

A New Era of Accessibility?

Sarah Niles and Susan Hanson

Abstract: The authors explore some of the many ways that grounded social relations remain salient to the online world of the Internet. Because of the ability to distribute via the Internet information at a very low cost anywhere that is connected to a telephone line, many advocate the Internet as being a democratizing force in the modern world. Such claims, however, often overlook the constraints on this medium created by uneven social relations, which shape how we use technology and how we are able to use technology. This article explores examples of Internet use from recent research on the topic, examples that show how the social context in which online information is produced and consumed greatly affects the accessibility of that information.

Introduction

A recent front-page story in the *Wall Street Journal* asks whether the city—as a high-density, highly centralized settlement pattern—has a future (Wessel 2001). Citing many contemporary examples of the demise of centralized institutions and the concomitant success of dispersed, networked ones, the author wonders if the downtown can survive in the face of terrorist threats, which encourage dispersal, and information technologies, which enable it. Wessel concedes, however, that the kinds of accessibility and the face-to-face interaction that cities foster are unlikely to be replaced or are replaceable to such a degree in the foreseeable future that the existence of cities will be undermined: “In short, the very forces that are breaking up the old centralized institutions of the 20th century—the ones that make possible the dissemination of information through decentralized networks and threaten rigid military-style hierarchies—are often the result of old-fashioned human interaction in crowded places.”¹ By highlighting the dependence of the very creation of space-transcending information technologies (ITs) on face-to-face social interactions, this news article nicely pointed to the enduring imprint of grounded social relations² on accessibility in an information age.

In this article, we explore the concept of accessibility at the intersection of cyberspace and physical (or grounded) space. Early prophecies hailing the ability of cyberspace to offer complete access to everyone portrayed cyberspace as a sci-fi version of an isotropic plain, where even the friction of distance would no longer hold sway. In fact, cyber-accessibility has proved to be remarkably dependent on good, old-fashioned geography and grounded social relations. Our focus here is on why physical places and grounded geographies remain salient to travel in cyberspace.

Accessibility has always been important to retailers, politicians, and geographers, *inter alia*. Individual access refers to one’s ability to reach or obtain something (usually something desirable such as a paying job, medical care, or entertainment), and in the non-virtual world achieving access—often even access to infor-

mation—requires physical mobility. In both physical and virtual access, one must know of the existence of a destination that will meet one’s needs, be aware of how such a destination might be found, and be able to reach the destination. If connecting to the information superhighway from anywhere gives a person access to everywhere, the physical locations of the origin and destination of that connection do not matter. What is germane to a person’s ability to access online information is their knowledge of what information is available online and how to navigate to the place where that information resides.

In this article, we review research that considers accessibility via the Internet in light of grounded social relations. We draw on research from a wide range of disciplines to illustrate that physical access to infrastructure does not equate to accessibility and that social and geographic context remain important to how and by whom information is produced and consumed. Specifically, we provide examples showing that the use of both technology and online information are context-specific; appreciating this specificity is important in understanding the accessibility or final utility of the Internet in everyday life. Throughout our discussion, we relate questions of accessibility in an information age to changing urban spatial structure and inequality. The 1999 Participatory GIS Conference held in Spoleto, Italy sought to discuss the liberalization of geographic information (GI) data and what that means for empowering people to participate in public decision-making. This review foregrounds the need to understand the various conditions under which people gain access to online information, including GI, and the possible impediments to the general dissemination of this information.

Accessibility to Information in Physical and Virtual Space

Measuring Access to Online Information:

Technology Penetration

Access to the Internet in the United States has mostly focused on access to the hardware necessary to connect to the Internet. Set up as an issue of uneven technology penetration, most surveys aimed at measuring a population's access to the Internet examine geographical and socio-economic disparities among those who have or don't have a computer and modem in the home and consider those who lack these hardware items to fall on the wrong side of the "digital divide" (National Telecommunications and Information Administration 2000). These important and influential studies equate access to the Internet with the physical presence of a home computer equipped with a modem, the lack of which is considered the only barrier to the unlimited benefits that the Internet has to offer.

The results of these national studies of the digital divide are widely disseminated and have raised alarm that the U.S. is becoming a nation of information haves (those with computers in their homes) and have-nots (those without computers in their homes). Although the overall penetration rates are rapidly increasing across the U.S., the disparities persist and are even growing in some instances (National Telecommunications and Information Administration 2000). Rural populations, the inner-city poor, minorities, young households, and female-headed households remain disproportionately disadvantaged (McConnaughey and Lader 1998). Similar studies examining penetration rates of computers and modems have shown that the digital divide is even more severe on a global scale; illiteracy and lack of physical access to computer hardware explain why 88% of Internet users come from countries that represent only 15% of the world's population (Charp 2001).

Although access to appropriate hardware is a necessary condition for online activity, conceptualizing access to online information as a function of uneven penetration of physical infrastructure encourages one to see physical space and physical access as the primary constraints on access in cyberspace; in this view, if you lack proximity to a telephone network, electricity, etc., you are offline. Yet, this sort of analysis denies the possibility that one's on-the-ground social relations also shape opportunities for and constraints on virtual accessibility. Nor does framing the problem around physical access address whether closing the digital divide will erode inequalities in the access to information and improve the general welfare of Americans. By this measure, accessibility would be ubiquitous if universal service could be assured for every citizen. Universal service in turn, would guarantee equal access to welfare-improving information.

Place Matters: Internet Infrastructure and Information Flows

In studying the Internet, geographers have looked at the extent to which Internet infrastructure is place-dependent and have sought

to understand the spatial patterns of flows of information. Examining the distribution of physical infrastructure and patterns of digital information flows reveals that online communications are distributed to favor large cities in the U.S. Focusing on aggregate flows of information between places, geographers, and others have determined that physical locations shape the form that the Internet takes—the information available on it as well as patterns of traffic and connectivity. A number of researchers focus on measures such as communication flows (Castells 1996) and information transfer capacities (Moss and Townsend 2000) between places. By examining information transfer capacities (i.e., the capacity of the physical infrastructure), Moss and Townsend found that seven cities in the U.S. have the greatest capacity for information transfer and, although these cities are also connected to the regions within which they exist, there is more capacity between and among the seven large centers than between the centers and their surrounding regions. Castells claimed that instead of decentralization or the even distribution of information with the Internet, a global urban network is being created where nodes (major information producing and consuming cities) dominate information production and dissemination. The ascendance of cities to node status is usually explained through place-based inertia and first-mover advantages that favor historically dominant economic and political centers (Sui 2000). This inertia, in which the spatial patterns of the IT economy mirror those of the pre-IT world, has been demonstrated for everything from the spatial distribution of information workers to the building of the physical infrastructure of the Internet atop existing rights-of-way that privilege cities (*The Economist* 2001c). The irony here is, of course, that the very places that have long benefited from excellent physical access are now also benefiting from superb IT access, so that instead of mitigating spatial inequalities, the Internet is exacerbating them.

Place Matters: The Production and Regulation of Internet Content

The production and regulation of Internet content also increasingly reflects the importance of geographic context. The production of Internet content is biased in the U.S. toward large established cities, and the production of specialized Internet content often occurs in places where there was a previous specialization in activities associated with that content (e.g., entertainment in Los Angeles) (Kellerman 2000). According to Kellerman, New York City, Los Angeles, and the Silicon Valley are the largest Internet content producers, with concentrations of production within those places (e.g., Manhattan in New York City, Hollywood in Los Angeles). Kellerman points to the accumulation of expertise and other social and physical infrastructure in these places as reasons for their dominance in the production of Internet content.

As technological advances have increasingly made it possible to identify the location of Internet users, Internet content providers have used geography both to shape the content produced on the Internet and to appeal to the place-based context within which online information will be received. Firms can now target

Internet users by identifying the geographic location from which they are connecting to the Internet and can then differentiate users geographically based on socio-demographic data (*The Economist* 2001c). A new service offered by the company Quova can determine the geographic location of Internet users down to the zip code, thus allowing for online marketing and the localization of Web sites (Singer 2001). Such technologies will allow the same geomarketing³—or differentiation of consumers across space—that is a key component of non-Internet marketing.

Content can also be differentiated by jurisdiction, for example to offer state specials or to reflect local regulations. In *The Economist* (2001d), it was predicted that the mobile Internet (or mobile data services) will permit network operators to fine-tune location-specific content to let users know, for example, of up-to-date special offers or sales at stores within, say, 500 meters of a user's current location.

Nations have used this same technology to control the types of information that can be disseminated within national space on the Internet. France has cited the ability to locate Internet users in a court case that decided to regulate Yahoo! to prevent that company from marketing Nazi paraphernalia to French citizens (*The Economist* 2001b). In Saudi Arabia and Singapore, the national governments enforce morality regulations by the selective screening of Internet content to prevent “immoral content” from being downloaded in those countries (*The Economist* 2001b).

Geography therefore remains important in a number of ways that conspire to deny the placelessness of cyberspace. From the physical capacity of infrastructure, to the flow of information, to the production of Internet content, to what information can be viewed, grounded geographic contexts and the grounded social relations that are unevenly distributed across those contexts govern access to GI. As pointed out in *The Economist* (2001c:20):

It is undoubtedly true that the Internet means that the distance between two points on the network is no longer terribly important. But *where those points are* [emphasis added] still matters very much. Distance is dying; but geography, it seems, is still alive and kicking.

Context Matters: Adoption and Use of IT

How people create and make use of online information and services are also particular to the socio-spatial context within which such services are received. For example, the e-commerce-only online grocer GroceryWorks was unprofitable as an online-only retailer with dedicated warehouse space. When Tesco, the United Kingdom-based grocery chain giant, bought it and re-organized it to integrate online sales with its own bricks-and-mortar operations, the company was able to successfully capitalize on its network of existing stores, store design (easy picking), reputation, and existing supply chains (*The Economist* 2001a). The nature of e-commerce in Japan similarly shows the importance of the social context in which ITs are embedded. In Japan, a tradition of inexperience with catalogue shopping, a population with few credit card users, and low penetration rates for home computers make for a distinctive social and physical context for e-commerce

(Aoyama 2001). To overcome these barriers, e-commerce retailers have joined forces with neighborhood convenience stores to provide a set of dispersed, easily accessible physical locations for ordering, paying for, and sending e-commerce goods, proving that “interaction between real space and cyberspace need not take a single form” (Aoyama 2001:133). As these examples illustrate, retailers can enhance their accessibility via IT (i.e., by becoming e-tailers as well as—not instead of—retailers) by capitalizing on their pre-existing geographies.

The uneven, context-specific adoption and use of Internet technologies is highlighted in one study of four different scientific disciplines. Walsh (1997) surveyed scientists in physics, biology, chemistry, and mathematics about their use of Internet technologies. He found that modes of Internet use differed in important ways depending on the social practices and technical limitations of each discipline. For example, Walsh found that physics researchers, who are often involved in large interdependent and capital-intensive projects requiring large amounts of information sharing and communication, use the Internet largely to coordinate their activities. On the other hand, chemists, whose research is often commodifiable, are less likely to share their early findings online for fear they will disseminate proprietary information. For chemists, then, Internet use focuses on accessing databases of published research abstracts. Walsh's study makes it clear that the social context from which people seek information affects how they use the Internet and the context from which people disseminate (or not) information shapes the way these technologies can be used.

Another illustration of the importance of grounded socio-spatial context in Internet use comes from a pilot study that we undertook in Worcester, MA in 1999 to explore some of the ways in which employers use online recruiting to find workers (Niles and Hanson 2003). We had hypothesized that employers would use the Internet to broaden their search for employees, both socially and spatially; that is, we thought employers would see the Internet as a way to gain access to a more varied pool of talent than was available locally through traditional methods of recruitment such as word of mouth and news-article advertisements. The results of our small case study suggested, however, that employers were often not seeking to broaden their applicant pool socially or (especially) geographically. Instead they were advertising jobs on Internet job boards like Monster.com in the hope of capturing the attention of a type of employee they had already identified—via their traditional recruiting methods—as desirable. Perhaps most important, in terms of demonstrating the power of geography, the employers voiced a strong preference for hiring employees who already lived nearby.

These examples show how on-the-ground social organization affects the ways that Internet and other technologies are adopted and the uses to which they are put. The social context of technology and, in particular, the ways in which information and services that are available over the Internet are produced and consumed have an uneven geography that depends in part on pre-IT geographies. As the example of e-commerce in Japan

shows, this geographically uneven social context precludes singular measures of accessibility. Measuring Internet access via home computer penetration rates in the U.S. flattens the variety of ways in which online services may be accessed and thus ignores the uneven social contexts of production and use.

Place Matters: Understanding and Applying Information

Context and place affect not only what information is made available online and what technological means are used to receive it; they also affect what online information is sought and how that information can and will be applied. Virtual accessibility requires that people be able to find, make sense of, and apply information on the Internet: considering access to information as good in its own right overlooks the importance of the context within which that information is received and the reason for which it is sought. An individual's social and spatial location places her/him in a context through which s/he learns how to use technologies and interpret information. The production of information in one context with little or no knowledge of how it will be found and interpreted by people in other contexts compromises the notion of accessibility.

The lack of appropriate skills required to find online information, as well as the lack of an appropriate context for understanding how to interpret and prioritize information according to one's needs, can prevent many people from accessing the information they require. Research has shown that frustration with information overload and irrelevant downloads is a major stumbling block to accessing desired information online (Hoftsetter 1998, Dodge 2000, Kibirige 2001). Another study of new Internet users found that although initially many people had positive attitudes toward the Internet, often these people had only vague ideas of what purpose the Internet could serve (Kiesler et al. 1997).

Problems such as information overload and the difficulty of locating relevant information are likely due to incompatibilities between the context in which information is produced and those within which it is consumed. Three points need to be considered:

First, information available online is a product of a person, group, or firm/agency that is embedded in a social organization and/or set of social relationships. Information is posted online for a variety of reasons—from profit to public service to entertainment—that may involve motives not appreciated by the Internet surfer. The link between people and the online information that they seek is usually through search engines (as evidenced by the fact that search engines are the most popular ways of finding and accessing information on the Internet) (Kellerman 2000, Kibirige 2001). However, studies of Internet users show that popular search engines bias the information returned in an Internet search (because these search engines specialize in different areas and never index more than one-third of the web on average) (Fornesca and King 2000, Kibirige 2001). Furthermore, because for the most part search engines are driven by a profit motive, or at least must

cover costs of production and operation, network operators have an incentive to please sponsors. Many search engines have adopted a system of “pay-for-placement” where “a rising number of [search engines] let companies pay to pop up prominently when people enter particular search terms” (*Business Week* 2001). Such a system may create little incentive for search engines to search out and index alternative, small-scale, highly specialized or local pages. In turn, the willingness to please sponsors might translate into less effort to find relevant information to fit the searcher's particular needs. Sui (2000) argues also that information available online is not always the best or the most accurate information available; one could add that it is not always appropriate to suit the context from which it is sought. If content is produced disproportionately in the U.S., and within the U.S. disproportionately in its historically dominant political and economic centers, there is a question of whether the information produced in these places is really accessible, relevant, or interesting to a person in for example the Southern Sudan. Having information structured in one place so that it suits a particular set of social relations does not mean it will necessarily make sense to those who do not share that social understanding.

Second, the skills needed to harness the Internet in this way are usually acquired through social processes that mostly occur in places. Most people learn how to use the Internet from other people. In much the same way as having a car does not predict one's ability to drive, simply putting a personal computer in every home does not ensure that everyone will be flying down the information highway.

An important study called “HomeNet” conducted in Pittsburgh provided a large number of households with a computer, modem, and Internet software and measured how, how often, and for what purpose these were used. One of the most interesting findings of the HomeNet study was that individuals in households with at least one heavy Internet user were less likely to have the otherwise frequent experience of having trouble getting started on the Internet owing to a lack of understanding of overall concepts and difficulty diagnosing problems (Kraut et al. 1996). Another telephone poll in two U.S. states similarly finds that individuals in multi-person households, and especially in households with children, are more likely to be frequent Internet users (Bucy 2000), presumably because of increased motivation and skills. These studies show how on-the-ground social relations in the home provided a social form of access via motivation and technical help.

Third, obtaining and learning how to use the requisite technology may be the first step in accessing information, but also necessary is the ability to translate information acquired online so that one can use it for productive purposes. Seely-Brown and Duguid (2000) argue that information is useful only when interpreted with a set of knowledge; social contexts provide knowledge that imbues information with meaning. Knowledge, they claim, is a result of learning to be a practitioner, and practice shapes the assimilation of how information can be dealt with, which is knowledge: “Both examples, the classroom and the workplace, indicate how the resources for learning lie not simply in informa-

tion, but in the practice that allows people to make sense of and use that information” (Seely-Brown and Duguid 2000:133). In this vein, Kibirige and DePalo’s (2000) research examining the online searching strategies of undergraduates, graduates, and faculty found that those with more specialized and/or advanced training had an easier time finding information online.

The HomeNet study in Pittsburgh found that “local Pittsburgh and neighborhood information and communication services have special appeal to participants” (Kraut et al. 1996:60). Kraut et al. attribute the appeal of local sites to: 1) searching for information that is only useful at the local level (e.g., bus schedules, information about social services), and 2) the idea that local sites appeal to “people’s social identities, [Where] [p]eople want to participate in and be part of groups, and geography provides one basis for group formation” (p. 60). People visit local sites because local information is embedded in a familiar context that enables people to understand and make productive use of information. In addition, people might visit local sites frequently because they are more heavily advertised in local areas and/or are more frequently recommended by friends and/or family living locally.

Together, these results imply that the more aware people are—before going online—of the information available online and how it is useful in their own context, the more efficient the search and the more accessible the information retrieved.

Information that appears online is first filtered and interpreted through the socio-spatial context of the producers of Internet content, and then that information is filtered through the socio-spatial context of the individual accessing the information. These filters may hamper the ability of information seekers to apply Internet content to the specific need for which they sought that information. Research in the medical health field has found that, despite the widespread dissemination of medical information on the Internet, individuals do not see the Web as the easiest way to access health information; they trust advice from doctors and/or nurses far more than the information they receive online (Pennbridge et al. 1999). The unspecific, decontextualized medical advice available online is unlikely to replace the advice of a trained doctor who knows the specifics of a case. For these reasons too, Wimmer et al. (2000) predict that while services and information on the Web may curtail the demand for many market intermediaries (middle men), new intermediaries will be needed. The Internet creates a demand for new kinds of specialists, experts, and purveyors of quality information to disseminate and translate online information so that people can use it to make competent decisions on the transactions that the Internet now allows them to make themselves.

Information online, as elsewhere, is filtered through both the socio-spatial context of the producers and the consumers of that information. Information available on the Internet is unique as it often comes without any traditional ways to identify the purposes and biases with which it is produced or the audience for whom it is intended. As researchers of virtual accessibility, we may be overlooking social context as an important new frontier on the digital divide: the potential for fundamental incompatibilities

between the socio-spatial context for information production and the context of its consumption. The degree to which people are able to interpret and filter Internet information to suit their specific contexts will greatly affect how accessible that information really is.

The Ascendance of E-Mail: The Importance of Information Tailored to the Individual

In light of the importance of social and spatial context, it is not surprising that the most popular online activity—the one that keeps people logging on—is e-mail. U.S. studies cited by Bikson and Panis (1997) show that e-mail is the Internet activity most often used by the largest proportion of people. The HomeNet project in Pittsburgh similarly found that e-mail, and especially the desire to check if a new message had arrived, was the main service that kept people logging on (Kiesler et al. 1997). Once online to check e-mail, people may then go elsewhere on the Internet; in the words of the researchers, “For our sample, interpersonal communication via E-mail was both more popular and more sustaining than information acquisition via the Web” (Kiesler et al. 1997:3).

E-mail is a unique online activity in that e-mail messages are almost entirely specific to an individual; people receive information over e-mail that is related directly to them. E-mail messages have a context, people know why they are receiving an e-mail message, they know the origin of information, and therefore they are usually aware of the context in which the information is being sent. In short, e-mails assume the knowledge and context that will be used in receiving the information in them; they are embedded in a set of social relations that give people the context with which to process information. As the HomeNet study found “Compared to the Web, electronic mail is personalized, spontaneous, and interactive; the content of a particular message is usually tailored to the recipient and often takes into account their prior interactions” (Kiesler et al. 1997:3). The HomeNet study in Pittsburgh found that “e-mail sustains ongoing dialogues and relationships” (www.homenet.andrew.cmu.edu/progress/), and similarly Wellman et al. (2001) found that the Internet is especially used to maintain friends met in more traditional, on-the-ground ways. A survey by Wellman et al. of 39,211 visitors to the National Geographic Society’s Website found that not only is e-mail used especially to maintain active social ties to existing friends, but people use e-mail to contact friends who live physically close more frequently (by three times) than they do friends who live at a distance. This study also found that the frequent use of e-mail is often associated with frequent face-to-face and telephone interactions, leading Wellman et al. to conclude that e-mail supplements but does not substitute for face-to-face and telephone communication.

The success of e-mail as the most popular online activity provides an important clue about the importance of embedded social relations and social context in making information accessible or useful to the individual seeking or receiving online information.

Because information available on the Web is embedded in social or knowledge structures that are not always transparent to the person trying to access the information, it may be difficult for that person to understand how to comprehend and apply that information. Especially given the difficulty mapping and prioritizing information available online, it is likely that some special knowledge is needed to make sense of the information that can be identified. A person might acquire the special knowledge with which to make sense of online information via general knowledge gained through socio-spatial context, via an explicit statement accompanying the online information which makes obvious its application, or via someone in the person's social network referring her or him to online information and by doing so providing a way to apply the information to the person's needs.

Conclusion

We have outlined some of the many ways that grounded geographies mark cyberspace. Because pre-Internet geographies to a large extent shape Internet geographies, understanding patterns of individuals' access to information on the Internet requires a close examination of the intersection of people's use of IT and grounded socio-spatial relations.

Grounded geographies shape the Internet by guiding the placement of IT infrastructure such that—at regional and even intra-urban scales—physical access to the Internet closely resembles pre-Internet patterns of spatial access to goods and services. But physical access to Internet infrastructure alone does not equate to access. Pre-Internet geographies shape constraints on individuals' accessibility to usable information and knowledge on the Internet in other ways as well. As suggested in the *Wall Street Journal* article mentioned at the outset of this article, the production of Internet content takes place (quite literally) in selected urban locations, and the content itself often reflects its specific geographic origins. A great deal of information on the Internet is also targeted to users in particular locations, and some nation-states have begun to regulate the Internet content that citizens within their boundaries can access. The ways in which people and institutions adopt and use the Internet also reflect pre-Internet geographies, such that one's ability to obtain groceries, for example, via the Internet differs by geographic location. Finally, we note the importance of geographic context in people's ability to understand and usefully apply information accessed via the Internet. We cite the example of e-mail as testimony to the importance of context in Internet access.

By describing the key ways in which Internet access intersects with grounded social relations, we have pointed to some of the key constraints on Internet access that need to be addressed if the initial promise of the Internet to provide equal access to information is to be realized.

About the Authors

Sarah Niles is a Ph.D. Candidate in the Graduate School of Geography at Clark University. She has a Master's Degree in Planning from the University of Toronto and her current research addresses the role of grounded social relations in the function of labor markets for temporary workers.

Corresponding Address:
School of Geography
Clark University
Sarah Niles
Worcester, Massachusetts 01610
sniles@clarku.edu

Susan Hanson is the Jan and Larry Landry Professor and Chair of the School of Geography at Clark University. Dr. Hanson received her Ph.D. in Geography from Northwestern University and her current research examines the difference that grounded, gendered social relations make to entrepreneurship activities in place.

Corresponding Address:
School of Geography
Clark University
Susan Hanson
Worcester, Massachusetts 01610
shanson@clarku.edu

Acknowledgements

The authors thank Harlan Onsrud for the invitation to prepare this piece as a keynote address at the Spoleto conference and we thank the Spoleto participants for their reactions to our article. The authors are also grateful to the National Science Foundation for supporting this research through a Varenus seed grant.

This article was written while Susan Hanson was a Fellow at the Center for Advanced Study at Stanford; she gratefully acknowledges the fellowship support of the William and Flora Hewlett Foundation (Grant # 2000-5633).

Notes

- 1 The last report of the Office of Technology Assessment before the U.S. Congress abolished it in 1995 reached the same conclusion (Office of Technology Assessment 1995).
- 2 The term "grounded social relations" is used throughout to refer to interactions in physical, not virtual, space.
- 3 For a discussion of pre-Internet geomarketing, see Goss (1995).

References

- Aoyama, Y., 2001, Structural Foundations for E-Commerce Adoption: A Comparative Organization of Retail Trade Between Japan and the United States. *Urban Geography*, 22(2), 130-153.
- Bikson, T.K. and C.W. Panis, 1997, Computers and Connectivity: Current Trends. In S. Kiesler (Ed.), *Culture of the Internet* (Mahwah, NJ: Lawrence Erlbaum Associates), 407-430.
- Bucy, E.P., 2000, Social Access to the Internet. *Harvard International Journal of Press/Politics*, 5(1), 50-61.
- Business Week, 2001, Search Engines: Leading Us Astray?, i3744, 8.
- Castells, M., 1996, *The Rise of the Network Society* (Oxford: Blackwell).
- Charp, S., 2001, Bridging the Digital Divide, *T H E Journal (Technological Horizons in Education)*, 28(10), 10.
- Dodge, M., 2000, Accessibility to Information with the Internet: How Can it be Measured and Mapped? In Janelle, D.G. and D.C. Hodge (Eds.), *Information, Place, and Cyberspace* (Berlin/Heidelberg/New York: Springer-Verlag), 187-199.
- The Economist, 2001a, Surfing USA. June 30, 2001, 58-59.
- The Economist, 2001b, The Internet's New Borders. August 11, 2001, 9-10.
- The Economist, 2001c, Special Report: Geography and the Net. August 11, 2001, 18-20.
- The Economist, 2001d, Special Report: The Internet Untethered. October 13, 2001, 12.
- Fornesca, T. and M. King, 2000, Incorporating the Internet into Traditional Library Instruction. *Computers in Libraries*, 20(2), 38-44.
- Goss, J., 1995, We Know Who You Are and Where You Live: The Instrumental Rationality of Geodemographic Systems. *Economic Geography*, 71(2), 171-198.
- Hofstetter, F.T., 1998, *Internet Literacy* (Boston: Irwin/McGraw-Hill).
- Kellerman, A., 2000, Phases in the Rise of the Information Society. *Info*, 2(6), 537-541.
- Kibirige, H.M. and L. DePalo, 2000, The Internet as a Source of Academic Research Information: Findings of Two Pilot Studies. *Information Technology and Libraries*, 19(1), 11-17.
- Kibirige, H.M., 2001, Internet Access in Public Libraries: Results of an End User Targeted Pilot Study, 1997-2000. *Information Technology and Libraries*, 20(2), 113-115.
- Kiesler, S., R. Kraut, T. Mukhopadhyay, and W. Scherlis, 1997, HomeNet Overview: Recent Results from a Field Trial of Residential Internet Use. Carnegie Mellon University, The HomeNet Project, August 1997. <http://homenet.hcii.cs.cmu.edu/progress/ovrview8697.html>.
- Kraut, R., W. Scherlis, T. Mukhopadhyay, and J. Manning, 1996, The HomeNet Field Trial of Residential Internet Services. *Communications of the ACM*, 39(12), 55-64.
- McConnaughey, J.W. and W. Lader, 1998, *Falling Through the Net II: New Data on the Digital Divide* (Washington, D.C.: National Telecommunications and Information Administration).
- Moss, M.L. and A.M. Townsend, 2000, The Role of the Real City in Cyberspace: Understanding Regional Variations in Internet Accessibility. In Janelle, D.G. and D.C. Hodge (Eds.), *Information, Place, and Cyberspace* (Berlin/Heidelberg/New York: Springer-Verlag), 171-186.
- National Telecommunications and Information Administration, 2000, *Falling Through the Net: Towards Digital Inclusion* (Washington, D.C.: National Telecommunications and Information Administration).
- Niles, S. and S. Hanson, 2003, The Geographics of Online Job Search Preliminary findings from Worcester, MA *Environment and Planning A*, in press
- Office of Technology Assessment, 1995, *The Technological Reshaping of Metropolitan America* (Washington, D.C.: U.S. Government Printing Office), September 1995.
- Pennbridge, J., R. Moya, and L. Rodrigues, 1999, Questionnaire Survey of California Consumers' Use and Rating of Sources of Health Care Information Including the INTERNET. *The Western Journal of Medicine*, 171(5), 302-305.
- Seely Brown, J. and P. Duguid, 2000, *The Social Life of Information* (Boston, MA: Harvard Business School Press).
- Singer, M., 2001, Quova Acquires Realmapping, Gains More Internet Geolocation Technology. (http://siliconvalley.internet.com/news/article.php/3531_733021).
- Sui, D.Z., 2000, The E-Merging Geography of the Information Society: From Accessibility to Adaptability. In Janelle D.G. and D.C. Hodge (Eds.), *Information, Place, and Cyberspace* (Berlin/Heidelberg/New York: Springer-Verlag), 107-130.
- Walsh, J.P., 1997, Computer Networks and Scientific Work. In S. Kiesler (Ed.), *Culture of the Internet* (Mahwah, NJ: Lawrence Erlbaum Associates), 385-406.
- Wellman, B., A. Quan-Haase, J. Witte, and K. Hampton, 2001, Does the Internet Increase, Decrease or Supplement Social Capital? Social Networks, Participation and Community Commitment. *American Behavioral Scientist*, 45(3), 436-455.
- Wessel, 2001, Decentralization and Downtowns. *Wall Street Journal*, October 21, 2001, 1.
- Wimmer, B.S., A.M. Townsend, and B. Chezum, 2000, Information Technologies and the Middleman: The Changing Role of Information Intermediaries in an Information-Rich Economy. *Journal of Labor Research*, 21(3), 407-419.