

CONVERGENT FLOWS: HUMANITIES SCHOLARS AND THEIR INTERACTIONS WITH ELECTRONIC TEXTS¹

Suzana Sukovic²

This article reports research findings related to converging formats, media, practices, and ideas in the process of academics' interaction with electronic texts during a research project. The findings are part of the results of a study that explored interactions of scholars in literary and historical studies with electronic texts as primary materials. Electronic texts were perceived by the study participants as fluid entities because the electronic environment promotes seamless interactions with a variety of media and formats. Working with electronic texts combines some traditional information and research practices into new patterns of information behavior. The practice called "netchaining" combines aspects of networking with information-seeking practices to establish and shape online information chains, which link sources and people. Different forms of exploration of participants' research questions were enabled by interactions with electronic texts.

Introduction

Electronic information technologies have triggered significant changes in many areas of everyday life and scholarly research, but it had appeared for some time that the humanities were largely unaffected by new technologies. An impulse for change had been apparently contained in peripheries of the humanities field. The main reasons were often identified as the nature of humanities research, limitations of information and communication technology (ICT), and scholars' resistance to technology in general.

Humanities research deals with the "creative, imaginative, the subjective world" [1, p. 250]. The main contribution to the discipline is usually in-

1. The author wishes to thank Joyce Kirk, Theresa Dirndorfer Anderson, and reviewers for their comments about this article.
2. Program coordinator, Digital Innovation Unit for the Humanities, Arts and Social Sciences, The University of Sydney, Sydney, P.O. Box 123, Broadway NSW 2007, Australia; E-mail suzana.sukovic@gmail.com.

[*Library Quarterly*, vol. 78, no. 3, pp. 263–284]

© 2008 by The University of Chicago. All rights reserved.

0024-2519/2008/7803-0001\$10.00

dividual interpretation based on interaction with a wide variety of primary materials. The way in which electronic technology enables the use of primary materials and the way in which scholars engage with primary sources in electronic form are the central issues in the employment of electronic technologies in the humanities. Stephen Wiberley and William Jones noted, "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" [2, p. 428]. Jerome McGann wrote about the "material revolution" in which we reconceive the entity of our cultural archive of materials [3]. Widely accepted electronic texts (e-texts) are expected to revolutionize research to such an extent that some authors see them as a catalyst for a cultural change equivalent to major developments in the history of print [4].

Although digital collections are growing rapidly, evidence for the scholarly change has not been conclusive yet. Deborah Lines Andersen found that the "humanities have been the most resistant to digital endeavors" [5, p. 9], confirming Virginia Massey-Burzio's view that scholars in the humanities have been skeptical about technology [6]. However, there is some evidence that the situation has been changing. In our comparatively fast-paced world, it is easy to forget that a decade is a split second in the life of the humanities, probably the oldest scholarly field. Only fifteen years ago, Matthew Gilmore and Donald Case [7] wrote that electronically published materials were a step back in some ways. They observed that the cost of electronic publications was a factor that severely reduced access. A decade later, democratized access to materials in electronic form was flagged as one of the most important benefits brought by electronic technologies, particularly the Internet. Wiberley and Jones [2] found that, over a period of ten years, most academics, even senior scholars without much interest or inclination, increased their use of electronic technology. Three reports from Australia [8], the United Kingdom [9], and the United States [10] documented an increased engagement with ICT in the humanities.

The perceived value of the engagement with new technologies may depend on the particular subdiscipline or the department, but the literature and anecdotal evidence both suggest that it is not very high in the mainstream humanities. Martha Brogan and Daphnée Rentfrow [11] investigated recent journals in American literature and found very few articles dealing with digital scholarship. Studies of citation patterns, such as Suzanne Graham's investigation of citations in historians' professional publications, show that electronic resources do not rate highly in published works [12, 13]. Andersen wrote that tenure and promotion committees tended to discount digital works [5].

Noticing and documenting the change is difficult for two main reasons. First, the influence of information technology in the research process is

often missing from published works. Second, the nature of electronic media makes it difficult to monitor their contribution to the research process. The American Council of Learned Societies (ACLS) [10] noted that infrastructure is deeply embedded in the way we work but that, when it is efficient, it is invisible. Carole Palmer wrote that the Internet and local digital library collections tend to be perceived “as one big digital blur of information, quite separate from personal or physical library collections” [14, p. 1144]. Although “digital blur” probably makes it more difficult to notice the impact of different aspects of online interactions on research, the effects of search engines capable of gathering information and large amounts of materials very quickly have been observed. The ACLS [10] found that recent trends in scholarship have broadened our understanding of what type of material belongs to any academic discipline, which has led to the inclusion of a much wider range of materials.

Research in the humanities is a process that includes numerous nonlinear paths in the search for relevant information and connections between scattered sources. One practice that allows the establishing of connections is chaining, described by David Ellis as “following chains of citations or other forms of referential connection between material” [15, p. 483]. Another prominent practice that promotes discovery is browsing [16–18]. Serendipity is an integral part of the research process, enabled by practices such as browsing, but the literature often mentions the lack of possibility for serendipitous discovery as one of the significant shortcomings of electronic environments. Allen Foster and Nigel Ford [19] overviewed the literature that discussed serendipity in electronic environments. The use of personal names for searching and organizing information is also a common practice in the humanities [20, 21].

There is disagreement on whether scholars can employ their significant practices in electronic environments and whether electronic sources contribute to intellectual aspects of their work. Helen Tibbo [22] found that historians seemed to be using the Internet in the same way in which they traditionally used printed repository guides or the telephone, but she also noted that people “tend to base their information-seeking behaviors on what they expect to find” [23, p. 29]. It can be expected that practices will change as more materials and services become available. Participants in Brogan and Rentfrow’s study [11] appreciated search capabilities because they facilitated access to large amounts of material and the establishment of connections in ways that were impossible or impractical before.

Scholars in the humanities tend to work alone, but networking and participation in invisible colleges are important ways of keeping in touch with colleagues [8, 24, 25]. Sanna Talja, Reijo Savolainen, and Hanni Maula [26] showed that mailing lists have been important to researchers in scarcely populated fields because of their social and informational value.

The Internet fosters short-term exchanges with strangers rather than colleagues, which are potentially valuable in accessing new information [14]. Paul Genoni, Hellen Merrick, and Michele Willson's [27] survey showed that over 72 percent of academics in their study used the Internet to activate latent ties. The concept of latent ties, based on Caroline Haythornthwaite's description, includes "individuals working within the same occupational or professional group, who may be aware of each by name or reputation, but who have not had previous personal contact" [27, in the section "Strong, Weak, and Latent Ties"]. According to Susan Leigh Star, Geoffrey Bowker, and Laura Neumann [28, p. 244], "information artifacts undergird communities of practice, and communities of practice generate and depend on these same information resources." The authors described convergence as "this process of mutual constitution."

The literature offers a range of studies on the information behavior of the humanities scholar; some are focused on the use of digital resources in the humanities, but none deals primarily with the use of e-texts. Several studies have been conducted that deal briefly with the use of e-texts as part of a broader investigation [4, 6, 11, 29] or that investigate the use of a particular electronic resource [30–34]. Although primary textual materials are central to research in the humanities, there is a gap in our knowledge about the role of primary materials in electronic forms in the research process. There is a need to explain how researchers interact with e-texts and how these interactions contribute to the research process.

Methodology

Study Design

Qualitative methodology was used to investigate research projects in which e-texts have been used and the nature of academics' interactions with e-texts. This study focused on exploring the roles of e-texts as primary sources in the projects aiming to produce traditional outputs. It dealt with the use of e-texts as a resource and tool, as opposed to projects that aimed to produce electronic textual editions or enhance e-texts in any way. Investigated research projects were in the areas of literary and historical studies because both fields are known for extensive and sophisticated use of textual resources.

Hermeneutics provided a philosophical and methodological framework for the study. Hermeneutics as a philosophical tradition based on studying text and Hans-Georg Gadamer's reflections on phenomena of understanding and interpretation [35] are particularly relevant, considering that this study investigated interactions with text and that interpretation and text define scholarship in the humanities in many ways.

TABLE 1
STUDY PARTICIPANTS

	Number of Participants
Total	16
Gender:	
Female	9
Male	7
Field:	
Historical studies	9
Literary studies	7
Career stage:	
Early career researcher	2
Midcareer	5
Senior	9

Study participants.—Researchers who worked in universities in a major Australian city were initially invited to discuss their current and recent research projects in which they had used e-texts at least once. In later stages of data gathering, theoretical sampling was required to identify scholars who worked with electronically born literature, in order to explore further some issues raised in the first round of interviews. The final group of study participants included scholars from six universities in two Australian cities and one participant from a university in the United States (altogether, sixteen participants). There were nine female and seven male participants in different stages of their careers (see table 1).

Participants researched a wide range of time periods and topics from a variety of disciplinary orientations. Literary scholars discussed projects that explored subjects in a broad time range, from Old Icelandic literary studies to biographies of contemporary authors, and in a variety of fields, from creative writing to criticism of electronic poetry. Historical projects included, for example, studies in religion, cultural studies, and eighteenth-century English history.

In order to protect participants' anonymity, numerical codes were used instead of names to label all data gathered during the study. The labels are in the format 1/1, the first number indicating the number of the participant and the second standing for stage 1 or 2 of the study (e.g., 2/1 means participant 2 in stage 1). All references that could reveal participants' research topics were replaced with more general terms to protect participants' anonymity and their ownership of ideas. I would like to acknowledge that numerical codes may have the effect of constructing participants as peripheral to the study [36]. The choice of numerical codes in this study was based on two considerations. First, it ensured an effective way of labeling data gathered in two research stages without identifying

participants who continued their participation. Second, pseudonyms imply gender and ethnicity, which were not relevant in this study. An occasional use of a personal pronoun when presenting views of a participant makes gender less prominent than would be the case if a pseudonym was repeatedly used to identify the participant. Numerical codes are not meant to construct a participant as a faceless entity.

Data gathering.—The study had two stages. The first stage included in-depth semistructured interviews and examination of participants' manuscripts and published works, as well as examination of some e-texts mentioned during interviews. The second stage involved detailed data gathering from a group of four academics drawn from the participants in the first stage. Data were gathered throughout 2005 and 2006. The study investigated thirty research projects.

In the first interview, participants talked about some general issues relating to their engagement with e-texts, and they discussed one finished and one current research project. The interviews in the first stage lasted sixty-five minutes on average.

The participants in the second stage recorded data about their interactions with e-texts during the current research project identified in the first interview. The participants were asked to record data on forms and audiotapes. Data-gathering forms were designed as a memory aid for the participants, who were asked to record brief details about e-texts they used. The study participants were also asked to record their comments on audiotapes, reflecting on any interesting aspect of their interactions with e-texts during the current project. Researchers who completed forms and/or recorded comments discussed recorded information in the final interview. It appeared that forms and tapes served as a memory aid during the final interviews. In the second interview, the participants talked about the details of the research project and their view of e-texts in the research process. The second-stage interviews lasted one hour and fifteen minutes on average. Participants' publications arising from their projects were examined throughout the second stage of data gathering (see table 2).

Data analysis.—The interviews and tapes with comments were fully transcribed. Data from interviews were used in audio and written form during much of the analytical process, to aid interpretation. Understanding developed in considering part and whole in the hermeneutic circle, which Thomas Schwandt [37, p. 114] described as a method that "involves playing the strange and unfamiliar parts of an action, text, or utterance off against the integrity of the action, narrative, or utterance as a whole until the meaning of the strange passages and the meaning of the whole are worked out or accounted for."

TABLE 2
DATA-GATHERING SUMMARY

Stage of the Study and Method	Number of Participants
First:	
Interview	16
Examination of participants' works	15
Second:	
Interview	4
Audiotape with comments	2
Data-gathering forms	2
Examination of participants' works	3

NOTE.—In both stages of the study, e-texts were examined when they were accessible and when sufficient details were available to retrieve them.

Grounded theory techniques described by Anselm Strauss [38], Strauss and Juliet Corbin [39, 40], and Barney Glaser [41] were used to code transcripts. After developing an initial coding scheme, the software NVivo was used for the coding. The coding scheme was refined and developed at different levels of abstraction as additional data were gathered.

Credibility.—Credibility was ensured by triangulation of data sources and methods [42], as well as by prolonged and persistent engagement with the field of inquiry, avoiding the danger of “going native” and building trust with participants [43]. Documentation of the research process contributed to the credibility of the study. Referential adequacy [43] and descriptive validity [44] were ensured by taping and transcribing interviews and participants' comments. Participants' published works also provided a reference point. Procedural and reflective memos were written during the study to provide data about the research instrument.

Joseph Maxwell's approach to validity “refers primarily to accounts, not to data or methods” [44, p. 42]. Triangulation of methods in this study was used in a way that strengthened interpretive validity. Accounts in participants' own words provide some evidence for interpretation.

Limitations of the study.—The exploratory study aimed to investigate a range of issues concerning scholars' engagement with e-texts, based on in-depth data gathering. The study results do not have any statistical significance and cannot be generalized beyond the study data. The selected group of participants was not unique in any way, so a comparison with similar groups of scholars is possible. The literature suggests significant similarities between researchers in different countries, but there may be some national differences.

Convergent, Divergent, and Parallel Flows

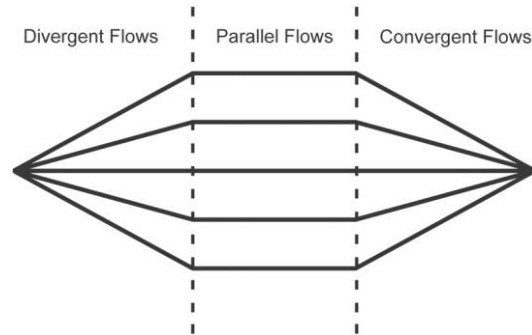


FIG. 1.—Divergent, parallel, and convergent flows (based on [45])

This article presents some study findings related to the converging formats, media, practices, and ideas that result from working with e-texts. Some experiences of working with e-texts and aspects of academic writing and presentation of research results are also part of the convergences identified in the study, but they are omitted from this article because their coverage would exceed the limitations of a single journal article. However, it is important to acknowledge the existence of converging tendencies in academic styles and genres, which contribute to changes in the research process.

I would also like to acknowledge that converging tendencies do not present the whole picture of scholars' work with e-texts. Divergent and parallel developments are present as well. The diagram in figure 1 is based on research into the evolution of glacial ice [45], but it provides a framework for thinking about flows that can be observed in the electronic environment.

Divergent tendencies appear in the development of different research projects arising from the same idea or in the shift of some aspects of the project into new online activities. Divergence is also noticeable as branching out from one's scholarly field to explore materials and ideas in other disciplines and in alternative, nontraditional sources. Parallel flows provide a way of thinking about multipurpose environments as well as parallel investigations of the same problem. Parallel flows can also describe scholars' work on different projects or tasks, which could have had the same source and could converge at some point. Convergent flows describe the movement from various directions to one point, such as the contribution of ideas from disparate sources or disciplines to form an understanding of the topic. While acknowledging the existence of divergent and parallel flows, I will focus on convergent flows.

Understandings of E-Texts: Converging Media and Formats

Definition of "e-text".—The notion of text and textuality has been changing since the beginning of the twentieth century, so that it now encompasses linguistic and nonlinguistic forms. When text, with its numerous meanings and connotations, appeared in the virtual space, defined by mutable objects and fluid boundaries, further reshaping of textuality was inevitable.

An understanding of text in this study was derived from François Rastier's [46, p. 265] and Paul Ricoeur's [47, p. 43] definitions, which see text as a linguistic phenomenon. For the purposes of this study, "text" is defined as an autonomous linguistic chain (oral or written) that constitutes an empirical unit, fixed by writing or recording.

The term "e-text" in this study means any textual material in electronic form used as a primary source in literary and historical studies. Primary materials are usually poetry, stories, novels, plays, and a variety of historical documents—government, public, or private. Digitized archival copies of magazines and newspapers as well as Web sites and blogs could be e-texts as defined here when they are used as primary sources. E-texts could be written or spoken (e.g., oral histories), digitized or created electronically, and stand-alone documents or part of electronic databases and editions.

Textual fluidity.—The definition in the previous paragraph was communicated in different ways to the study participants. Although I have been aware of the mutable nature of electronic textuality, I expected that occasional clarifications were all that might have been needed, considering that the participants have had very clear understandings of the nature of primary materials. As it turned out, the nature of the online environment and electronic textuality determined understandings of e-texts to such an extent that any definition provided only loose boundaries once people started to talk about their experiences with e-texts. The original definition was retained throughout the study, but participants' ways of viewing e-texts were taken into account when it was necessary to understand their perceptions of e-texts and their interactions with these sources.

E-texts are not solid objects. The convergence of formats, media, and information flows makes fluidity one of the most essential characteristics of electronic textuality. The participants talked about the ubiquitous nature of e-texts and referred to them as if they had a gaseous or liquid state of aggregation: "It becomes like the air you breathe. It's very difficult to talk about because it's everywhere" (participant 10/1). A number of participants compared e-texts to a rich and unpredictable ocean. It is a "vast ocean of information out there and I can draw on that when I feel like it" (participant 9/1). Or, exploration of a textual database is like "going in fishing, pot luck to see what turns up" (participant 6/1). That ocean

can also be threatening and overwhelming, making it difficult to define the boundaries of one's project.

It is certainly true that a "vast ocean of information" exists in analog forms as well. What distinguishes work with e-texts is that their unique complexity and interactivity are enabled by computerized search and speed rates, in which diverse sources are brought together. The Internet provides loosely ordered environments, which gather sources that traditionally do not exist in the same space. The speed in following hunches and patterns of information, combined with a lack of traditional reference points, underpinned participants' perceptions that they were dealing with a vast and rich, albeit unpredictable, ocean.

Converging media and formats.—The fluidity of e-texts embraces different formats and media, such as bibliographic records, transcribed textual materials, page images, and visual materials—sources that do not belong together in traditional divisions of material types. Bibliographic information found in catalogs becomes part of searching and exploration, leading to e-texts or other sources of information. However, constant and relatively quick iteration of search, retrieval, and interaction with sources, all happening in the same physical space, makes the process and its elements hard to distinguish from each other. Google and anything produced by Google and other search engines tend to be seen as e-text.

It is often difficult or irrelevant for the researcher to differentiate between page images and transcribed texts. At the same time, images without linguistic content tend to merge with textual sources. This happens either because images are part of digitized pages and/or because the search process does not require that they be perceived as different formats. One participant worked extensively with images of archival parish maps that had important handwritten inscriptions on them. In her use of all sorts of images, she found catalog records to be an important and integral part of her research—the records "textualized" images and "put searchable language onto images" (participant 3/1). This participant combined various searching techniques to bring together materials in different formats (e.g., images and transcriptions of old newspaper articles, photographs, annotated maps) to help her make connections and see patterns. In this case, annotations on the maps as well as bibliographic records, which "textualized images," merged with other materials, all of which could be searched and retrieved at the same time for the same purpose.

Participant 13/1 talked about e-texts used in a project and referred to visual and textual sources, which revealed patterns of information in the search process. When asked what e-texts were used in the project, participant 5/1 answered, "Basically, I'm thinking here of digital images of the engravings that are on library and other archival Web sites."

Even when e-texts are clearly textual sources with linguistic content, other media are intrinsically present. The best example is electronic poetry, in which words become kinetic and visual elements are an integral part of the poetic text. Although graphic elements have been significant in some print-based genres, electronic media enable movement and inclusion of other media in novel ways, which can change literary genres. The linguistic nature of textuality changes, and one of the participants commented that “you’re writing a kind of picture” (participant 16/1). The relationship with music is easily established in the environment in which written words are often associated with sounds.

Sometimes it is even hard to distinguish between analog and electronic texts. If an archive digitized an old manuscript page to avoid photocopying and gave a printout of a digital image to the user, it can be argued that the printout is a hard copy of both analog and electronic formats. One participant thought it was ironic that a rare book library offered printouts of scanned pages but did not offer the digital images of pages.

In the electronic environment, physical boundaries and physical space do not exist, which promotes a sense of fluid movement through the electronic domain. While the users of a traditional library do not need to know about the fine details of the library system, they cannot help but be aware that they have stopped using the catalog and have physically moved to the stacks or that they have put a book back on the shelf and need to play a videotape. Physical movements and interactions with different physical objects do not exist online, which has its positive and negative effects. Limitations of electronic formats and environments as well as intrinsic qualities of different media are reasons why most users need materials in analog and digital forms, but materials in electronic form have their unique advantages. Not only is it convenient to access materials quickly from one’s own home or office and to gather materials scattered in many physical collections, public and private, but it is usually easier to handle electronic files than large bound volumes or crumbling microfiche. Participant 3/1, for example, talked about the convenience of accessing digitized archival materials on the Web sites of the New South Wales (NSW) Department of Lands and the State Library of NSW.

Not only do multimedia environments support converging formats in a technical sense, but the smooth move from a catalog record to an electronic monograph and film promotes the convergence of media and formats in the user’s perception—and this, in turn, promotes the convergence of ideas. Participant 3/1 explained the significance of being able to access and search large bodies of materials online:

Interviewer: When you explore the ideas related to your research, does it help you

in any way to follow certain threads more easily? Does it help you to explore more than you otherwise would? Or it doesn't change that?

Participant 3/1: No, no, it does. It changes that dramatically with images . . .

Interviewer: How does it change that?

Participant 3/1: Because it allows me to build networks of connections.

Netchaining: Converging Practices

The discussions about scholars' interactions with e-texts uncovered a number of converging and transformed practices of networking and information searching. I will describe a combination of information behaviors occurring on the Internet, which I call "netchaining" because it combines aspects of networking, chaining, browsing, and Web surfing in a new pattern. Netchaining is about establishing and shaping online information chains that link sources and people.

Netchaining is the Internet behavior that combines all of the above practices in traditional and new ways. Chaining is a traditional form of following references, but on the Internet, another source may be only a click away if there is a link, or it may require a brief additional search to retrieve the referenced source. Participant 1/2, for example, talked about finding references to primary sources in academic journal articles available from Project Muse or the Academic Search Elite database and then moving from the journal article to a primary source during the same searching session. Online chaining can widen to include communication with the author, whose contact details appear as part of the reference or the linked e-text.

The practice of browsing was transferred to the electronic environment and may include browsing of digital collections as well as Web surfing as a way of looking for relevant information by searching and following hyperlinks. Chaining is often combined with browsing and Web surfing. Participant 2/1, for example, talked about doing a keyword search online, retrieving e-books that were used as primary materials, examining Web sites of some people recommended by colleagues or identified online, examining blogs, and participating in online discussions in order to find more information about a research concept. Participant 5/2 had favorite Web sites created by communities of research interests. This researcher would go to the Web sites to retrieve relevant e-texts through searching and browsing and to visit the bulletin boards and discussion sections. The difference between traditional chaining and browsing often disappears online. If a reference to another source is provided as a hyperlink, it is difficult and probably irrelevant for practical purposes to establish whether following the link is part of the general browsing of a collection, surfing

the Web, or a straightforward online version of traditional chaining. Traditional browsing and chaining are ways of discovering materials that cannot be found through catalogs and indexes. Online variations of these practices have the same aim. However, the ease and speed at which the scholar can employ searching, browsing, chaining, and surfing practices change the nature of the interaction, and, more importantly, the ease of interaction with other people brings new aspects to the process.

Communication with people can be part of an online search for information (e.g., asking how to obtain documents), interaction with materials (e.g., clarifying details from a document), or networking (i.e., connecting with people). The common practice of searching by personal name has been widened to include checking various details about a person and, possibly, communicating by e-mail. The ease of contacting people strengthens informal communication and opens access to alternative sources of information. Traditional networking by participation in invisible colleges is practiced through participation in online academic forums. However, netchaining includes communication with a variety of people in formal and informal ways. Some aspects of online communication are unique. For example, one participant (16/1) found that authors of electronic poetry were usually more responsive than authors of print-based poetry and were willing to reveal requested information about technical aspects of their work because they were interested in discussing their technical solutions. Another participant (9/1) used Web sites and online discussions to keep in touch with communities that were a subject of her research, which was not possible in other ways. For this researcher, electronic materials discovered or created in the process of communication provided unique primary data.

In many cases, networking happened as part of finding and checking information. When asked what she liked about e-texts, participant 7/1 responded:

I guess the immediacy. So when you found someone in particular who had written something you really like and then written it in the last two years and their e-mail address was at the bottom, you actually also realize you could go and talk to them. And then if you like them, you could connect them in with your [name of the topic] network. So that whole people-publication actually humanly connecting with them thing works.

Interviewer: So you contact them and what happens then?

Participant 7/1: Well, then you'd say, look, I really like this article, can I just check, when you said 1838, did you mean that, or was that the '39 one? Just little details like that. And, you know, you're going to come to Australia, we're thinking of having a conference and, you know, that sort of thing.

In traditional chaining, a reference in a footnote would be used as a lead to another document. In the situation described above, a note at the bottom of the screen provided an e-mail address, which led to interaction. In this example, the researcher wanted to contact the author whose work was interesting, and their communication combined information seeking and networking.

Four main reasons motivated netchaining activities that involved other people in some way: to find information, to aid access to a physical collection, to confirm information, and for purposes of current awareness.

To find information.—An example of contacting people to find additional information is already mentioned in relation to the participant who contacted authors of electronic poetry to check technical details. Participant 15/1 referred to a situation in which online communication with a friend helped him to clarify details and find a needed e-text.

To aid access to a physical collection.—Participant 2/1, for example, talked about contacting an archivist after consulting online samples of materials, to aid access to a physical collection and organize a visit.

To confirm information.—The excerpt from the interview with participant 7/1 quoted above provided an example of contacting the author to check information: “Can I just check, when you said 1838, did you mean that, or was that the ’39 one?” Participant 2/1 mentioned situations when information looked suspicious but an alternative source did not exist or was not readily available. Communication with people on a discussion list and electronic correspondence with the author can be used to confirm information: “I would ask colleagues or post it on a discussion list or check it with, like I said before, check the contact person or the copyright” (participant 2/1).

For current awareness.—A number of participants mentioned certain Web sites they checked regularly for current awareness purposes, particularly Web sites that were likely to publish the latest works by modern authors. One of the participants (10/1) regularly checked a Web site of a poet’s fan because the poet tended to publish his new works there. In other cases, a secondary document may lead to primary materials readily available on the same database (e.g., JSTOR) as well as provide a link to information about the author, which is used for current awareness rather than for the satisfaction of immediate information needs.

Communication with other people is not necessarily part of netchaining, as illustrated by examples where netchaining included a combination of other techniques, but it is an important part of the online behavior. Table 3 summarizes why participants initiated netchaining activities that involved approaching other people at some point. Reasons and netchaining activities can be combined so that one reason can include several netchaining

TABLE 3
REASONS FOR INITIATING NETCHAINING ACTIVITIES INVOLVING OTHER PEOPLE

Reason for Netchaining	Netchaining Activities
To Find Information	
If interested in a document	Contacted a person who may know
To confirm detail(s)	Looked up author's Web site
If information is crucial	Made a note for future use
If author's authority could not be discounted	Contacted the responsible person and asked question(s)
If curious	Connected that person into own network, invited to a conference
If interested in technical details of electronic literature	
To Aid Access to a Physical Collection	
To confirm details about a collection	Contacted archivist listed on the Web site
To arrange a visit to an archive	
To Confirm Information	
When worried about trustworthiness of a document	Posted a question to a discussion list Contacted the responsible person
For Current Awareness	
When coming across new work and wondering what other people do	Contacted the author Initiated online discussion about the type of work people are doing Contacted people outside the discussion list

activities from the same category. In the first category, to find information, contacting another person is a necessary first step.

Netchaining often reinforces and widens connections based on authority. The participants contacted people perceived as authoritative in certain respects (e.g., the author, the archivist) to check information. These connections were also widened by contacting people who “sounded interesting” (participant 2/1) and maybe involving them in some professional activities or discussing issues outside formal forums. The immediacy is an important part of the ability to make these connections.

The significance of netchaining for participants ranged from an occasionally useful practice to the perception that this was a critical element of their professional identity. One of the participants talked about a network intelligence formed by linked data and artistic and intellectual agents. For this researcher, netchaining as a form of participation in the network intelligence meant “mainly just who I am” (participant 15/1). This participant talked about new ways of doing scholarly research, which started from traditional fields—in this case from English departments—to grow

in new directions. The clarification that the new direction had become a new discipline came from feedback from people who form networks of online connections.

Netchaining is an important way of gathering information by following broad and unpredictable information paths. It has the potential to contribute to interdisciplinary exchanges. Fast retrieval of a wide range of materials inevitably brings to the scholar's attention a variety of materials. Study participants frequently searched the Internet to find and confirm information in a broad area of interest. Interdisciplinary investigations are divergent in the sense that they spread out to other disciplinary fields, but they enable the convergence of information and ideas.

As in many other aspects of interactions with e-texts, netchaining does not include completely new information behaviors that could not be compared with anything that was done in traditional ways. However, the ways in which various information-seeking and networking practices come together for various purposes reveal a new pattern of electronic interactions.

Exploration: Converging Ideas

The multiplicity of sources, formats, and textual information that could be quickly brought together form a basis of exploration that allows scholars to see different meanings and aspects of the topic. In the process of exploring traditional and nontraditional sources and experimenting with different approaches online, connections and patterns emerge.

The participants in the study, particularly if they were working on a relatively new topic, started with an Internet search to learn about the background of a topic, discover main bodies of materials, and build a bibliography. After the initial orientation, scholars started exploring their research questions by investigating events, particular works, issues, and ideas in depth. The convergence of ideas happened during online exploration of large amounts of materials as well as by interrogating a limited range of texts.

Exploration of patterns and connections is a prominent online practice described by researchers in historical studies. The researchers searched for a variety of materials from different sources to build a profile of the topic. Critically important aspects of the search are search engines, which retrieve information in a systematic way and provide access to a wide variety of genres. Participant 13/1 commented that "oral history often gets captured in the blogging culture." Searching for information on a historical personality retrieves blog entries as well as "local historical society online postings about him. There you've got a whole range of different registers of different genres of text all turning up in the electronic version" (participant 13/1). Newly established connections point to other possible directions, and the scholar keeps moving "backwards and forwards between

a whole range of sources" (participant 3/1), including digital and analog materials. Electronic access to large amounts of materials from different sources allows a scholar to make comparisons and see connections, which was not possible before: "And we wouldn't actually have imagined making those sorts of links because it wouldn't be simple to do, so we wouldn't have even bothered" (participant 3/1).

Although some scholars thought that digital environments were not conducive to browsing and serendipitous discovery, others found that they allowed new forms of serendipity to emerge. One participant is a researcher in both literary and historical studies, who sometimes combined these disciplines in the same project. He described a search during which he had two browsers open while working on a historical project, when he noticed what he thought to be surprising information related to another research interest in literary studies. To divide the two threads suddenly emerging, he opened other windows to follow the second thread. Finally, he downloaded a large number of poems related to the literary project for future investigation. These poems were not available in hard copy. In the process, he realized that there was a strong connection between the two different research interests. The researcher found "that link logic, that hypertextual kind of logic helps one understand relationships . . . quite well" (participant 6/2). The participant talked about the value of this discovery: "And I find this again and again, that investigating the gardens . . . leads quite quickly to investigating other aspects of the Zen aesthetics, for example, so I could start with the gardens and within three or four minutes end up looking at a Black American's poetry writing. But it is very strongly related, and I love that sense of how, if I would have just said to you, 'I've got a couple of topics I'm interested in, Zen gardens and the late writing of [author],' we wouldn't have seen a connection at all."

Serendipitous discovery also happens by opening several windows on the computer desktop. There are similarities between serendipitous discovery that happens in browsing books or other media and serendipity occurring when someone works with several computer windows. Library books are organized by subject, so shelves collocate books that may be relevant to someone working on that subject. Windows contain the content related to the scholar's research interests, and they collocate materials around the researcher's sense of what is relevant.

These examples illustrate the convergence of the parallel flows. The new ways of working, which rely on quick retrieval of large amounts of materials and searching of patterns, encourage a new type of investigation. Some serendipitous discoveries emerge in moving quickly through large amounts of diverse materials when juxtaposition of ideas and information trigger novel combinations.

Interrogation of textual databases or a limited range of texts to explore

research questions was described by scholars in both literary and historical studies. Although it is possible to work in this manner online, all participants who referred to the interrogation of textual databases worked offline.

Similar to explorations of large amounts of diverse materials, in-depth exploration of a small number of texts allows researchers to investigate connections. Participant 8/1, for example, used a database of primary materials to explore links between certain concepts and to prove his hypothesis that a widely held view in his field was not quite correct. His ideas came from the field of cognitive psychology, and the textual database helped him to apply these ideas to the field of studies in religion. It was very difficult, if not impossible, to prove his understanding by using more traditional research methods. In this case, the parallel flow of ideas in different disciplines came together assisted by the use of e-texts.

Interrogation of textual databases was also used to establish connections between different texts. Participant 6/2 downloaded a particular version of the Bible and the Book of Common Prayer to produce concordances and explore connections between these texts. Participant 12/1 prepared a database of literary motifs and plot summaries to support her investigation of connections between literary texts. As participant 6/2 said, interrogation of e-texts made it easier to “understand relationships amongst bodies of knowledge.”

Perceptions of the Library Role

The university library was seen as a major factor in promoting e-texts. The researchers observed organizational encouragement in the way libraries worked: libraries preferred electronic forms, there seemed to be money for electronic resources, and library staff sent notifications about sources and organized seminars for academics. Considering participants' responses, there may have been significant differences in the way different libraries or even subject librarians communicated with academics. Although no one criticized librarians, some participants emphasized how important the services were that they received from their subject librarians (e.g., circulated information about new sources and suggestions), while others discussed difficulties they had in learning how to work with e-texts in the absence of any training or workshop organized through their institution.

The range of available sources differed between participants' institutions. The participants mentioned initiatives to make some expensive sources available through academic networks to several universities as very helpful. In the complex process of evaluating the trustworthiness of e-texts, researchers valued access to e-texts that had been digitized or selected by trusted libraries. They also preferred institutional support when they used

new software and tools because it was easier to work with new technologies if training and technical support were available at the workplace.

Discussion and Conclusions

The Internet gathers a diverse range of material types that do not coexist in any single physical collection. Online interactions further promote the convergence by blurring the boundaries between a variety of media and formats. Different understandings about what constitutes scholarly evidence influence scholars' decisions on how to approach the diversity of online materials, but, at the same time, available materials shape the understanding of the topic and selection of the evidence. The study has provided evidence of the contribution of scholars' interactions with e-texts to intellectual aspects of the research process.

Scholars work with e-texts in ways that employ traditional behaviors, and some academics engage in new information and research practices. Chaining is a behavior that has been transferred and sometimes transformed in electronic environments. Serendipity is still an important part of information encounter, but it may take new forms enabled, for example, by netchaining and the way in which computer windows present information. Online practices promote convergences based on information discovery and informal communication, which may include members of the community of practice as well as anyone who may be related to a research interest or an information trajectory.

Research libraries have a significant role to play in supporting these changes by providing sources, expert advice, and technical support. The study confirmed indications from the literature that ICT is embedded in working practices, which often makes it invisible [10]. It has implications both for methodologies of studies that aim to investigate the use of ICT in general and e-texts in particular and for the design of electronic environments.

The convergence of formats, media, and practices points toward the development of new settings, which would allow further convergence of existing online communication and information environments. These new environments need to provide for divergent and parallel movements as well. Investigations of how to map and support existing tendencies and how to apply them in new ways need to consider settings for a range of disparate activities including online communication, search of large multidisciplinary repositories, and textual analysis, as well as explorations involving work with software tools and multimedia productions. These new settings will enable further change and transformations of academic research and will encourage new research directions. They will provide conditions for predictable fishing and for navigating on the open seas.

REFERENCES

1. Immroth, John Phillip. "Information Needs for the Humanities." In *Information Science: Search for Identity; Proceedings of the 1972 NATO Advanced Study Institute in Information Science Held at Seven Springs, Champion, Pennsylvania, August 12–20*, edited by Anthony Debons, pp. 249–62. New York: Marcel Dekker, 1974.
2. Wiberley, Stephen E., and Jones, William G. "Time and Technology: A Decade-Long Look at Humanists' Use of Electronic Information Technology." *College & Research Libraries* 61, no. 5 (2000): 421–31.
3. McGann, Jerome. *Radiant Textuality: Literature after the World Wide Web*. New York: Palgrave, 2001.
4. Brockman, William S.; Neumann, Laura; Palmer, Carole L.; and Tidline, Tonyia J. "Scholarly Work in the Humanities and the Evolving Information Environment." Digital Library Foundation, Council on Library and Information Resources, Washington, DC, 2001. <http://www.clir.org/pubs/abstract/pub104abst.html>.
5. Andersen, Deborah Lines, ed. *Digital Scholarship in the Tenure, Promotion, and Review Process*. Armonk, NY: M. E. Sharpe, 2004.
6. Massey-Burzio, Virginia. "The Rush to Technology: A View from the Humanities." *Library Trends* 47, no. 4 (1999): 620–39.
7. Gilmore, Matthew B., and Case, Donald O. "Historians, Books, Computers, and the Library." *Library Trends* 40, no. 4 (1992): 667–86.
8. Houghton, John W.; Steele, Colin; and Henty, Margaret. "Changing Research Practices in the Digital Information and Communication Environment." Department of Education, Science and Training [Canberra?], 2003. http://www.dest.gov.au/sectors/research_sector/publications_resources/profiles/changing_research_practices.htm.
9. The British Academy. "E-Resources for Research in the Humanities and Social Sciences: A British Academy Policy Review." The British Academy, London, 2005. <http://www.britac.ac.uk/reports/eresources/report/eresources-pdf.pdf>.
10. American Council of Learned Societies' Commission on Cyberinfrastructure for Humanities and Social Sciences. "Our Cultural Commonwealth: The Report of the American Council of Learned Societies' Commission on Cyberinfrastructure for Humanities and Social Sciences." ACLS, New York, 2006. <http://www.acls.org/cyberinfrastructure/acls.ci.report.pdf>.
11. Brogan, Martha L., and Rentfrow, Daphnée. "A Kaleidoscope of Digital American Literature." Council on Library and Information Resources, Digital Library Federation, Washington, DC, 2005. <http://www.clir.org/PUBS/abstract/pub132abst.html>.
12. Graham, Suzanne R. "Historians and Electronic Resources: A Citation Analysis." *Journal of the Association for History and Computing* 3, no. 3 (2000). <http://mcel.pacificu.edu/JAHC/2000/issue3/works/graham/>.
13. Graham, Suzanne R. "Historians and Electronic Resources: A Second Citation Analysis." *Journal of the Association for History and Computing* 4, no. 2 (2001). <http://mcel.pacificu.edu/JAHC/2001/issue2/articles/graham/>.
14. Palmer, Carole L. "Scholarly Work and the Shaping of Digital Access." *Journal of the American Society for Information Science and Technology* 56, no. 11 (2005): 1140–53.
15. Ellis, David. "Modeling the Information-Seeking Patterns of Academic Researchers: A Grounded Theory Approach." *Library Quarterly* 63, no. 4 (1993): 469–86.
16. Stone, Sue. "Humanities Scholars: Information Needs and Uses." *Journal of Documentation* 38, no. 4 (1982): 292–313.
17. Delgadillo, Roberto, and Lynch, Beverly P. "Future Historians: Their Quest for Information." *College & Research Libraries* 60, no. 3 (1999): 245–59.

18. Duff, Wendy M., and Johnson, Catherine A. "Accidentally Found on Purpose: Information-Seeking Behavior of Historians in Archives." *Library Quarterly* 72, no. 4 (2002): 472–96.
19. Foster, Allen, and Ford, Nigel. "Serendipity and Information Seeking: An Empirical Study." *Journal of Documentation* 59, no. 3 (2003): 321–40.
20. Siegfried, Susan; Bates, Marcia J.; and Wilde, Deborah N. "A Profile of End-User Searching Behavior by Humanities Scholars: The Getty Online Searching Project Report No. 2." *Journal of the American Society for Information Science* 44, no. 5 (1993): 273–91.
21. Cole, Charles. "Inducing Expertise in History Doctoral Students via Information Retrieval Design." *Library Quarterly* 70, no. 1 (2000): 86–109.
22. Tibbo, Helen R. "Primarily History: Historians and the Search for Primary Source Materials." Paper presented at the Association for Computing Machinery/Institute of Electrical and Electronics Engineers Joint Conference on Digital Libraries, Portland, OR, 2002.
23. Tibbo, Helen R. "Primarily History in America: How U.S. Historians Search for Primary Materials at the Dawn of the Digital Age." *American Archivist* 66 (Spring/Summer 2003): 9–50.
24. Becher, Tony. *Academic Tribes and Territories*. Milton Keynes: The Society for Research into Higher Education, 1989.
25. Weedman, Judith. "On the 'Isolation' of Humanists: A Report of an Invisible College." *Communication Research* 20, no. 6 (1993): 749–76.
26. Talja, Sanna; Savolainen, Reijo; and Maula, Hanni. "Field Differences in the Use and Perceived Usefulness of Scholarly Mailing Lists." *Information Research* 10, no. 1 (2004). <http://informationr.net/ir/10-1/paper200.html>.
27. Genoni, Paul; Merrick, Helen; and Willson, Michele. "The Use of the Internet to Activate Latent Ties in Scholarly Communities." *First Monday* 10, no. 12 (2005). http://firstmonday.org/issues/issue10_12/genoni/index.html.
28. Star, Susan Leigh; Bowker, Geoffrey C.; and Neumann, Laura J. "Transparency beyond the Individual Level of Scale: Convergence between Information Artifacts and Communities of Practice." In *Digital Library Use: Social Practice in Design and Evaluation*, edited by Ann P. Bishop, Nancy A. Van House, and Barbara Pfeil Buttenfield, 241–69. Cambridge, MA: MIT Press, 2003.
29. Porter, Sarah. "Reports from the Front: Six Perspectives on Scholar's Information Requirements in the Digital Age." *New Review of Academic Librarianship* 4 (1998): 167–89.
30. Ruhleder, Karen. "Reconstructing Artifacts, Reconstructing Work: From Textual Edition to On-Line Databank." *Science, Technology and Human Values* 20, no. 1 (1995): 39–64.
31. Flanders, Julia. "Scholarly Research and Electronic Resources." *WWP Newsletter* 4, no. 2 (1998). <http://www.wwp.brown.edu/project/newsletter/vol04num02/scholarly042.html>.
32. Duff, Wendy M., and Cherry, Joan M. "Use of Historical Documents in a Digital World: Comparisons with Original Materials and Microfiche." *Information Research* 6, no. 1 (2000). <http://informationr.net/ir/6-1/paper86.html>.
33. Cherry, Joan M., and Duff, Wendy M. "Studying Digital Library Users over Time: A Follow-up Survey of *Early Canadiana Online*." *Information Research* 7, no. 2 (2002). <http://informationr.net/ir/7-2/paper123.html>.
34. Noguchi, Sachié. "Assessing Users and Uses of Electronic Text: In Case of the Japanese Text Initiative, Japanese Classics Electronic Text on the World Wide Web." PhD diss., University of Pittsburgh, 2001.
35. Gadamer, Hans-Georg. *Truth and Method*. 2nd rev. ed. New York: Continuum, 2004.
36. McKechnie, Lynne; Julien, Heidi; Pecoskie, Jennifer L.; and Dixon, Christopher M. "The Presentation of the Information User in Reports of Information Behaviour Research." *Information Research* 12, no. 1 (2006). <http://informationr.net/ir/12-1/paper278.html>.

37. Schwandt, Thomas A. *Dictionary of Qualitative Inquiry*. 2nd ed. Thousand Oaks, CA: Sage, 2001.
38. Strauss, Anselm L. *Qualitative Analysis for Social Scientists*. Cambridge: Cambridge University Press, 1987.
39. Strauss, Anselm, and Corbin, Juliet. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. 2nd ed. Thousand Oaks, CA: Sage, 1998.
40. Strauss, Anselm, and Corbin, Juliet. "Grounded Theory Methodology: An Overview." In *Strategies of Qualitative Inquiry*, edited by Norman K. Denzin and Yvonna S. Lincoln, pp. 158–83. Thousand Oaks, CA: Sage, 1998.
41. Glaser, Barney G. *Doing Grounded Theory: Issues and Discussions*. Mill Valley, CA: Sociology Press, 1998.
42. Denzin, Norman K. *The Research Act: A Theoretical Introduction to Sociological Methods*. Englewood Cliffs, NJ: Prentice-Hall, 1989.
43. Lincoln, Yvonna S., and Guba, Egon G. *Naturalistic Inquiry*. Beverly Hills, CA: Sage, 1985.
44. Maxwell, Joseph A. "Understanding and Validity in Qualitative Research." In *The Qualitative Researcher's Companion*, edited by A. Michael Huberman and Matthew B. Miles. Thousand Oaks, CA: Sage, 2002.
45. Wilson, Christopher John, and Zhang, Yu. "Comparison between Experiment and Computer Modeling of Plane-Strain Simple-Shear Ice Deformation." *Journal of Glaciology* 40, no. 134 (1994): 46–55. <http://web.earthsci.unimelb.edu.au/wilson/ice1/evolution.html>.
46. Rastier, François. *Meaning and Textuality*. Translated by Frank Collins and Paul Perron. Toronto: University of Toronto Press, 1997.
47. Ricoeur, Paul. *A Ricoeur Reader: Reflection and Imagination*. New York: Harvester Wheatsheaf, 1991.