

Defining the Technology Gap

In an October 8, 1996, article describing one of California's technology corridors, the *Wall Street Journal* captured some of the enthusiasm many people feel for the revolution arising from the marriage of computers and communications networks. "Silicon Valley," it said, "is in the midst of an epic boom, opulent even for this glittering edge of America."



But such riches haven't reached many low-income communities even ones like East Palo Alto, which is right in the middle of Silicon Valley's technological abundance.

"Anywhere else in Silicon Valley, your parents use computers, there is a shop down the street to sell you a computer, another to fix your computer, another to give you computer classes, (and) there are Kinko's everywhere," notes Bart Decrem, director of a California youth technology initiative called Plugged In. "In East Palo Alto, there's none of that."

The contrast between affluent and low-income communities may be particularly sharp in places like Silicon Valley, but it exists almost everywhere. The simple fact is that poor communities are entering the Information Age far behind their wealthier neighbors.

"While [middle-class communities] are rapidly approaching the 'next cycle,' the technology of the previous cycle has already bypassed the inner city," says Richard Krieg, executive director of the Institute for Metropolitan Affairs, a public interest organization in Chicago committed to seeking practical answers to problems involving education, health care, and crime. Krieg notes that while families in affluent areas are rapidly acquiring home computers, people in many low-income neighborhoods have little exposure even to earlier generation tools such as laser scanners at supermarkets and bank automatic tellers. "Despite limited empirical study of technology diffusion..., it is clear that computerization, telecommunications, and mass media applications are dramatically underrepresented in distressed urban areas."

As Krieg suggests, the technology gap is not simply a reflection of the choices made by individual households. The deeper problem is that many poor neighborhoods lack the infrastructure available in affluent areas. Groups such as the United Church of Christ that have studied patterns of telecommunications investment have found that, all too often, telephone and cable companies have moved quickly to wire wealthier suburbs with advanced systems, while poor, inner-city neighborhoods aren't upgraded. While public attention is often focused on whether individuals can get a service, the equally important problem is that lack of adequate telecommunications facilities makes an area less attractive for businesses. This can feed a spiral where the lack of investment at the community level leads to fewer economic opportunities for people who live there. As a result, the poverty in the neighborhood makes it a less inviting target for investment, further aggravating the problem.

The same neighborhoods that lack infrastructure are comprised of households that are far less likely to have the tools of the Information Age. In an August 1996 survey of southern Californians, the *Los Angeles Times* found that just 22 percent of households earning less than \$25,000 had access to computers, compared to 69 percent of those with incomes over \$50,000. "Poor neighborhoods of the region are just totally cut off from the potential benefits of an economy that integrates such vast scientific skill," says Mike Davis, a Los Angeles historian and teacher of urban studies at the Southern California Institute of Architecture.

More recently, according to a Computer Intelligence 1998 Consumer Technology Survey, 80 percent of families making more than \$100,000 have computers. By contrast, of those families making less than \$30,000 a year, only 25 percent have computers. A 1998 study led by David Birdsell of Baruch College found significant disparities in the area of education: of people with an undergraduate degree or higher, 53 percent use the Web while only 19 percent of people with a high school education or less are Web users.

While demographic trends are changing quickly, there is some evidence that race and income may interact in troubling ways. A 1998 Vanderbilt University study based on Nielsen data from late 1996 and early 1997 indicates that racial inequities in computer ownership and Internet access jump significantly when household incomes drop below \$40,000. In such cases, African Americans were less than half as likely as whites to own a home computer and about 60 percent as likely to have Internet access.

Similar trends appear in telephone service, a much older technology that many poor Americans still don't have. While all but 6 percent of U.S. households have telephones, 43.5 percent of families who depend entirely on public assistance and 50 percent of female-headed households living at or below the poverty line lack even this basic technology. And African Americans and Latinos lag about 10 percentage points behind their white counterparts in access to telephones even when income is held constant.

Worrisome Trends

There is no easy way to measure the impact of the current inequitable distribution of information technologies, but it clearly is becoming an increasingly important contributor to inequality in America. The Office of Technology Assessment (OTA) described the effect as "the concentration of poverty and the deconcentration of opportunity."

Email, video conferencing, fax machines, and computer networks are making it easier for jobs to migrate from city centers to suburbs and beyond, the OTA explained in a 1995 report. These technologies are enabling industries that once had to be close to customers and related businesses to operate at greater distances. Similarly, they are allowing distributors and financial institutions like banks and insurance companies to consolidate operations and locate "back room" facilities farther from their customers, eliminating many downtown jobs.

At the same time, new technologies have led to sweeping changes in manufacturing processes, making old factories in urban centers obsolete. The OTA estimated that the 28

largest counties in the Northeast and Midwest lost one million jobs in the 1980s. The city of Chicago alone has more than 2,000 unused manufacturing sites, according to Krieg.

As employers take advantage of technological advances to relocate to suburbs, the labor market in many cities has become fractured. Many highly skilled managerial and professional jobs remain downtown because they require a great deal of face-to-face contact and networking. But increasingly, the only work for unskilled people consists of low-paying, service sector jobs. Such jobs offer little hope of advancement, and intermediate jobs that would help less skilled workers climb career ladders are hard to find.

"We are witnessing the wholesale disappearance of work accessible to the urban poor," concludes Milton J. Little, Jr., executive vice president and chief operating officer of the National Urban League. His view was confirmed in 1996 by Harvard sociologist William Julius Wilson in *When Work Disappears: The World of the New Urban Poor*.

But the cities' loss has not been the rural areas' gain. "Without intervention, unemployment, poverty, and out-migration will likely increase, exacerbating the structural problems typical of rural areas," the OTA warned in an earlier report, *Rural America at the Crossroads: Networking for the Future*. "Unlike routine manufacturing industries that migrated to rural areas in search of lower production costs, today's high-technology industries are attracted by a highly skilled workforce and communications networks to other economic markets and information centers. These are precisely what rural areas lack."

"Poor, rural communities are already isolated," observes Amy Borgstrom, executive director of ACENet, an organization dedicated to using networking technologies to open new markets for citizens in Appalachian Ohio. "There is low access to infrastructures." Borgstrom argues that information technologies could enable isolated communities rural and inner-city to compete economically with other regions. "But without infrastructure, training, and access, information technology and these opportunities will pass these communities by," she says.

Who Suffers?

The technology gap is taking a toll on individuals, communities, and society at large.

The cost to individuals is most obvious. By the year 2000, 60 percent of jobs will require skills with technology, according to Larry Irving, Assistant Secretary of Commerce for Communications and Information. Moreover, notes the Office of Management and Budget, 75 percent of all transactions between individuals and the government including such services as delivery of food stamps, Social Security benefits, and Medicaid information will take place electronically. People without technology skills or access to electronic communications will be at a considerable disadvantage.

This is already clear in today's job market. The gap between wages for skilled and unskilled workers has been widening for some years as employers increasingly compete

for well-trained workers who can use new technologies. Between 1979 and 1995, for instance, real wages dropped 23 percent for people with less than a high school education and 12 percent for those with only high school diplomas, while wages rose 4 percent for college graduates and 12 percent for people with advanced degrees, according to the Economic Policy Institute, a Washington think tank. Economists David Autor and Lawrence Katz of Harvard and Alan Krueger of Princeton found in a March 1997 study that the spread of computer technology may explain as much as half of the increase in relative demand for more skilled workers.

Education Attainment & Internet Access		
PEOPLE WITH A HIGH SCHOOL DIPLOMA OR LESS	19	52
PEOPLE WITH A COLLEGE DEGREE OR MORE	53	23
	% WITH INTERNET ACCESS	% OF US POPULATION

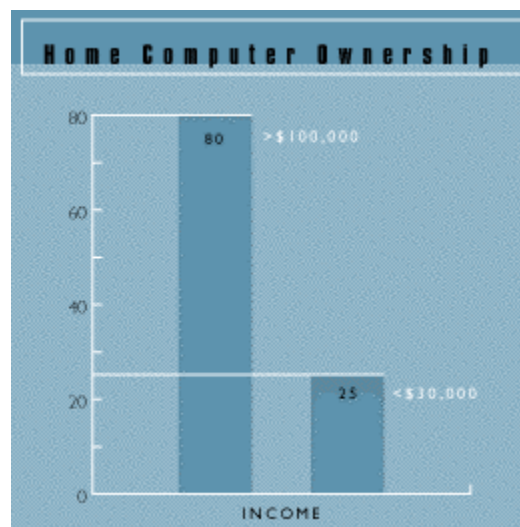
Source: "Web Users are Looking More like Americans," Harris Survey Unit of Baruch College and Louis Harris Associates, April 1998.

More recently, *The Washington Post* reported that students with limited or no access to computers are falling behind in skills that educators and parents worry will cost them later. These students are less exposed to a diverse range of facts and ideas than their computer-owning classmates, and they are increasingly at a disadvantage when it comes to skills that will be needed in college and in the job market.

People with relatively poor access to computers suffer disadvantages that stretch beyond the labor market. Unless there is intervention, "fewer and fewer Americans will be able to fully participate in our nation's economic, social, civic, and government life," the Department of Housing and Urban Development (HUD) says on its website. HUD has established a "Neighborhood Networks" initiative to assist disadvantaged Americans living in HUD-insured or -assisted housing gain access to information technologies.

"The rich are going to be getting richer in terms of information," says James Katz, a researcher at Bellcore and co-author of a survey on Internet usage. "The information poor will become more impoverished because government bodies, community organizations, and corporations are displacing resources from their ordinary channels of communication onto the Internet.... To the extent any demographic group becomes excluded from and underrepresented on the Internet, it will also be excluded from the economic fruits that such participation promises."

The technology gap may also slow efforts by low-income communities to help themselves. A growing number of civic activists believe that modern communications networks are an important tool for fostering civic engagement. According to Harvard political scientist Robert Putnam, civic engagement whether in PTAs, bowling leagues, or any of the associations people form to address specific issues can facilitate coordination and communication, foster the emergence of leaders who can help generate collective action, and reduce incentives for people to act solely in their own self-interest. Research in fields as varied as education, urban poverty, unemployment, crime, drug abuse, health, and economic development recognizes that the resulting "social capital" can enable communities to deal more successfully with social problems. Communities without access to communications networks may find it more difficult to sustain the civic engagement that can lead to these improved outcomes.



Source: Computer Intelligence,
"1998 Consumer Technology Index"

Communications technologies may be especially important to neighborhood-based organizations, many of which struggle in relative isolation to deal with such daunting problems as abandoned housing, poor street maintenance, crime, substandard health care and education, and environmental threats. Yet the Urban University and Neighborhood Network (UUNN), a coalition of universities and community organizations in Ohio, found in a recent survey that most such organizations have neither Internet access, nor believe that they could afford it. According to the UUNN, organizations without access may be undermining their own prospects for survival because the Internet in at least some cases is not only the most efficient resource for information, but also for updates on pending legislation and funding opportunities.

"Those who lack access to the Internet...will lose out in an increasingly competitive environment," the UUNN concluded. "Because so many neighborhood-based organizations are small, geographically isolated, and woefully underfunded, their members don't have efficient access to the information needed to understand all aspects of their neighborhood problems and the paths toward solutions."

This lack of infrastructure strikes some as particularly worrisome because it comes at a time the federal government is forcing individuals and communities to become more self-sufficient. Cuts in spending on social programs and the new, strict work requirements imposed on welfare recipients make it more necessary than ever that low-income people take responsibility for their own well-being, but their task is greatly complicated by the lack of communications tools and other networking opportunities that people in affluent areas take for granted. "It's as if we're asking them to pull themselves up by their boot straps, and we are taking away their boots," says Joey Rodger, president of the Urban Libraries Council.

Katherine Willis, of the Alliance for Community Technology at the University of Michigan, believes that exclusion of certain groups from these communications tools could also have profound implications for our society's ability to function as a democracy. "When democracy functions well, individual perspectives balance each other out," she notes. "But if I can lobby my congressman with email with a click of a button, and those on the other side of an issue don't have such easy access, laws will be made that don't reflect the full population's beliefs."

Can Schools and Libraries Help the Poor Catch Up?

Traditionally, we have looked to schools and libraries to help eliminate disparities in access to information resources. Unfortunately, through no fault of their own, many of these institutions mirror the technology gap rather than mitigate it.

Despite considerable progress, schools in low-income communities have fewer computers and modems than schools serving wealthier districts. According to *Computers and Classrooms: The Status of Technology in U.S. Schools*, a study by the Educational Testing Service (ETS), minority and poor students had significantly less access to computers in their classes than more affluent children. Schools with minority enrollment greater than 90 percent had a student-to-computer ratio of 17 to 1, compared to the national average of 10 to 1. For computers with advanced graphics and interactive video capabilities, the discrepancies were even bigger. While 62 percent of schools in high-income areas had Internet access in 1995, just 31 percent of schools serving low-income populations had access, according to the Department of Education's 1996 report, *Getting America's Students Ready for the Twenty-First Century*. ETS's later study found that the number of schools with Internet access rose markedly in 1996, but the gap remained: 75 percent of schools in high-income areas and just 55 percent in low-income areas had Internet access. "The kids with the most needs are getting the least access," an ETS researcher told the *Washington Post*.

Insufficient hardware or network connections aren't the only and may not even be the biggest problems for schools in poorer communities. Because of inadequate teacher training, these schools may not be using the computers they have in ways that have the greatest long-term benefits for students. All too often, they use computers for rote learning or drill exercises. In wealthy schools, on the other hand, where there generally is more money for curriculum development and teacher training, computers tend to be used

more for complex learning activities, analysis, and writing skills that command higher wages in today's economy.

As Delia Neuman at Maryland College of Information Services put it in a 1990 study that remains one of the few academic analyses of the issue, "economically disadvantaged students, who often use the computer for remediation and basic skills, learn to do what the computer tells them, while more affluent students...learn to tell the computer what to do." (The Benton Foundation explores the educational role of computer networking in its report, *The Learning Connection: Schools in the Information Age*.)

Libraries, meanwhile, are working to reduce inequality in access to new technologies, but they lack resources to do the whole job. According to Richard Kreig, public libraries in the city of Chicago had just one computer for every 20,000 residents they served in 1995, while libraries in the city's suburbs had one for every 13,000 residents. Krieg asserts that the discrepancy would be even greater if figures were available to compare the number of computers available in libraries in low-income sections of Chicago to those at suburban libraries.

Internet access is also spread unevenly among libraries, with the greatest disparity between libraries in urban/suburban and rural areas. While 72.3 percent of all public libraries had some type of Internet connection in the spring of 1997, library systems serving populations of 25,000 and above had a better than 90 percent connectivity rate, according to *The 1997 National Survey of U.S. Public Libraries and the Internet*. Those serving populations of 5,000 or less had a connectivity rate of around 56 percent. Even among libraries that are connected, Internet access for patrons varies widely.

There is a direct link between the wealth of a library's neighborhood and the ability of that library to serve its neighborhood information needs, argues the Urban Libraries Council's Joey Rodger. "Ninety percent of library funding is local," she says. "Where there are many, many poor people, the local library has less capacity to serve them."

Source: <http://www.benton.org/Library/Low-Income/one.html> *The Benton Foundation*