

A new era of accessibility: or is it?

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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. He concedes, however, that the kinds of accessibility and face-to-face interaction that cities foster are unlikely to be replaced or 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 (IT) on face-to-face (F2F) social interactions, this newspaper story nicely points to the enduring imprint of grounded social relations² on accessibility in an information age.

In this paper we explore the concept of accessibility at the intersection of cyberspace and physical 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 proven 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 information—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 remains germane to one's accessibility to information on the Internet is knowledge of how to get to a particular destination and awareness of what is available there.

¹ The last report of the Office of Technology Assessment before Congress abolished it in 1995 reached the same conclusion (Office of Technology Assessment, 1995)

² We use the term *grounded social relations* throughout to refer to interactions in physical, not virtual, space.

Hanson (2000) argued that webs of social relations have always (long before IT) affected accessibility and will continue to do so; she pointed to the need to study how IT intersects with grounded social relations to shape accessibility in the age of the Internet. This paper begins that process by considering how access to Internet information is shaped by on-the-ground geographies and then by describing a pilot study we undertook to examine the intersection of IT access and on-the-ground access in the context of employment. Understanding the relationships among IT, accessibility, and grounded social relations seems important for illuminating two important contemporary societal processes; the nature of on-going changes in urban spatial structure and the socio-spatial sources of inequality.

The remainder of the paper consists of two parts. In the first 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 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. In the second part of the paper we draw on examples from an exploratory study that examines how and why some employers in Central Massachusetts use the Internet to find new employees. This study shows that employers do not use online technologies to broaden their applicant pools socially or geographically any more than they would with newspaper help-wanted ads. These employers have fixed ideas about the type of employees they want and are mostly seeking a low-cost way of catching those particular potential employees' attention. Throughout our discussion we relate questions of accessibility in an information age to changing urban spatial structure and inequality.

I. Accessibility to information in physical and virtual space

Physical Access as Access

The proclamations of early technology boosters that the Internet would spell the death of distance and the end of place-based advantages, including those associated with urban agglomeration, seemed to provide little role for geography in measuring access to the Internet and the information the Internet provides. Even today, most surveys aimed at measuring access to the Internet take geography no further than looking for disparities between and among central city, urban, and rural populations. The yearly Census of Population (CPS), a major source for the study of Internet access in the US, examines socio-economic variables and the rural/urban split. The National Telecommunication and Information Administration explores this data in the provocatively named "Falling Through the Net" studies (1995, 1998, 1999, and 2000). This widely cited source of data measures access to the Internet by the availability of a computer and modem in the home. People who lack these hardware items are deemed to fall on the wrong side of the 'digital divide.'

Physical space is paramount here, but only vis a vis the physical presence of a home computer equipped with modem, the lack of which is considered the only barrier to the unlimited benefits that the Internet has to offer. This concern with the physical

availability of home computers and modems reflects efforts by the Clinton administration under the leadership of then-Vice President Gore to put in place a national Internet infrastructure, which Clinton-Gore saw as a public good similar to the telephone. The Clinton administration's effort created a focus on universal service availability; once framed in terms of universal service, accessibility became seen primarily as an issue of technology penetration.

The results of these national studies of the digital divide are widely disseminated and have raised alarm that the US 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 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 15% of the world's population (Charp, 2001).

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; if you lack proximity to a telephone network, electricity etc., you're offline. This sort of analysis denies the possibility that one's on-the-ground social relations also create opportunities for and constraints on virtual accessibility. Nor does this fashion of framing the problem around physical access address whether those who have the necessary hardware are using the Internet effectively or in the productive ways envisioned by the US government. 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 all 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 on-line communications are distributed to favor existing 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, 2000) between places. These studies find that cities that were dominant economically, politically, or culturally prior to online communications now form a network of intense digital communication interdependence.

By examining information transfer capacities (i.e., the capacity of the physical infrastructure), Moss (2000) finds 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 the seven large centers than between the

centers and their surrounding regions. Castells (1996) claims 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 LA) (Kellerman, 2000). According to Kellerman, New York City, Los Angeles, and Silicon Valley are the largest Internet content producers, with concentrations of production within those places (e.g., Manhattan, Hollywood). 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. *The Economist* (2001d) predicts 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

³ For a discussion of pre-Internet geomarketing see (Goss, 1995)

company from marketing Nazi paraphernalia to French citizens (*The Economist*, 2001b). In Saudi Arabia and Singapore the national government enforces 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. Everything from the physical capacity of infrastructure, to the flow of information, to the production of Internet content, to what information can be viewed, depends on physical space and the social relations that are unevenly distributed across that space. As *The Economist* points out:

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 still matters very much. Distance is dying; but geography, it seems, is still alive and kicking (2001c: 20).

Context Matters: Adoption and Use of IT

How online information and services are created and used is also particular to the socio-spatial context within which they are received. Whereas the e-commerce-only online grocer GroceryWorks made no profits as an on-line-only retailer with dedicated warehouse space, the UK-based grocery chain giant Tesco bought it out and re-organized it to mimic its own superior model that integrates its online sales with its bricks-and-mortar operations to 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 IT’s 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 very different 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 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 also affects the way they use these technologies.

These examples show how on-the-ground social organization affects the ways 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 from Japan shows, this geographically uneven social context precludes singular measures of accessibility. Measuring Internet access via home computer penetration rates in the US 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

The tendency to see 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. Virtual accessibility requires that people be able to find, make sense of, and apply information on the Internet. An individual's social and spatial location provides her/him a context through which she 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, comprises the notion of accessibility.

The lack of appropriate skills required to find online information, as well as 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 that often prevents people from finding online the information that they require (Kibirige, 2001; Dodge, 2000; Hoftsetzer, 1998). Another study of new Internet users found that although initially many people had positive attitudes towards the Internet, these people had only vague ideas of what purpose the Internet could serve (Kiesler et al, 1997).

Due to the lack of transparency in how Internet content is assembled and prioritized by those who create and/or index that content, researchers such as Kwan (2000a) examine the cognitive and behavioral dimension of access to the Internet, the ways in which people map out cyberspace in their minds in order to give it meaning. Kwan attempts to understand the "cognitive cyber-environment" in order to understand how people access information online. According to her, feeling lost is a common Internet experience, where no maps or distinctive signposts exist of or on the Internet that help us find our way. As a result people create their own way--finding strategies when using the Internet including a home-page (portal), bookmarks and search-history files (Kwan, 2000a). However, Kwan believes that these online challenges and how people overcome them is a product of cognitive ability, personal attributes (gender, race, age, income) and both technical and cognitive ability (training/skills/experience).

Problems such as information overload and the difficulty of locating information relevant to the purposes for which a person seeks that 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 unknowing 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 (Kibirige, 2001; Kellerman, 2000). However, major Internet search engines index much less than one-half of all web pages (Kibirige, 2001). Because for the most part search engines are driven by a profit motive, or at least must cover their costs of production and operation, network operators have an incentive to please sponsors. 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 searchers particular needs.

Sui (2000) argues also that information available on-line is not always the best or the most accurate information available; one could add that it is not always appropriate to suit the context in which it is sought. If content is produced disproportionately in the US, and within the US 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 the Southern Sudan. Because information is structured in one place in such a way that it suits a particular set of social relations, does not mean it will necessarily make sense to those who don’t share that social understanding. Because both authors know Clark University and understand the relationships among disciplines, departments, and cross-discipline concentrations, navigating the Clark U website is easy for us. For the uninitiated, however, the assortment of academic options is irrelevant if all one is seeking is a set of directions to a film being screened in the basement of an out-of-the-way building. For many people, using the Internet is akin to using a vast library without the benefits of a universally applied Dewey Decimal system or knowledgeable librarians.

Second, the skills needed to harness the Internet in this way are usually acquired through social processes that mostly occur in places. 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. While a few true auto-didacts or those with a compelling reason to learn how to use a personal computer and Internet software might commit themselves to finding and reading books on how to go online, most people rely at least in part on formal and informal learning.

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 US states similarly finds that individuals in 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 (2000) argues that information is useful only when interpreted with a set of knowledges; social contexts provide knowledge that imbue information with meaning. Knowledge, he claims, 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 information, but in the practice that allows people to make sense of and use that information” (Seely-Brown, 2000: 133). Following in this vein, researchers in education and information science are beginning to stress the importance of teaching people not only how to use the hardware to get them online, but also how to acquire, process and evaluate information (Kenway, 1996; Kibirige and DePalo, 2000).

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. This situation may result in the inability of information seekers to make Internet content that they find relevant to the needs 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 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 role of a large variety of market intermediaries (middle-men) in making transactions on behalf of others, a new role will exist for 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.

We count on much of our non-Internet media to put information in context for us. Compare people’s access to information in a newspaper with their access to information on the Internet. A newspaper is now considered a simple medium because we know how to read it. A newspaper has a clear beginning and end, a total sum of information, and that information is usually prioritized by position in a well-accepted logical pattern – the front page of a newspaper contains the most important information, and the news is clearly delineated in sections that make sense to the geographical market that the newspaper targets (e.g., the Worcester, Massachusetts local newspaper starts with international, then national, then Massachusetts, then city/neighborhood news). Furthermore most people read local newspapers (and sometimes national newspapers in addition) because local news is most immediately important in their lives. By providing a local context for global and national news (i.e., the local editor filters national and international news through the local lens) local newspapers also contextualize information relevant to people in certain locations. While it is true that the local newspaper editor probably knows no more about you than an advanced search engine

with geolocating abilities, a newspaper is a tangibly finite source of information with a clear road map.

As such, information in a local newspaper that would seem parochial and irrelevant to the outsider is useful to the local resident precisely because that resident knows what to do with this information – the information is aimed at a socio-spatial audience with an assumed understanding of the issue in question. Internet boosters may claim all online information is accessible to anyone who can locate that information online. However, it is likely that that information is less relevant and therefore less useful without a good understanding of the context through which the information is filtered.

Information online, as elsewhere, is filtered through both the socio-spatial context of the producers and 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 and 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. How people are able to interpret and filter Internet information to suit their specific context will greatly affect how accessible that information really is.

The Ascendancy of Email: 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 email. U.S. studies cited by Bikson and Panis (1997) show that email is the single Internet activity most often used by the largest proportion of people. The HomeNet project in Pittsburgh similarly found that, email, 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 already to check email, people may then go elsewhere on the Internet; in the words of the researchers, "For our sample, interpersonal communications via Email was both more popular and more sustaining than information acquisition via the Web" (Kiesler et al 1997: 3).

Email is a unique online activity in that email messages are almost entirely specific to an individual; people receive information over email that is related directly to them. Email messages have a context, people know why they're receiving an email, they know the origin of information and therefore are usually aware of the context in which the information is being sent. In short, emails assume the knowledge 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 "email sustains ongoing dialogues and relationships"

(www.homenet.andrew.cmu.edu/progress/), and similarly Wellman et al (2001, in press) found that the Internet is especially used to maintain friends met in more traditional, on-the-ground ways. Wellman et al's (2001) survey of 39,211 visitors to the National Geographic Society's website found that not only is email used especially to maintain active social ties to existing friends, but people contact friends who live physically close

more frequently (by three times) than they contact friends who live at a distance. This study also found that the frequent use of email is often associated with frequent face-to-face and telephone interactions, leading Wellman et al (2001) to conclude that email supplements but does not substitute for face-to-face and telephone communication. Despite popular impressions to the contrary, only 14% of people make friends solely from interacting on the Internet, and while these Internet friends exist, most people have met one or two of their Internet friends in person (Katz, 1997). More evidence, although they do not argue that the reason lies in embedded social relations, is *The Economist's* (2001d) prediction that personal communication will be the most widespread use of mobile IT, including the mobile Internet.

The success of email 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 understand 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 as a result of the general knowledge they acquire through their socio-spatial context, an explicit statement accompanying the online information which makes obvious its application, or someone in their social network referring them to online information and by doing so providing a way to apply the information to the person's needs.

II. Place Matters: Job Search on the Internet

We undertook a pilot project that sought to understand whether online job-postings expand the occupational opportunities and size of the labor market for job seekers. The results from this project—tentative as they are—shed light on the power of socio-spatial context in shaping access to Internet information.

Getting a Job Off-line

The process by which people find jobs and employers find workers is well researched in the social sciences. The traditional geographic approach considers a person's potential job opportunities to be those jobs requiring the person's skill-set and lying within a "reasonable" commuting range. This view is analogous to seeing every web-page and service on the Internet that may be useful to an individual as accessible if that individual has a computer, modem, and Internet access, and is willing to travel or move to the location where the job is offered.

A great deal of research has shown that measuring access in this way neglects the important role of social relations and social networks in the dissemination of information about job opportunities and the hiring process. Both workers and employers depend on their social networks for reliable information (Granovetter 1974; Farkas, England and Barton, 1988; Schultz, 1992; Hanson and Pratt, 1991, 1995). These networks of social contacts and/or relationships are also geographic in so far as they are shaped by people's daily activity patterns, which affect who people meet, where, how often, and in what

capacity. An individual's own experiences and the experiences s/he hears about through her social networks influence the jobs that person considers available to her, what jobs she hears about, and how suitable she believes she is for any given job (Wial, 1991; Hanson and Pratt, 1991, 1992, 1995; Clark and Whiteman, 1983). As a result, because workers use these geographically informed social networks extensively to find jobs, they often end up with jobs similar to those held by the people who comprise their social networks, limiting their opportunities both socially and geographically. For example, receiving all of your job information from other women significantly increases your chance of ending up in a female-dominated line of work (Hanson and Pratt 1991).

Employers reinforce this segmentation of the labor force through their location strategies and recruiting strategies. Because labor is important to their production process, manufacturing and producer services firms often choose locations that offer proximity to a particular type of employees (Rees and Schultz, 1970; Curran, 1988; Hanson and Pratt, 1992, 1995); firms also target their formal recruiting (newspaper ads etc) to those areas where their target labor pool resides (Caruth et al, 1988; Hanson and Pratt, 1992, 1995; Mier and Giloth, 1985). This socio-geographical targeting is reinforced by employers' frequent use of employee referrals, which they prefer as a hiring strategy for a number of reasons, including: to increase the likelihood that the employee will 'fit in' (Fernandez et al, 2000) and to help expedite on-the-job training (where the current employee will help train the new employee). Like potential job applicants' reliance on personal contacts, employer reliance on employee referrals results in a labor force that is more homogeneous than it would be were different recruiting strategies used. These processes, which are embedded in the spaces of people's social contacts and networks, contribute significantly to the emergence of local labor markets that are segmented on the basis of workers' personal characteristics such as sex, age, and ethnicity or race. One aspect of this labor market segmentation that results from these embedded processes is that people often get stuck in certain types of jobs despite a wider range of job opportunities that might be located within commuting distance of them.

Getting a Job On-line

One might expect that advertising jobs on the Internet is a way to extend job opportunities to all qualified workers and to expand the social and geographic diversity in an employer's applicant pool. Because information is so central to the employer-applicant matching process, Internet job boards like monster.com, hotjobs.com, and Yahoo!jobs, appear to be the perfect antidote to the limited information and limiting social contacts of people's geographically constrained social networks. One might assume that online job postings by-pass social networks by giving people direct access to job information to which they would not otherwise have access. In this utopian view, the Internet holds the potential to provide people with information with which they can improve their livelihoods through access to better jobs. This Internet-based process would break down traditional labor market segments and would eventually lead to a more open labor market. Our initial research shows, however, that the resilience of geographically informed social networks prevails even online.

Some important research findings underscore and help to explain our findings. As we have already mentioned, we know that people's online activities are shaped in important ways by their social and spatial positions. 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) (Kibirige, 2001; Fonesca and King, 2000). For this reason, a large amount of attention in the discipline of information science is directed at teaching librarians how to help Web searchers by evaluating search engines for, and recommending search engines to, people seeking information online (Kibirige and DePalo, 2000; Kirkwood, 1998). Kibirige and DePalo's (2000) research examining the searching strategies of undergraduates, graduates, and faculty found that those with more specialized and/or advanced training had an easier time finding information online. Together, these results imply that the more aware a person is before they go 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 that they will retrieve

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 (1996) attribute that appeal of local sites to a) searching for information that is only useful at the local level (e.g. – bus schedules, information about social services), and b) 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" (p60). Visiting local sites is likely to reflect not only that local information provides a context with which to understand and make productive use of that information, but might also suggest that it is these local sites that are more heavily advertised in local areas and/or that are more frequently recommended by friends and/or family living locally.

Our pilot project explored the use of online activities in job search. We randomly selected 40 employers, located within 20 miles of Worcester, Mass., who had advertised jobs on monster.com in October 1999 and requested a personal interview; only nine of these employers consented to an interview. Six of the firms interviewed were manufacturers, two were involved in distribution, two were hiring for a variety of positions in retail companies, and only one was an IT-specific firm. Of these companies only the IT firm had fewer than 100 employees; the other eight ranged from 100 to 2000 employees. The interview questions aimed to understand whether employers are able to attract qualified candidates from a broader social and geographic spectrum than that represented by their existing workers, and whether expanding and diversifying the applicant pool were important reasons for employer use of the Internet as a recruiting tool.⁴ Although the sample size is small, the interviews revealed a number of very strong patterns worthy of mention here and further research elsewhere.

Monster.com is a popular job search medium that is well publicized on non-Internet media. By displaying a job ad on this web site, an employer ostensibly creates the ability for anyone around the world connected to the Internet to apply and be considered for a given employment opportunity. This increased access for job searchers to information about potential jobs, whereby information about job opportunities is more democratically disseminated, should create a more open recruitment and hiring climate than is the case when people rely on their own personal contacts.

⁴ A second part of the research design was to contact job seekers to learn how they use the Internet to learn about job opportunities and to make job applications. This part of the study encountered logistical problems in that we were unable to obtain a large enough number of surveys from job seekers for analysis.

Most of the companies we interviewed, many of whom were just starting to use the Internet, considered posting open employment positions on the Internet only after facing significant challenges in hiring through more traditional (i.e., personal communication and newspaper) channels. Specifically, the very tight labor market during the interview period (Massachusetts had an unemployment rate of 2-3% in 1999-2000) had encouraged many of the employers to try the Internet after newspapers, word-of-mouth, and employee referral methods had been exhausted. It may well be that the popularity of online job boards during this period has as much to do with employee scarcity as it does with the benefits of online employment ads. The employers indicated that if they had been able to hire from word-of-mouth or referrals, they would have preferred one of these more conventional methods. This contention is supported by the fact that employers used the Internet almost exclusively for the hardest-to-fill skilled workers where they faced the greatest scarcity of candidates.

Nor, for most of these employers, did the Internet provide qualitatively better candidates; instead it enabled them to assemble a quantitatively larger applicant pool from which to choose. More specifically, many employers felt that posting jobs on a popular online job-board attracted applicants whom they termed 'passive lookers,' or people already gainfully employed who might be convinced to change jobs. Posting online ads was not an indication that these employers were willing to broaden the scope of potential workers they might consider; instead, the Internet seems to be a way to make workers of the type an employer wants to consider, consider that employer! Employers' enduring preference for word-of-mouth or referral candidates, in turn, is a result of cost and specialization; they prefer these methods because they are a very inexpensive way of finding appropriate candidates.

A clue in understanding the popularity of the Internet for hiring therefore lies at the intersection of recruiting costs, context-specific needs, and a tight labor market, which is also likely to be place-specific. Many of the employers remarked that cost was the primary consideration in their choice of recruiting tool. In a tight labor market the costs of hiring appreciate considerably because fewer appropriately skilled individuals are available for any given job – especially skilled jobs. In this climate, employers are often faced with the prospect of having to use a headhunter, which can cost up to 30% of the new hire's first year's salary. A common complaint of employers is that headhunters do not screen candidates well enough and recommend workers who end up not fitting in well. In this second complaint it is obvious that employers feel they are better able to identify workers who are appropriate to the particular employment context for which they are hiring. It may well be then that companies know exactly who they are looking for (broadly) but do not want to pay a headhunter to find someone willing to apply for that position. Posting job ads on the Internet provides a low-cost way around the headhunter rather than reflecting a desire to create a more democratic hiring process. Also, many employers noted that using the Internet to post jobs and receive applications greatly reduced the time frame for hiring. If the costs incurred by a vacant position in a firm are considerable, these time savings too would be a benefit of using the Internet for recruiting.

The Internet is not a plausible venue for everyone searching for jobs. The employers we interviewed almost all agreed that hiring unskilled, low-paid workers via online job postings was unlikely to work and was costly for the expected outcome; few

tried to attract such workers using the Internet. Here again, the prejudices and previous experiences of employers are brought into cyberspace and affect how employers use online job boards. All employers but one agreed that low-skilled workers were unlikely to have the computer skills necessary to find and make an online application. Furthermore most of the employers claimed that although difficult in a tight labor market, they were still able to hire low-skilled workers using lower-cost methods.

In addition to the social prejudices that are evident in the ways that employers use online job boards, we also noted significant geographic prejudices by the employers interviewed. Despite their online job postings being available to job seekers worldwide and despite the difficulties these employers were facing finding appropriate candidates, every employer agreed that they preferred to hire locally. Many insisted that they would not even consider applicants from outside a defined commuting area. In part this preference for local hires fits employers' goal to keep recruiting costs down. Many employers confirmed that the costs of interviewing people (which most did F2F) from outside the local area would entail travel costs that they were unwilling to pay. Furthermore most companies did not want to pay relocation costs for workers: "because for that type of job there's enough of a labor pool locally so I wouldn't want to relocate them." Most employers interviewed agreed that they did not even consider workers who applied from beyond a certain "commutable area;" in addition, employers filtered their applicants extensively based on geographic location for all but the very top jobs, such as a VP, for which it would be reasonable to relocate workers. One of the employers explicitly insisted that hiring workers that lived a considerable distance from the workplace was unwise: "I tend really not to want to hire people that live too far away; I mean we have a plant manager that lives in [a town 45 minutes away]. I mean if the weather sprinkles or [there is] a little snow flurry, people tend not to want to come in. So I prefer to get people that are closer to be honest."

Clearly whereas these employers are using an IT medium that extends globally, they are not interested in broadening the geographic net; their intention in using this global medium is to catch more fish in the local labor pool! In sustaining their strong preference for an indigenous local labor force, employers who advertise jobs on the Internet are replicating precisely the behavior of employers in Hanson and Pratt's pre-Internet study (1992). In addition, drawing on points we made in Part 1 of this paper about inequalities in socio-spatial access to the Internet, we note that not everyone even *within* the local labor market that an employer deems an acceptable recruitment area will have access to Internet job information. Employers also used the resume bank on monster.com as a first step or a complementary step to posting a position online. Employers are able to search resumes using key words to identify workers with certain specific skills or work histories that are particularly germane to the position they are trying to fill. This method of searching is, however, unlikely to capture many of the candidates who qualify for and might otherwise want to be considered for the job. Some of the employers also used listservs or web sites of professional organizations or even alumnae/i from a favored technical college to attract the 'right person.' Over the years one employer had assembled her own distribution list of persons employed in the industry she was hiring for and routinely sent job-postings to this list in hopes of finding passive lookers.

How employers will use the Internet in the future to fill job openings is therefore likely to depend on the availability or perceived availability of appropriate candidates. In a tight labor market the Internet was attractive because, by identifying a larger number of candidates, employers could still find workers who fit the profile of their current workforce; employers did not have to stray from their strict social and geographical requirements to attract enough new workers. Once a labor market loosens it is possible, given what we were told by employers, that employers will be able to revert to lower-cost methods such as word-of-mouth. Also, the nascent popularity of the resume banks might signal their increased use to identify candidates whose work histories and specialized skills seem best to fit the needs of the employer. In placing their resumes in Internet resume banks, job seekers will not be able to control who looks at the resume, or how the resume is interpreted. The use of online resume banks in a loose labor market might give job seekers the impression that their resumes are universally available to potential employers; without job seekers knowing the context-specific needs of potential employers, however, it will be difficult for such potential applicants to anticipate how to mold their resumes so as to make themselves viable candidates. This will likely result in a less transparent, not more transparent, employment matching system.

Together these results show that the Internet, despite its promise to ‘make the world smaller,’ in the case of recruiting can often re-emphasize the local nature of job recruitment for most jobs. Job seekers’ access to information about jobs available in different labor markets will be irrelevant if employers do not consider those applications to be viable (e.g., on the grounds of the applicant’s location). Furthermore, if firms continue to turn to Internet job postings only after having exhausted informal and local methods of recruiting such as employee referral, the impact of access to Internet job information on labor market processes will be minimal. Finally, in part because informal recruiting methods have been found to be more successful the less skilled the job (Simpson, 1992; Holzer, 1996; Kasinitz and Rosenberg, 1996) and in part because low-skilled workers often lack the physical and social access to IT we described in the first part of this paper, unskilled and semi-skilled workers are not likely to benefit much from Internet recruiting efforts.

Conclusion

We have outlined some of the many ways that grounded geographies mark cyberspace, and through a small case study we have illustrated the imprint of grounded social relations in Internet-mediated recruitment of employees. 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 intraurban 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 paper, 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 email as testimony to the role of context in Internet access.

In our pilot study of employers' use of Internet job postings to recruit workers, the two reasons employers cited most often for using the Internet were to increase the number of qualified candidates and to save money. Using the Internet in this case does not mean dramatically changing the way firms hire people; it means looking for a way to make the existing methods more efficient. It was clear that efficiency is often measured by finding very specifically skilled candidates *who already reside within the area inscribed by what the employer deems an appropriate commuting distance*. Although hiring specifically like this may be efficient in terms of time and money, it necessarily precludes considering non-traditional, or more distant, applicants. As a result, narrow definitions of who is an appropriate candidate prevail online to the confusion of the applicant who does not understand why she/he has been turned away. Not knowing what a company is looking for specifically (knowledge usually gained from talking with people who are currently employed there or who have other knowledge of the firm) might mean that in the future changing jobs or moving up will be more difficult.

Together, the examples we have described suggest that many of the socio-spatial patterns of *inaccessibility* that are the essence of pre-Internet geographies are emerging in the context of Internet access. The places and groups of people who enjoyed excellent access before the advent of the Internet are precisely those places and people who benefit most from the accessibility to information afforded by the Internet. The power of pre-Internet geographies to shape Internet access is to a large degree responsible for the enduring patterns of unequal 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.

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