The Birth of Web Site Design Skills

Making the Present History

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The fleeting life cycle of Internet technologies poses new challenges to the pillars of scientific method, validity, and reliability in research about technology. Time compression—the concentration of numerous and rapid technological changes into shorter, erratic time cycles—affected the author's research on Web site design skill, resulting in a disappearance of data that is unexpected in the Information Age. Given the intensifying digitization of human life, the discipline of sociology increasingly confronts a tension between an imperfect, realistic data situation with which history has already made its peace, and an ideal type of scientific method that was always challenging, but now seems even more formidable. History, the past and the discipline, offers tools and insights to address the complexity of time in the digital world and its effect on evidence and methodology.

Sociologists often claim that information overload and data smog plague research about the social dimensions of the Internet. My research on Web site design skills shows that digital technologies such as the Internet may also cause the contradictory effect: the rapid and easy disappearance of empirical evidence. The concentration of numerous and rapid technological changes into shorter, erratic time cycles, a phenomenon I call *time compression*, posed a methodological challenge to my research on Web site design skills. In the course of my research, I discovered that time compression transforms human experience of technology in ways that complicates scientific research about these same technologies.

Time compression is characteristic of the Information Age. As Castells (1996, p. 464) writes, "the network society is characterized by the breaking down of rhythmicity," and "timeless time" has become the dominant paradigm of society. In my investigation of Web site design skills in the San Francisco Bay Area in the 1990s, I did find that time compression in the Web industry affected

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the emergence of skill. However, as I discuss in this article, time compression unexpectedly affected my research methodology. The increased speed of technological time and the ease of data creation and destruction made scientific study of this skill difficult from a lack—not a surplus—of evidence.

Sociology rarely casts time as a methodological issue. For sociologists, time has been a straightforward methodological affair, easily and conveniently marked by the modern markers of years and decades. Friedland and Boden (1994) write that time for sociology is "typically treated as a technical resource to be budgeted or a neutral environment for social life" (p. 5). In contrast, for historians, the subject of time is a complex methodological issue addressed in classic works (Bloch, 1953; Braudel, 1980) and contemporary articles (Abbott, 1991; Goldthorpe, 1991; Gottschalk, 1969; Jones, 1976; Tilly, 1981). Therefore, I looked to history, by which I mean both the past and the academic discipline, for tools and insights to address the complexity of time and evidence in the digital world.

It is ironic that in the Information Age, the greatest challenge to my research on an information technology skill proved to be the paucity and inaccessibility of data. In the first section of this article, I describe how data about Web site design skills disappeared due to its digital characteristics. Then, I turn to the strategy I used to deal with this challenge, which was to turn, not to new methods, but to the methodological strategies of historians, historical sociologists, and other scholars who study the past. I discuss how I used these insights to handle the increasingly fleeting nature of evidence in the Information Age.

DISAPPEARANCE OF DATA

Though the Web is a major contributor to the phenomenon of the Information Age, we know less about it than one might expect. Though scholars have explored the Web's role in financial transactions (Zaloom, 1999), communication and information retrieval (Kiesler, 1997), and education (Gell & Cochrane, 1996), the process by which the Web is produced remains understudied. I had difficulty establishing how many people work in Web site design in any capacity, for any length of time, much less how much they are paid, whether they are women or men, and what kind of training they receive.

The lack of data about Web site design is probably due in part to the fairly recent adoption of Web technology. Neither the skill nor the occupation has had the time to settle into the social categories and institutions that are characteristic of skills and occupations in general. For example, the Department of Labor's Occupational Outlook Quarterly states that, "there is no typical Internet staff," and that Internet "job titles can be confusing because duties vary by employer" (Steinberg, 1997). Because the World Wide Web is a recent innovation, the skills around it initially are defined broadly, without specialization. A participant in a listserv for women in the Web industry lamented, "It would be nice to know

every program that they ask for but who has the time to fully master debabelizer, Photoshop, Aftereffects, Flash, Fireworks, CGI, Cascading style sheets . . . and have five or more years experience designing and coding for the web?"

However, although the novelty of Internet technology partially explains the amorphous state of Web site design skill, my evidence indicated that features of time compression—the high speed of technological change and the quick, easy replacement of data—were an even greater factor.

SPEEDING UP TECHNOLOGICAL CHANGE

The technology of the World Wide Web reinvents itself with breathtaking speed. For example, in my research, I noted the rapid turnover of technologies in four areas: hypertext markup language (HTML) code, browser software such as Netscape Navigator and Microsoft's Internet Explorer, software to handle images, and software that automates elements of the Web design process. First, every single page of every Web site is written in hypertext markup language (HTML).[1] Within the first 6 years of the Web's existence (1993-1999), roughly four versions of HTML went through a standards-setting process, and a subsequent public release to Web site designers and developers.[2] Change in HTML can have serious implications for the skills of Web site designers. For example, an HTML modification that streamlines the amount of coding may demand a more informed understanding of another technological component, such as various image formats.

Second, the browsers that people use to access the Web, usually Netscape Navigator, America Online, or Microsoft Internet Explorer, changed versions on a schedule of months, not years, in both Macintosh and IBM-based platforms. For example, Mosaic, the first graphic browser for the World Wide Web, was introduced in 1993. The Netscape Corporation released its first official product based on Mosaic, Navigator 1.0, on December 15, 1995.[3] Netscape released the beta version of the next version, Navigator 1.1, with additions, deletions, and modifications, less than 3 months later. The turnover of browser versions labeled with successive numbers continued and by the fall of 1998, the company shipped Netscape Communicator 4.5. America Online and Microsoft, the two other major browser developers, matched this pace of technological development in their own products.

Third, Web site design skill constantly incorporated new software essential to design, such as Photoshop to manipulate and format images for the Web, software tools such as Shockwave and Flash to add movement to a Web site, and scripting languages like JavaScript. Fourth, as the technologies of Web site design grow more complex, software to manage that complexity by automating aspects of Web site design emerged and became part of the repertoire of Web site design skill; both the essential and automation software cycled through numerous versions and upgrades.

Web technologies, like many digital technologies, change on a scale and with a speed unlike those of previous technologies. Although all technologies are adjusted and modified to accommodate technical and market needs, the numerous small changes to Web technologies have fundamentally different consequences.[4] First, digital technologies such as the World Wide Web, diffuse through populations during, not just after, the modification process. For example, the ability to release software beta versions, correction patches, and continual upgrades has encouraged the replaceable, transient state of software. Second, digital technology diffuses more quickly than other technologies, mainly because diffusion's beasts of burden, transportation, and communication are faster and more efficient. Third, digital technology permits the evidence of modifications to be written over, erased, replaced, and forgotten with ease, speed, and low cost. Uploading a file to overwrite information on a Web site or rendering an earlier version of software obsolete is cheaper and less time consuming than destroying and recreating a discarded, imperfect version of a motor.

WITHOUT A TRACE

Digital technology lends itself to the creation, modification, destruction, and replacement of information with very little effort and very little cost. This aspect of digital technology can affect research in unexpected ways. In my research, I used classified advertisements as an indicator of when employers started advertising for prospective employees with Web-related skills. I went through the classified sections of the Sunday *San Francisco Chronicle* and *San Jose Mercury News* for a 5-year period, 1994 to 1998. For each week, out of approximately 300 job advertisements asking for Web-related skills, only one or two advertisements explicitly mentioned "Web site design." The classified advertisements seemed to be a weak indicator of the industry's demand for Web design skill.

I suspected two plausible reasons for the invisibility of Web site design in the print classifieds. First, previous research on work indicates that many job openings are not advertised publicly, and many posts are filled by word-of-mouth recommendations. Informal recruitment of employees is endemic to the hiring process in many industries, and Web site design is no different. As the president of a prominent Web site design firm told me, "We've never gotten anyone from the paper. It's all by asking around" (personal communication, April 23, 1998). Second and more important, my research revealed that companies seeking employees with Web site design skills usually posted job openings on their own company Web sites or on employment-specific Web sites. A study by the American Management Association found that whereas 51% of U.S. companies indicated that they used the Internet to advertise for jobs in 1997, the figure increased to 70% in 1998 (Conhaim, 1998). Employment Web sites such as Monster Board (http://www.monster.com) that report several million visits per

month, are becoming the main vehicle for employment recruitment, particularly among high technology occupations (Conhaim, 1998).[5]

The application of Web technology to the career search process has reduced the accuracy of classified advertisements as evidence about work. In the past, classified advertisements were a fairly reliable, accurate, systematically collected, easily accessible source of information about the labor market. Now, this information no longer exists in a systematically collected fashion and no new source of comparable, high quality data has emerged to replace it. None of the employment Web site companies I contacted systematically archive the positions advertised on their site and, therefore, archival data no longer exists. A researcher has no way of knowing what positions were advertised on-line on a given Sunday as recently as 3 months ago. As an increasing number of employment positions in the United States are advertised solely on the Web, rich, systematically collected data is steadily vanishing without replacement **{QQ11}**. And as some scholars have been warning for years, these initial disappearances are only the first of many to come.

Time compression also affected evidence collected from people, whether through face-to-face interviews or from large-scale surveys. My informants remarked on the speed of technological change, noting that Web site design "changed all the time" and that Web designers "needed to be able to keep up" with the technological changes. As one Web site production manager put it, "the most important thing is just knowing HTML inside and out and being familiar with all the compatibility issues with all different browsers. That's really important" (personal communication, May 5, 1998). Because Web technology changes all the time, this aspect of the skill, up-to-date knowledge, proved most valuable to him. However, for the most part, the people I interviewed were not able to remember the details or impact of technical changes that occurred a mere 3 months ago. They could not remember what skills early versions of HTML demanded from them. Similarly, they were usually unable to remember how Web site design changed when cascading style sheets were introduced, or that some versions of Internet Explorer and Netscape once handled JavaScript differently—events that had taken place within months of our interviews.[6]

Although data solicited directly from individuals has its much discussed strengths and weaknesses, the ability to create data is a distinguishing characteristic of sociological research. As Goldthorpe (1991) writes, "historians have for the most part to rely on evidence that they can discover in the relics of the past, while sociologists have the considerable privilege of being able to generate evidence in the present" (p. 225). My interview experience foreshadows the degree to which Internet technologies may curtail the accuracy, and therefore the usefulness of, such generated evidence. Data, the traces of technology-related phenomena, reflects Web technologies and in doing so evidence increasingly mimics the high turnover, rapid obsolescence, and momentary existence of digital technologies.

GIVING HISTORY TO THE PRESENT

Internet technologies and their complex relationship with time and speed, pose substantial, new challenges to traditional means of achieving validity and reliability. In my research on Web site design, no single source of data provided a satisfactory level of validity, the degree to which the measurement accurately reflected the characteristics of the Web site design skills. Each source by itself—classified advertisements, informant interviews, trade publications, professional organization's demographics—failed to accurately reflect the phenomenon I was studying.[7] For example, the ease with which digital technologies facilitate the creation, replacement, and destruction of data curtailed the validity of classified advertisements as an indicator of demand for skill, without providing new indicators that could be used as substitutes.

Similarly, time compression in the Web industry also complicated reliability—the ability of the study to be repeated with the same results. By the time a researcher would want to repeat a study about a given Web technology, that technology would no longer be in use. In general, sociologists are used to generating data and to studying the contemporary world, and consequently, they are unused to operating in a data-poor environment. My methodological strategy was to adopt the techniques of scholars who expect and accept that substantial parts of data will be missing and incomplete, namely, those of scholars who study the past.

Historical undertakings have a sensitivity to time that befits sociological studies of contemporary, digital technologies. Many essays about history and method address the problematic concept of time. In a section called "Time for the Historian, Time for the Sociologist," Braudel (1980) writes, "For the historian everything begins with time" (p. 48). Sociologists, he continues, do not embrace this notion of time, because for them, "social time is but one dimension of the social reality under consideration" (p. 48). Bloch (1953) in *The Historian's Craft*, notes that "reality demands that its measurements be suited to the variability of its rhythm, and that its boundaries have wide marginal zones" (p. 189). Such an understanding of time, Bloch claims, is essential to the project of history. The popularity of digital technologies and their impressive power to distort time, compels sociologists to reexamine assumptions about time and its implications, and to readjust their expectations of validity and reliability.

VALIDITY: ANYWHERE YOU CAN GET IT

Technology, in its broadest sense, tends to resist being captured in a single form of evidence. Historians of technology often maximize validity by using several complementary forms of data. For my research, and I would suspect for most research on digital technologies, one site or one form of evidence only begins to answer the urgent, complex, and fascinating questions to which these

technologies speak. The ease with which technology—when it works—assimilates into everyday life renders it only faintly visible to the observant eye. Internet technologies resemble previous technologies in the sense that they, too, are complex systems of technology built by actors and by institutions. However, speed and simultaneity are particularly salient in digital technologies, and this emphasis influences the framework through which we examine technology. The story of the operating system Linux's development—one of simultaneous tinkering with technologies by thousands of actors in equally numerous geographical locations around the globe—has replaced the histories of industrial technology in which a handful of inventors in a few European countries refined a technological tool around the same year.[8]

If we live in a network society, as Castells (1996) proposes, one with numerous nodes, then scholars of the Internet need to analyze and research in a network format as well. Although evidence for all sorts of phenomena is dispersed throughout society, sociologists wishing to study technology need to be more amenable to—and more skilled at—looking for bits and pieces rather than for the elusive perfect data set. Technology scholars highlight the virtual, placeless nature of the Internet, yet too often they rely on one single place—one chat room, one listserv, one virtual world—as a definitive source of evidence for the broad, complex changes wrought by digital technologies. Researchers who combine methods, such as participant observations with face-to-face interviews, gain a richer insight into the juxtaposition of Internet technologies and social life (Haythornthwaite & Wellman, 1998; Kraut, 1996; Thorne & Wakeford, 1998).

My work combined complementary sources of data. In addition to informant interviews and trade publication reviews, I combed through the Yellow Pages from several cities for the years 1993 to 1998. I tracked how many companies were listed in computer-related categories, when the heading of Web design appeared, and whether the companies that paid for advertisement space mentioned the Web. I compiled a database of all the books published on Web site design and made a chronological list of publication dates. I located all the Bay Area educational institutions that offered Web site design credentials and when following up with e-mails and phone calls, I created a timeline of these programs and a typology of the curriculums. By combining data sources, I was able to achieve a level of validity that no single form of evidence afforded me.

Using multiple data sources may seem counterintuitive to scholars of digital technology who report that a glut of data is a problem in their research. I, too, found myself staring bewilderedly at downloaded newspaper articles, stacks of classifieds, and lists of works still to consult. However, sheer volume of data is not a creation of the digital age. Durkheim's assistant, Marcel Mauss, tabulated the records of 26,000 suicides by hand, more than once, in the preparation of *Suicide*. In my research, 3 years of computer-related print classified advertisements yielded several thousand individual advertisements. Certainly, contemporary technology is capable of creating enormous quantities of data. However,

this same technology facilitates analysis. A staggering 10,000 respondents can participate in Georgia Institute of Technology's on-line survey thanks to digital technology, but the same technology allows researchers to calculate regressions quickly and painlessly.

RELIABILITY: LOOKING BEHIND YOU

The technology of the Internet compromises reliability because it distorts the traditional sequence of events making repetition difficult, if not impossible. Digital technologies move so quickly that it is a challenge to capture them once, much less to repeat the process. Scholars studying virtual environments face the task of reconciling the time frame of social life, which is measured in life times, generations, and eras, with that of Internet technology, which is measured in weeks, months, and software upgrade versions.

Evidence about previously existing technological skills and the often-hidden theoretical assumptions in histories of skills can provide a context that simulates reliability. If it is no longer possible to repeat studies of Internet technologies, comparisons to studies of similar phenomenon approximate repetition. For example, Srole's (1987) work on feminization of clerical work in the early 20th century demonstrates how the roles and skills of Bostonian women as copyists transformed into the roles and skill of typewriters. This emphasis on the transition of skills from one occupation to another led me to include the print graphic design industry in my data. Rather than looking only at the magazines of programmers and coders, I analyzed trade magazines for desktop graphic design specialists. The founder of a Web site design firm reinforced the comparison between graphic design skill and Web site design skill, saying, "I started a company doing desktop publishing . . . we started doing all sort of multimedia things, we were doing all those kinds of projects when the Web came along. So it was a natural transition" (personal communication, March 11, 1999).

In another example, feminist historical work on skill highlights the degree to which ideology determines how skills within the same skill set are coded as more or less valuable. Baron's (1987) work on the printing industry in the late 19th century demonstrates how gender affected the definition and control of skill around the linotype. This assumption about internal stratification of skill led me to reexamine my evidence, looking for signs of this division. The evidence cast JavaScript as a high skill, whereas portraying HTML coding as a low skill.

Sociology, even when it eschews scientific method, seeks patterns in evidence, formations that reappear to form testable theories and tentative truths. Digital technologies do not lend themselves easily to being studied and restudied, mainly because their fleeting life cycle eliminates the possibility of studying the same phenomenon over time and, therefore, complicates reliability. As the founder of a Web site design firm told me, "Nobody can get by with just HTML. There was a day, but not now, you have to know some JavaScript, maybe

a little Perl" (personal communication, March 11, 1999). It is no longer possible to use participant observation, small- or large-scale interviews, or content analysis of Web sites to repeat a study of the short-lived, now obsolete HTML 2.0 code, but history can suggest other ways of creating patterns.

CONCLUSION

The wealth of histories of technologies and the dearth of sociologies of technologies—particularly in the United States—is a testament to the challenge of satisfying theoretical and methodological demands of sociology. In the constantly transforming, deceptively data-rich sphere of the Internet, validity and reliability are particularly elusive. However, if social researchers want to be able to weave individual, small-scale observations into larger, general statements about society, then validity and reliability are worthy—if always unattainable—goals. Given the intensifying digitization of human life, sociology will increasingly be confronted by a tension between an imperfect, realistic data situation with which history has already made its peace, and an ideal type of scientific method that was always challenging to sociologists, but now seems even more formidable. Bringing methods commonly considered as historical—particularly by sociologists—to the task of analyzing contemporary technologies is one way to deal with time compression's challenges to scientific method.

My project focused on a skill that exists, that started less than 5 years ago, and that is widely practiced in the area where I live and work. However, properly addressing the sociological question required a method that scholars use to study phenomena that are firmly in the past and, therefore, less well documented. In the introduction to her work, Marvin (1988) writes that, "New media . . . are always introduced into a pattern of tension created by the coexistence of old and new, which is far richer than any single medium that becomes a focus of interest because it is novel" (p. 8). To understand where Web site design technologies and skill exist in the context of old and new, it seems only fitting to use techniques of the old to study the world of the new. Pushing theory forward and deepening the understanding of the Information Age is not only about predicting the future or remembering the past, it is also about recognizing both in the present.

APPENDIX
Annotated Bibliography

Fischer, C. S. (1992). *America calling: A social history of the telephone to 1940*. Berkeley: University of California Press.

In the first chapter of this social history, Fischer admits that he combines the methods of historians and sociologists in his exploration of modernity theory's

fascination with technology. His work demonstrates just how well multiple methods can complement each other to provide a rich understanding of technology. Directory of rural farms, regional household expenditure statistics and cost of living studies, telephone directories, advertisements in newspapers, marriage and voter records, and oral histories are among the data sources used in this work.

Kiesler, S. (Ed.). (1997). *Culture of the Internet*. Mahwah, NJ: Lawrence Erlbaum.

This book is a collection of articles from social researchers interested in the social existence of the Internet. Unlike the spate of journalism-style work about the Internet that abound, the essays in this book pay attention to the conventions—and range—of scientific method. The contributors from a variety of academic disciplines (information science, sociology, social and clinical psychology, anthropology), for the most part, draw insightful, responsible, and suggestive conclusions based on small-scale studies of the technology. The collection is an example of thorough social science research conducted on a contemporary, much-hyped Internet.

Little, D. (1991). *Varieties of social explanation: An introduction to the philosophy of social science.* Boulder, CO: Westview.

This book is a welcome alternative to method textbooks that list social science methodologies and briefly discuss their practitioners. Little, a philosopher by training, delves into the theoretical underpinnings of the numerous ways in which social scientists have sought to explain the world. In densely written chapters devoted to methodological traditions in social science, Little excerpts classic works from a range of social science disciplines (history, anthropology, political science, sociology, philosophy, psychology) to illustrate his explanations.

NOTES

1. HTML is a simplification of a previously existing markup language, standard generalized markup language, which in turn derives from another language, GML, which was created by IBM. Both languages and HTML allow the structure of a document to be defined as well as the relationship between its parts, such as headers versus body and graphics. (World Wide Web Consortium Web Site: http://www.w3.org/History/19921103-hypertest/hypertest/WWW/Markup/SGML.html.)

2. This standards-setting process is overseen by the World Wide Web Consortium (W3C), an industry consortium responsible for promoting common protocols on the Web. In 1993, an early version of HTML (informally Version 0.9 or 1.0) appeared in Mosaic, the graphic Web browser developed by the National Center for Supercomputing Applications (NCSA). In 1994, Tim Berners-Lee, Dan Connoly and Karen Olson Muldrow submitted a draft of HTML 2.0 to the International Engineering Task Force (IETF) and HTML 2.0 became a proposed standard in November 1995. In March 1995, Dave Raggett of Hewlett-Packard circulated a draft of HTML 3.0, which was never officially authorized though remained in use. The W3C announced HTML 3.2 in May 1996 and made it a recommendation in January 1997. In August 1997, 8 months later, the organization released HTML 4.0 as a public draft. (World Wide Web Consortium: http://www.w3.org.)

3. Netscape Corporation: http://www.netscape.com.

4. For an excellent account of these changes in the walkman, see the following: Du Gay, P., Hall, S., Janes, L., Mackay, H., & Negus, K. (1997). *Doing cultural studies: The story of the Sony walkman*. London: Sage.

5. Among the most prominent employment Web sites are Monster Board (http://www.monster.com), CareerSearch (http://www.careersearch.com), Dice (http://www.dice.com), and CareerMosaic (http://www.careermosaic.com). Web-related job openings in the Bay Area were also posted

on private e-mail listservs, such as Craig's List or the San Francisco webgrrls list. These kinds of lists were often archived and some were available to the general public. However, the method by which job openings appeared on these lists was even less systematic than on classified advertisement Web sites, and these listservs were not representative at all of open job positions.

6. An interesting contrast to this short-term memory effect of Internet technologies is Fischer's (1992) experience with oral histories as a form of evidence in his social history of the telephone. Fischer notes that the elderly respondents had to be encouraged to recollect the entrance of the telephone in their lives, an event that was presumably distorted by 60 years, the current widespread usage of the telephone, and the surge of new technologies in the past 50 years.

7. Trade publications and professional associations' statistics are valuable forms of data but are often too biased to be used as the primary source of evidence in a research project. Trade publications are often implicated in a complicated web of corporate sponsorship, and professional associations usually have a vested interest in inflating their statistics.

8. A very good example of how digital technology facilitates creation, tinkering, and diffusion is the popularity of Linux, a free, open source operating system that was created by Linus Torvalds with the continuing assistance of developers around the world (http://www.linux.org).

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