "trouble," so that benefits of new technologies will outweigh the costs, in time, effort, and money, of adopting new technologies when they arise. Decreasing the trouble might be in the form of new technologies or in the form of new techniques that make such technologies and resources available to particular populations (Pankake 1991). It might also be in the form of creating standards for documents that are being generated only in electronic format so that historians in the future will have access to them (Zweig 1994, p. 9). Standardization of electronic information access systems could go a long way toward making historians more comfortable with the materials that are available on-line (Shreeves 1992). Additionally, as Case as suggested, information system developers should take into account cognitive aspects of their user populations, and "consider segmenting the audience for computer interfaces, as well as designing generic tools that apply to all users" (1991, p. 657).

.05. Theoretical Foundations (back to table of contents)

The next four sections concern the theoretical underpinnings of this project. The broad categories encompass diffusion of innovations, technological gatekeepers, critical success factors, and evaluation of web site design. In each case these theoretical frameworks help to explain aspects of historians' use or non-use of electronic information access technologies.

.06.Diffusion of Innovations (back to table of contents)

The process of introducing a new product or function into a system has been generalized into four steps (Rogers 1983). Initially there is a perceived problem or need that exists. Next, thorough research into the problem is undertaken, and a possible solution is developed. Third, agents (individuals or groups with decision-making and implementing ability) decide that the innovation should be diffused. Finally, the actual diffusion takes place.

While the emphasis in the above four-step process is upon problems and innovations, Rogers and Shoemaker (1971) also looked at the culture in which the diffusion of innovations would take place, concentrating on the actors in the society or external to it. They believed there were four types of change.

> 1. Imminent change which occurs when people internal to the society primarily on their own create and develop the innovation.
>
> 2. Induced imminent change in that the innovation could be catalyzed by someone who is a temporary member of the society, though the primarily burden of the creation rests with the members of the society.
>
> 3. Selective contact change when members of one system adopt an innovation primarily as a result of their exposure to the innovation outside their own system or society.
>
> 4. Directed contact change caused by actors external to the system who seek to induce change for achievement of goals defined by them (pp. 219-220).

These types of change were originally constructed to deal with institution building within organizations, but can be generalized to define diffusion of innovation patterns across a wide variety of

circumstances, including those within academic departments, especially when seen in light of communication channels employed by academics, including invisible colleges, conferences, and electronic information exchange.

The process of diffusion has been likened to that of the contagion process in epidemiological research--a process in which one individual passes a communicable disease on to others, in a potentially geometric progression until the disease is fully diffused or saturated in the population (Crane 1972, Chapter 4). This disease metaphor, with its possibility for resistance to a particular virus or bacteria, or lack of exposure due to isolation, works equally well for diffusion of innovations, as does the potential for isolating carriers of the disease (read "innovation") so that it does not spread to others.

.07. Technological Gatekeepers (back to table of contents)

In one definition, gatekeepers are "individuals who either limit access to information or restrict the scope of information, thereby decreasing opportunities within the organizational structure" (Metoyer-Duran 1993, p. 118). This sense of "gatekeeper" is an inhibiting one, and as such might also include organizations that establish college admissions policies, closed stacks in a library, or Internet access fees that restrict economically disadvantaged portions of populations.

Second, however, there is the gatekeeper as disseminator of information and innovation. Individuals in this role positively influence the use or transfer of information in an organization. They act as "communications channel, link, intermediary, helper, adapter, opinion leader, broker, and facilitator" (Metoyer-Duran 1993, p. 118). Both of these definitions can be useful in describing members of academic departments and their informal networks for information transfer.

Finally, in discussing gatekeepers and channels of communication, Klobas and McGill (1995) tested five propositions about technological gatekeepers, confirming that "self-reported information dissemination behavior can be used to identify gatekeepers among individuals with diverse information-gathering behaviors, but a common group of potential interpersonal communications channels" (p. 581). Their propositions included

1. Experience: Few gatekeepers have been in the IT profession less than 5 years.

2. Education: Gatekeepers are no more likely to hold a doctorate than others in the IT profession.

3. Number of Information Channels: Gatekeepers

3. Number of Information Channels: Gatekeepers use more information channels to gather information than others.

4. Importance of Information Channels: Gatekeepers consider more information channels more important than nongatekeepers.

5. Information Strategy: Gatekeepers use different groups of information channels to gather information (pp. 583-584).

Since Klobas and McGill were working with information technology professions outside of the academic arena, their proposition concerning amount of education was a critical factor. Within academic circles, the other four propositions are perhaps more pertinent.

.08. Critical Success Factors (back to table of contents)

Institution building within organizations has been studied many ways, another one of them being the development of critical success factors which allow organizations to keep track of a small set of goals critical to their success. Rockart (1979), building on Daniel's original work (1961), posited that there were a series of critical success factors (CSF) that could support organizational goals. Attainment of these goals ensures the success of the organization. Although each organization will have a small number of critical success factors at any one time, these factors need constant and careful attention, as well as adjustment as the organization changes.

Rockart presented four sources of critical success factors for private sector organizations. "Structure of the particular industry" will define, by the nature of the organization, what factors need to be developed. "Competitive strategy, industry position, and geographic location" look at the size and location of the organization in relation to others in the same market. "Environmental factors" take into account external forces such as economics and politics that could change the critical success factors for an organization. Finally, "temporal factors" are those that occur for a short time due to unexpected change such as the replacement of an executive or severe fluctuations in the market for a product (1979, pp. 86-87). Rockart was dealing with private sector, for- profit organizations, but it is not a great leap of theory to think about public sector or not-for-profit colleges and universities that also deal with a particular market for students, faculty and research grants. Additionally these same academic institutions compete at some level with a wide variety of other academic institutions defined by their size, rank, and geographic location, and find themselves dealing with political and economic forces which shape their culture. Finally, all academic

institutions undergo temporal change with incoming classes, changes in academic faculty, and shifts in their administrations. For the purposes of this paper Rockart's critical success factors will be applied to the academic rather than for-profit arena.

.09. Web Sites: Their Creation, Use, and Evaluation (back to table of contents)

The creation, use, and evaluation of web sites is a fairly new concept in the theoretical literature, primarily because web sites themselves, a maturing technology, are very new. Whereas focus in the past has centered on the creation of HTML documents, a growing body of literature deals with the evaluation of these sites.

This evaluation literature is in part driven by a phenomenon peculiar to web sites as information dissemination mediums. Historically the materials which were produced for public consumption would arise from a carefully reviewed print publishing industry which took great care to control for the design and contents of publications. With the advent of personal computers more individuals became desktop publishers, able to produce quality documents, but probably without the marketing force of large publishing houses. Electronic mail made possible widespread distribution of these materials from the desktops of individuals. Now there is the phenomenon of the web page. Information is far more easily distributed internationally in this medium that print, but the centralization and review process of a formal publishing industry has been removed.

In academic institutions thousands of dollars are spent every year to produce brochures that will attract the best students. At the same time individual departments are producing home pages that can be accessed by these same potential students, but the home pages potentially lack the review, administrative approval, and editing process that go into print (Quinn 1994). Many of these pages are of excellent quality, but the lack of central control means that a university can find itself with a hodgepodge of web page styles, looks, and content. It is no wonder that web page information evaluation has become a very important topic in medicine (Jadad & Gagliardi 1998), in government (Dawes et al. 1996), in the private sector (Sun Microsystems 1996) and at universities (Hinman 1998). Additionally, there are quality and content issues yet to be explored in the digital scanning of primary source documents for web page mounting (Lacher-Feldman 1998).

.10. Empirical Results (back to table of contents)

The next sections deal first with findings from the 1996 survey of historians, augmented with materials from the 1996 interviews, and second, with information gathered from the 1998 pilot review of

departmental home pages.

.11. Findings from the 1996 Survey (back to table of contents)

The following tables display data from the 1996 survey of academic historians that were central to the use of electronic information access technologies, including World Wide Web technologies. It is critical to realize that in 1996 these historians had created no web pages of their own although several of them were at the cusp of using these pages. Throughout this discussion a major distinction exists between using web pages and creating web pages. Creation of web pages for these four departments did not occur at all during the course of the 1996 study.

Table 1 displays the response rate for the 1996 survey of historians. The 60 returned surveys represented a 64 percent response rate that was fairly representative of full, associate, and assistant professors across the four campuses. Full professors were overrepresented while associate and assistant professors were underrepresented. (One respondent represented approximately 1.7 percent (1/60) of the total survey sample.)

[Table 1]

Table 2 examines the first use of a variety of electronic information access technologies by these historians. Predictably, use of telefacsimile was greatest, with a total of 50 historians reporting first use between 1986 and 1996, and with a peak in the number of users in 1990 to 1991. Electronic mail had the next highest number of first users (45), but the peak in these responses came in 1994 to 1995. While World Wide Web resource first use was also at its highest in 1994 to 1995, the total number of first users was 21, or approximately one third of the respondent group.

[Table 2]

Table 3 displays a variety of methods by which historians reported obtaining publications for their research and teaching. As with the information in Table 2, the modal responses for each variable help to describe the sample. While the modal response for use of campus library was "daily," personally purchasing books or subscriptions was "monthly." The modal responses for interlibrary loan requests, use of regional libraries, and travel to regional collections (overnight stay) were "infrequently." Use of network-based sources or on-line (remote) databases was one of the three variables measured that received a modal response of "never," although there were seven historians who reported using these resources on a daily or weekly basis. In general, these historians reported most frequent acquisition of locally available, paper-based materials, while distant and electronic sources received least attention.

[Table 3]

Tables 4 and 5 examine these historians' access to and use of equipment for information access, manipulation, and retrieval. Whereas Table 4 reports historians' responses to what technologies they believed were available to them, Table 5 reports historians' use of those technologies. It is important to note that there was a gap between many historians' perceptions of what was available to them and what technologies were actually at their disposal. In particular, historians on all four campuses had access to fax machines and photocopiers, but a number of individuals believed they had no access.

[Table 4]

When looking at actual use of these technologies in Table 5, the numbers which stand out concern not only high daily use of computers for word processing, computers for communications, printers and photocopiers, but also low daily or weekly use of computers for databases or spreadsheets, CD-ROM players, or microform readers. Almost none of these results were counterintuitive, simply reinforcing the types of information use that had been reported in previous studies of historians. The exception was the use of electronic communications (measured with variables for communications modem/software and connection to campus network). Although historians have been described as avoiding technological innovations, 66 percent (40 of the 60 respondents) were using their personal computer for communications on a daily or weekly basis. At least a partial explanation for this high percentage came from the interviews of history department chairmen on the four campuses. In one of these departments the faculty had been told that all departmental business would be conducted electronically and that there would be no departmental funds available for postage. Having been forced to communicate electronically, all departmental members (n=25) were frequent users of e-mail.

[Table 5]

Historians in this research reported varying use of networks for access to information sources. Table 6 displays these historians' reported use of information resources available through networks. Several bimodal response variables stand out for the purposes of this research report. Discipline-based electronic bulletin boards and listservs, electronic journals and newsletters, e-mail, and information available on the World Wide Web all elicited split responses from the sample with peaks of responses both at the "daily/weekly" level of use and at the "never" level of use.

[Table 6]

[Table 6]

It appeared that while there were many historians in the sample who made little or no use of these electronic information access technologies, there was also a small group of historians on each campus who were heavy users of these technologies. The subsequent interviews of these historians uncovered groups of information gatekeepers on each campus who not only used the technologies themselves but also served as technology educators for the department. (Note the unexplained discrepancy in the number of individuals who reported no use of electronic mail (16) and the number who reported no use of their personal computer for communications in Table 5 (12).) Additionally, in interview discussion, historians reported a high use of libraries, electronic mail and listservs for verification of the existence and content of primary and secondary sources before travel or before interlibrary loan requests for appropriate materials.

Table 7 shifts from the access to or use of a variety of information access technologies to the obstacles that historians reported encountering to the use of these technologies. Focusing on the most often reported obstacles, lack of time, lack of necessary training, and lack of information about accessing information all received responses from 47 percent or more of the 60 respondents. Although lack of hardware, software, and funding were all reported as obstacles, they were secondary to a lack of information about information. An additional obstacle which surfaced during interviews was fear of lost productivity. Several historians believed that learning and using these technologies would take away from research and teaching time as opposed to streamlining these tasks.

[Table 7]

.12. Conclusions Based on the 1996 and Previous Studies (back to table of contents)

There were nine categories of findings that surfaced as a result of the analysis of the quantitative data collected in the research.

Ownership of publications. Approximately half of the historians in this study owned between 25 and 50 percent of the materials they considered key for their research and teaching.

Library ownership of publications. Approximately half of the historians in this study believed that their campus library owned between 50 and 75 percent of the materials they considered key for their research and teaching.

Archival sources. Essentially all (99 percent) used primary sources located in archives, museums, special collections, and private collections for their research.

Travel. Ninety percent of the historians traveled in order to conduct their research.

Translation. All but three of the 42 historians who used non-English materials translated those materials themselves as their sole means of access. Those three made use of translators in addition to doing some of their own translation.

Personal computers and printers. Access to these technologies was almost universal (99 percent) although some individuals indicated that they did not presently "own" a computer, and several stated they had never used one. Eighty percent of the historians stated that they used personal computers for word processing on a daily basis.

Communications. Ninety percent of historians had access to electronic communications technologies, while more than 50 percent used electronic communications (e-mail) on a daily basis.

Instruction in electronic technologies. Historians reported the use of manuals, self instruction, or colleagues and friends as their primary method of learning to use their first computer. They stated that they preferred individual, hands-on instruction over classroom instruction, and in-house colleagues over outside technicians or technical manuals. They reported the desire for many transactions that could be performed from home or office computer with the aid of communications devices, but appeared not to know about services that were available to them.

Obstacles. The three obstacles to using electronic information access technologies that were most frequently mentioned were time, training, and information about information. Funding was reported as an obstacle by less than 20 percent of the respondents.

.13. Critical Success Factors for Historians' Use of Electronic Information Access Technologies (back to table of contents)

Although not all of the findings in the previous section related directly to electronic information access, those that did inform a small list of critical matters that allow historians to use these technologies, and that need to be watched in order to ensure their continued success with these technologies.

Equipment. New information technologies require up-to-date hardware and software. Historians who had no personal computer could not make use of these technologies. *Periodic technology inventories and updates are critical to information access success.*

Training. Since technologies change at a rapid pace, training in new technologies needs to keep up with that pace. Historians preferred individual, hands-on instruction from in-house colleagues. They

also reported that lack of time was one of their major obstacles to using new technologies. *Regularly scheduled, individual, in-house education in new technologies will best meet the needs of these historians*.

Support. Technical support follows equipment and training as a critical success factor. Historians preferred in-house colleagues, technological gatekeeper historians who were right down the hall and accessible, to computer center support staff who were hard to find and usually not immediately available. *Support mechanisms need to present short turn around times between problems and help.*

Information. Historians reported lack of information about information as a major obstacle to the use of electronic information access technologies. They did not know about new databases, or about how to gain access to electronic information. A fourth and final critical success factor concerns diffusion of innovations--the creation of mechanisms that will get current information about new software, hardware, programs, and information sources to historians in a timely, predictable manner. *These updates should arrive on the historians' desks, and will help solve the problem of individuals not knowing they could do something that would help their research and teaching, simply because they do not know that the technology exists.*

.14. Web Pages in 1998 (back to table of contents)

Although no history department on the four University Center campuses had a departmental web site in place in 1996, there were plans on all four campuses to have a web page in the near future. In February of 1998 three of the four departments had accessible home pages In April of 1998 the fourth departmental page was accessible through its university's home page after being "off line: for an unspecified amount of time. These web pages varied widely in terms of ease of access, webmaster profile, type of information, and number of links to external sites. Using text-based presentation software (Lynx), these four sites were analyzed to look for similarities and differences in content. Text-based materials avoid the additional variables of color, placement, and graphics, thereby eliminating all but content-specific variables.

Tables 8, 9, 10, and 11 compare the links available on the home pages of the four sites that were extant in April of 1998. All four of these sites could be found through the home page of their respective universities, although sites B, C, and D required two links from the home page (through academic departments and then history) while site A required three links through lists of colleges and schools before arriving at the history site, a much more cumbersome process. Additionally, sites C and D could also be

found immediately by attaching /history/ to the URL for the university. Sites A and B generated an error message when this technique was used.

Tables 8, 9, and 10 present a fairly straightforward series of links from their respective home pages. They differed in their number of initial link categories, and each had one link to sites external to its home university. These pages were informational, taking the place of the materials one would normally find in print catalogs or brochures created specifically for the department with the external links presenting materials that would not normally be in a brochure, information about other history sites for primary or secondary source materials as well as electronic journals and listservs that one could browse. Departmental administrators and graduate students as their webmasters. At each site there was a direct electronic contact to the webmaster as well as an update statement at the bottom of the home page.

[Table 8]

[Table 9]

[Table 10]

Table 11 displays the link categories for Department D. In stark contrast to the first three, Department D not only included most categories seen in Tables 8, 9, and 10 (no alumni newsletter), but also included seven external links to journals, course materials at other universities, newspapers, magazines, and search engines. Additionally, the second to last link cautioned students about the pitfalls of electronic plagiarism. The webmaster for Department D, a faculty technology gatekeeper, chose to insert update information at the beginning of the home page, a critical feature since the webmaster committed to a "Feature of the Month" for the departmental home page.

The categories of information found on Department D's home page included materials that would typically be seen in print advertising and admissions brochures but then expanded to add materials that would be useful to students and faculty within the department (as well as to other individuals outside of the department who wished to do historical research). The inclusion of several search engines also allowed faculty and students to move from the home page directly to additional web-based research

[Table 11]

.15. Critical Success Factors for History Department Web Pages

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The examples of web page materials in Tables 8, 9, 10 and 11

present a variety of issues that influence the development and design of home pages for history departments. From these it is possible to derive a small set of factors that need attention and success if web pages are to help the strategic goals of the department.

Ease of access. In a situation which is not internal to individual history departments, university home pages in this pilot were designed in such a way a to make access to the history department home page more or less difficult. In the one case where there were three decisions to be made before finding history, the department runs the risk of never being found because it is too much trouble. Inactive links from the university home page (the case of Department B in February of 1998) also make departments inaccessible. *Webmasters need to periodically check to make sure that the university home page makes finding them nearly transparent*.

Ease of navigation. Ease of navigation is a factor internal to any web page. It has to do with its design and the success of any user in finding information. Clarity of link labels, pages that have appropriate amounts of information and explanation, and clear methods of getting back to the home page all make navigation easier. *Paying attention to the organization of information at a web site, perhaps hiring an outside designer to create the site the way one would a glossy brochure, is a critical success factor, especially if prospective students who are becoming more and more technologically sophisticated might shop for a college or university over the World Wide Web.*

Currency of materials. Universities run usually on quarter, trimester, or semester systems. Information about course offerings changes at the beginning of each of these academic periods. Unless the departmental webmaster has tied herself into updates on a more regular basis (the "Feature of the Month"), *updates must correspond to, and anticipate, these academic periods.* (All four of the sites in this study were updated in April 1998 to reflect summer and fall 1998 course schedules.)

Continuity of web masters. At one of the four history department sites the webmaster was a graduate student--the second graduate student the department had used for a webmaster in two years. In on-line interviews with this webmaster it became apparent that some history about the site had been lost. *A critical success factor for web sites is the organization's ability to "remember" the decisions that have been made about the site and maintain continuity through various webmasters.*

Targeting informational content. The four web sites used for this pilot study appeared to target at least five customer bases: prospective students, present students, alumni, faculty, and

individuals not directly related to the university who could be interested in historical research. *Strategic planning would dictate that not just the webmaster, but stakeholders in the success of the department, need to decide who might access, read, and make use of materials on the department's web site.* Alumni giving, student applications, faculty research and teaching, and administrative agendas all might be critical targets for a department's web site.

.16. Critical Success Factors for Web Pages Housing Primary Source Documents (back to table of contents)

The final section of this paper deals with areas for future research. The issue of primary source documents is also an area for future research. At the time of the 1996 survey and interviews several historians were considering putting primary source materials on web sites for their classes. Several historians were using primary source documents that were "out there" on web sites not attached to the university's home page. Research is definitely needed in order to assess the electronic information needs of historians in their research and teaching, deciding what the critical success factors are for making primary source documents available in electronic formats. Central to these critical success factors appear to be electronic surrogates for print sources and verification of their authenticity of these electronic documents, as well as the archiving of and access to materials that have only appeared in digital formats.

.17. Conclusions (back to table of contents)

There were four theoretical issues which drove the analysis of the data in this study: diffusion of innovations, technological gatekeepers, critical success factors, and web site evaluation. The research has highlighted the areas in which historians have seen measurable diffusion of a series of technologies into their work environments, personal computers, electronic communications, and World Wide Web access among them. Similarly highlighted were those factors which have created barriers to the diffusion of innovation--time and information about information arising as the most critical issues. Central to the diffusion of innovation among historians appears to be the technology gatekeeper of each department. These individuals have the ability to keep others in the department technologically "up to speed," but only if they have enough time and energy (and perhaps enough compensatory time from the department) to help when help is needed. These technology gatekeepers have the potential for taking on the task of webmaster in the department, another role which requires large numbers of information channels and strategic planning in gathering and disseminating information.

Critical success factors for historians' use of electronic information

access technologies center upon historians' need for individual attention in a timely manner, and upon learning about new technologies that would be of assistance to them in their research and teaching. Additionally, as computing moves from a centralized function of the university to a distributed function which has become the responsibility of various departments, there is a critical need to think strategically about how these resources can be used to benefit the department, its students and faculty, and additional stakeholders beyond the walls of the university. Finally, World Wide Web dissemination of departmental information, as well as primary source documents, has the potential to change the way historians do their work. Since web technologies are still developing, maturing, and changing it seems apparent that all user populations, historians included, will need to find efficient ways of learning about and using these technologies without wasting valuable time and energy. Although it would appear that the technology expert in these history departments has moved at least somewhat from the edge of the profession, it remains to be seen whether we will enter an age where it is possible to speak of these individuals as "insurgents aiming at its core."

.18. Future Research (back to table of contents)

The 1996 survey of historians across the four University Center campuses of the State University of New York was a picture of academics in flux. This is equally apparent from the recent creation of home pages in the departments as well as from the emerging listing of course materials that were on the web. There is a profusion of research topics which could follow from this study. In particular, a repeat of the 1996 survey would create a second picture of academic historians, allowing for longitudinal analysis of their use of electronic information access technologies and of the process of diffusion of these technologies.. Additionally, the same questionnaire could be administered to historians at other academic institutions, or to a group of high-tech historians, in order to look for the sources of varying electronic information access use within the community of academic historians. Finally, the pilot study of the four departmental home pages is not generalizable to any larger population as a result of its small sample size. Future research needs to involve the creation and dissemination of materials for the World Wide Web, concentrating not only on the evaluation of web materials and presentation, but also upon the use of web pages as strategic tools for attracting students and faculty as well as for providing critical information sources for these individuals in their research, teaching, and studies.

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Email: Deborah Lines Andersen dla@cnsvax.albany.edu

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