

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

National Academy of Sciences
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Computer Science and Telecommunications Board Division of Behavioral and Social Sciences and Education

EXPLORING THE DIGITAL DIVIDE: CHARTING THE TERRAIN OF TECHNOLOGY ACCESS AND OPPORTUNITY

Summary of Exploratory Discussions and Project Prospects

The term “digital divide” emerged in the 1990s as an expression of concern about the distribution of access to and benefits from advances in communications and information infrastructure. At the turn of the century, speculation about a digital divide had become somewhat more concrete—analysts and advocates were making observations about who did and did not have access to information technology, digital information, and, in particular, the Internet—but interpretation of those observations remained hazy. Is there a persistent, national problem in which, to use the title of a series of federal government reports, people are “falling through the net?”¹ Is the problem transient, or too dynamic to describe in stable terms as access spreads, albeit slowly for some segments of the population? And has the issue become overly politicized, as suggested by the new chairman of the Federal Communications Commission (FCC), who cautioned against “digital divide” being invoked to justify government entitlement programs providing less expensive access to information technology for particular groups of people.²

The Computer Science and Telecommunications Board (CSTB) and the Division of Behavioral and Social Sciences and Education (DBASSE) joined forces in 2000 to examine the issues posed by the digital divide concept and to assess prospects for one or more projects addressing those issues. The core of their examination was a pair of meetings that brought together a wide range of people interested in the topic (see the Appendix for meeting agendas and participant lists); there was an additional meeting that focused on a complementary topic, digital democracy. These meetings were supported by a planning grant from the Sage Foundation and a grant from the National Academies. The CSTB-DBASSE digital divide meetings demonstrated the varying perspectives brought by individuals from different disciplines—such as sociology, economics, political science, and computer science—and the approaches of people whose emphases were either analysis or advocacy.³ This rich chemistry made for lively discussion, and it generated several suggestions for projects as well as affirmation that CSTB and DBASSE could, indeed, make a contribution to the discussions concerning the digital divide.

¹ The National Telecommunications and Information Administration within the Department of Commerce produced four *Falling Through the Net* reports between 1995 and 2000.

See <<http://www.ntia.doc.gov/ntiahome/digitaldivide/>>.

² Labaton, Stephen. 2001. “New F.C.C. Chief Would Curb Agency Reach.” *The New York Times*, February 7, C1, C2.

³ Bruce Brooks of Microsoft Corporation, a participant at the August CSTB-DBASSE digital divide meeting, pointed out that the other meetings on the digital divide that he attended focus on “what’s the program; what’s the project; and how much does it cost,” with little attention to larger questions.

Defining the Digital Divide

In opening the first CSTB-DBASSE meeting, Jorge Schement of Pennsylvania State University remarked on the definitional challenge:

At least in my experience, it isn't often that a policy issue becomes a national obsession so much so that we have to ask ourselves what does it mean, and we aren't always sure what it means. I recently received an inquiry from the U.S. Marine Corps to do a presentation on the digital divide—when the Corps and the divide come together, you're dealing with some pretty broad issues. This particular national discourse has spawned a lot of hand-wringing, and hand-wringing sometimes is important in order to get to some meaningful discourse, but at the moment, we have pretty little agreement on the terms of the phenomenon—if it is a phenomenon—or even what it is we might be asking. . . . Can any research we propose actually contribute positively to this national discourse? It's one thing to ask operational questions, and it's another thing to pose them within a policy context so that they make a difference.

Stephen Fienberg of Carnegie Mellon University underscored the challenge, asking “what it means to have a phenomenon, define it, measure it and understand aspects of it” and inviting participants to contemplate that question in the context of homosexuality, AIDS, Gulf War Syndrome, road rage, as well as the digital divide. He noted that clarity of definition is the key to addressing whether a phenomenon exists.

The digital divide is, loosely, a differentiation between those who have access to information technology (IT) and digital information and, in particular, the Internet and those who do not. “Access” itself is ambiguous. For example, from a K-12 perspective Carole Wacey of the Markle Foundation (formerly of the U.S. Department of Education) pointed out that initially, “it was really about getting tools to the kids.” (Ben Shneiderman of the University of Maryland explained that even this hardware-based definition can be problematic—is one personal computer per student optimal, or is it actually better to have two students per machine to compel students to cooperate and collaborate?) In the early to mid-1990s, discussion of a “national information infrastructure” soon captured the tension between the availability of a connection to the Internet and the ability to use it.⁴ Using the infrastructure presupposes access equipment (currently a personal computer for the most part), software, telecommunications services, and associated knowledge, which itself presupposes literacy and other nontechnological attributes—and gauging any or all of these factors can be done with varying degrees of difficulty. Even the technology, which strikes many as easier to evaluate, can be misleading because change is ongoing. For example, Tora Bikson of the Rand Corporation noted that the growth of cellular telephony argues against assuming telephony is mature or even that members of a household are constrained to share a single wireline connection. The National Telecommunications and Information Administration's (NTIA's) James McConnaughey described how his agency's reports moved from a focus on being “online” to “the Internet” and more recently to broadband or high-speed access. Several participants commented on the moving target of technology as a complicating factor.

The NTIA reports (available online at <<http://www.ntia.doc.gov/ntiahome/digitaldivide/>>) point to significant gaps in Internet access by income, education, race, and location. Complicating the interpretation of these statistics is another one noted by McConnaughey: the leading reason for non-use of the Internet (claimed by 31% of household respondents that have never used the Internet at home) is lack of interest; cost was the second most frequent reason. More fundamentally, Mark Cooper of the Consumer Federation of America questioned simple bivariate comparisons, noting that many reported

⁴ For additional discussion, see *Realizing the Information Future*, Computer Science and Telecommunications Board, National Research Council, National Academy Press, 1994.

gaps diminish once one controls for income or education, but that other interesting relationships persist, such as whether children are present in a household.

Participants noted that much more attention is paid to access to technology than access to content (which perhaps explains, in part, the lack of interest above). For example, Elsa Macias of the Tomás Rivera Policy Institute suggested that content for the Hispanic community in the United States is limited. She commented about “content created in Mexico or in Columbia: how important or useful is it to the people here in the U.S.?” Bill Wresch of the University of Wisconsin at Oshkosh observed that one of the most-watched shows in Namibia is “Baywatch.”⁵ Hence, embedded in the concern over content is how to broaden the participation in the development of content that is relevant to specific communities.

Even without clarity of definition, the bundle of hard and soft factors associated with the digital divide is linked by many to potential or presumed implications of access. Meeting participants identified impacts ranging from economic and educational benefits to political participation and democracy itself. Carole Wacey noted that educational benefits depended on more than simple access, given evidence of differences in how the technologies are used in the classroom (e.g., how well teachers are prepared to use information technologies). This example of the digital divide in the classroom suggests that the digital divide also varies by physical location, from schools and libraries to homes, workplaces, and even the voting booth, and the underlying telecommunications infrastructure available in a particular community.

The link between infrastructure—the capabilities for communication and access to information inherent in, say, the Internet—and impacts is not straightforward, and assumptions or attitudes about those links may be a key means of differentiating analysts from advocates. Schement captured this situation by invoking Henry David Thoreau:

As with our colleges, so with a hundred "modern improvements"; there is an illusion about them; there is not always a positive advance. . . . Our inventions are wont to be pretty toys, which distract our attention from serious things. They are but improved means to an unimproved end . . . We are in great haste to construct a magnetic telegraph from Maine to Texas; but Maine and Texas, it may be, have nothing important to communicate. . . . As if the main object were to talk fast and not to talk sensibly... (*Walden*, chapter 1, 1854)

Schement concluded that “the digital divide is probably not a phenomenon and more likely a discourse; it is hard to place conceptual boundaries around what it is and what it isn’t.” He concluded that the digital divide is not really about technology, per se, but it is about access and participation in a democratic society in a fundamental sense.⁶

⁵ Broadcasters in the developing world often air U.S. content because producing local content can involve costs that are much higher—as much as an order of magnitude higher.

⁶ B. Keith Fulton described AOL Time Warner’s framework for helping others to appreciate fully how to bridge the digital divide and create digital opportunity: the four parts of this framework are 1) Structure—hardware, software, connections, and technical support; 2) Skills—both the ability to search for and use information and analytical skills; 3) Content that is relevant, trustworthy, and useful; and 4) Community Awareness—ensuring that desired community values are a part of the digital economy. Fulton also observed that only about 50% of the digital divide is explained by education and income.

Measuring the Digital Divide

Stephen Fienberg laid out the measurement challenge from his perspective as a statistician, suggesting a need to measure along cultural, demographic, physical, and socioeconomic dimensions and to assess whether a phenomenon or measurement is illusory because it is really capturing something else. Measuring is not inherently objective, because subjective influences (e.g., hypotheses about sources or impacts of a problem) color choice of measurement approach and therefore results. He noted the challenge of choosing units of measurement: “how do you conceive of capturing the phenomenon? Is it a phenomenon of individuals? Is it a phenomenon of institutions? Is it a phenomenon that cuts across these? And if so, how do you interrelate the units of measurement, the units of interest and the units where, potentially, policy may impact on?” Fienberg discounted the results of a variety of reports on the digital divide because of methodological deficiencies, noting that perfecting a survey can be difficult and time-consuming. The challenge was affirmed by the Bureau of Labor Statistics’ Cathryn Dippo in the instance of the supplemental survey that informed recent NTIA reports. Janet Schofield of the University of Pittsburgh observed that there may well be a digital divide in terms of the kinds of uses individuals from different backgrounds make of the Internet as well as in terms of the kind of access they have. Further, she pointed out that measuring outcomes of Internet use is especially complex because the Internet is such a multifaceted system.

Digital divide discussions to date have been hampered by a dearth of data. Within the federal government, NTIA has sought to compile relevant data, and its late 1990s series of reports show evolution in the nature and interpretation of available data. NTIA efforts leverage data collection and analyses in a variety of agencies, such as the FCC for telephone penetration (which is based on Census Bureau data) and the Census Bureau for personal computer ownership (which is an NTIA-funded effort); all agencies have had difficulties tracking access to and use of the Internet, and approaches have evolved over time. Fienberg commented on challenges in understanding what population a data set represents and in collecting data to evaluate interventions that are accompanied by naturally occurring changes and consequences.

Statistics may be complemented by case studies. For example, Virginia Polytechnic Institute and State University’s Andrea Kavanaugh described the Blacksburg (Virginia) Electronic Village and the experience there with providing access to Blacksburg, per se, and the surrounding rural area. Benton Foundation’s Tony Wilhelm reflected on his recent visit to Austin, Texas, a community with both a strong high-technology segment and a large Latino population, to urge attention to research at a local level, in part to motivate local interventions and local economic development progress. B. Keith Fulton, who had just moved from the Urban League to AOL Time Warner, recounted experiences with community technology centers to underscore the contributions of a local presence, given the need to combine access to IT with support for new users, while noting how little research there is on such interventions.⁷ Katherine Montgomery of the Center for Media Education suggested that some qualitative assessment could be done by building on a compilation of information about otherwise poorly documented but numerous local efforts, while Paul Resnick of the University of Michigan observed that some such research does exist, although perhaps the problem is that it is not the kind of research others would like.

⁷ Rob Kling of Indiana University has written about how it can be difficult to pursue research on the impacts of technology because of certain norms in the research community, which shape “genre conventions” for writing about technologies at different stages of their life cycles.

A recurring question is “how long should it take for access to technology and related resources and services to spread or reach a given percentage of the population?” Meeting participants asked whether milestones might be usefully identified. Schofield argued for more research into long-term effects.

Contextualizing the Digital Divide

Miron Straf of DBASSE cautioned against discussing the digital divide in the abstract, noting that the discussions centered on differential effects of IT rather than access differentials in the population, per se. Many factors were raised by participants as relevant to impacts, from changes in government and political communication to changes in local economic development and quality of life enabled by IT.

Schement referred to one of his current research projects, which aims to develop a new theory of universal service, illustrating how the digital divide may connect with long-standing public policy frameworks such as in telecommunications, where extending service to all has been a goal that has shaped a number of policy interventions. McConaughy reported that for the Clinton administration, a goal was to “extend the universal service concept to ensure that information resources are available to all at affordable prices.” Early indications of the more conservative approach of the Bush administration compared to its predecessor suggest either a moderation of universal service goals or at least of federal government efforts in their pursuit.

Schement related digital divide concerns to broader concerns about equity, noting that gaps should be calibrated according to how they relate to equality of opportunity as opposed to personal choice or reasonable expectations about time for technology diffusion. He outlined results from the body of research on telephone ownership, observing that the results of an absence of a phone extend beyond a specific household to some portion of its community. He linked the availability and use of networks to the development of social capital. Lee Sproull of New York University noted that gender should be considered more in digital divide discussions, since it factors into the population of IT developers, as well as users, and cuts across other demographic dimensions.

Looking at the digital divide globally reveals larger and more complex disparities that provide some perspective on the domestic situation (and present their own opportunities). Ernest Wilson of the University of Maryland drew on his comparative international observations to note that reducing the digital divide tends to involve processes of negotiation and a range of institutions that may be domestic or transnational, such as the international non-governmental organizations that address telecommunications or economic development. Wilson noted that part of the reason for an observed link between education and Internet access is that knowhow (“human capacity”) can make the difference between use and non-use, a difference that can be more noticeable between countries because of the larger gaps in education, income, and institutions between countries of higher and lower levels of economic development. He decried a lack of good cross-national studies, noting that “there is no place right now in the world where one can go to and go to ‘digitaldivideinternational.com’.”

Responding to the Digital Divide

Responses to the digital divide need to keep the ultimate objective in sight. Within the realm of education, Rob Kling proposed that programs should support “effective teachers” as the goal, not “teachers who can use technology effectively.” Sharon Strover of the University of Texas reflected, “I realized after the fact that it’s a lot easier to talk about these issues when you’re not trying to define the digital divide, because instead, we focused talking about the contribution of life and work in the digital

economy to life and work in our communities, in our country, and maybe even globally, and [we] used that as a point of departure to reflect on a lot of the inequalities that play out.”

Participants in the CSTB-DBASSE meetings shared a wide range of ideas about how an understanding of the digital divide could contribute to policy-making. Bikson, for example, questioned the wisdom of leaving access to the workplace, given the limitations of workplaces in spreading access to health insurance. Andrew Blau of Flanerie Works lamented the difficulty of effecting new thinking about programs and policy: “when it comes to initiatives to address the digital divide, every initiative that we can imagine is, in some sense, the death mask of the problem statement that called for it.” He distinguished among options that focus on individuals and those that focus on the social context. He argued for homing in on the intractable problems as opposed to those where some market action was likely. Cooper observed that externalities at the social level may not be factored in adequately in whatever analysis is undertaken. Wilson argued that “if the gap is growing [as it appears to be], it’s going to be a heck of a lot easier to intervene at the front end of that gap than at the back end of that gap. At the back end, there are implications for class relations, ethnic relations, international relations, war and peace, terrorism, the whole shebang.”

Finally, labels matter. Russell Neuman of the University of Pennsylvania predicted the demise of digital divide as a politically useful term, following the earlier demise of “National Information Infrastructure,” the umbrella under which the term first gained prominence. Bikson summed up the challenge by expressing a desire to “come up with some ways of making it safe to create policies that would reduce the divide.”

Designing Information Technology and the Digital Divide

The design of information technology tends to be driven by mass-market preferences, which means that some traditionally disadvantaged groups (e.g., persons with disabilities) can become further disadvantaged. Deborah Kaplan of the World Institute on Disability described an issue emerging with the growing use of voice recognition technology. At first, voice recognition technology was quite sophisticated; it could recognize people with dysarthric speech, cerebral palsy, and many other conditions, and it was incredibly useful to people as an intermediary between themselves and various environments. However, some of that sophisticated technology is being simplified to appeal to a larger set of potential users. As a consequence, the training of recognition systems by individuals is not as detailed or time consuming, making such products more appealing to general users, but less useful for users with more demanding needs. There is a real potential for an increasing divide between what is feasible technologically and what may be provided by the marketplace.⁸

Contemplating Digital Democracy

Initially, discussions at the digital divide sessions were based on the assumption that access to the Internet would enhance political participation by citizens. Participants later decided that there is no evidence that improved access to information technology would, in fact, increase political participation. Thus, it is far from clear whether or how new digital and electronic technologies can foster and enhance democracy, enhance democratic values, and enhance democratic participation in the political process of not only voting but campaigning, of acquiring political information and political education and informing citizens about their government, their representatives, and the full range of choices available to them. These

⁸ For additional discussion, see *More Than Screen Deep*, Computer Science and Telecommunications Board, National Research Council, National Academy Press, 1997.

issues are discussed and summarized in the companion document to this summary “Democratic Processes in the Age of the Internet: A Framework for Action.”

Opportunities for CSTB and DBASSE

Participants in the CSTB-DBASSE meetings were united in affirming the value of an independent and analytical assessment of the digital divide. Their remarks point to a range of users for the results of potential research: not only the research community itself (and across multiple disciplines, from computer science to, in particular, many branches of social science), but policy-makers at all levels of government (local, state, and federal) and a range of nonprofit organizations that are more operational than analytical in their orientation. They also point to a need for broader recognition of where good research can be supported (and how to get the results).

Eileen Collins of the National Science Foundation underscored the need for objective input into policy-making, noting that policy-makers are bombarded by individuals or groups advancing their own papers and perspectives. At the same time, Collins observed, these inputs are needed, both to understand the effectiveness of mass-media treatment of such issues as the digital divide and to avoid backlashes that could be triggered by incomplete understanding of technical and social trends. Collins underscored the value of the interdisciplinary approach that CSTB and DBASSE bring, beginning with benefits to the research community, where technologists and social scientists are often ignorant of relevant developments in the other disciplines. Suzanne Iacono, also of NSF, amplified these observations by noting a need for more theory as a way to move research forward, plus a need for multidisciplinary research on relevant topics to be accepted in the research community. Several participants noted the limited support from private foundations (which has, however, been critical to underwriting the research that has been done on impacts of IT). Fostering such activity and its legitimacy might be a role for the National Academies, in part because it can do something several participants urged: engage technologists as well as social scientists in the research. Sproull urged doing so, because the technology is evolving. She described how her research into different kinds of social groups provides a vehicle for understanding what might happen with the introduction of electronic technology into social interactions and therefore how to design more effective technical support tools.

Tony Wilhelm suggested (with endorsement by a number of participants) that research inquiries into the digital divide “should draw on existing theory as far as it will take us rather than obsessing about the technology and thinking that it’s somehow new and unhinged to any kind of context.” The framework of sociology and what it tells us about inequality, as well as that of political science and what it tells us about why people don’t participate politically, have extensive literatures that should be leveraged. We will reinvent some (or many) wheels if initiatives focus on questions such as “how do the introduction of new technologies affect ethnic communities” without the benefit of building on past social science research.

While longitudinal studies are certainly needed, more evaluation of programs to yield short-term, quick information is also needed. Circumstances change so rapidly in the development and application of information technology, which argues for relatively frequent assessment of circumstances and outcomes with some hope that one is measuring the same thing over the period of study. Perhaps there should be a greater emphasis on designing policy interventions and investing money in the evaluation of programs to help identify those practices that result in real improvement in important outcomes suggested Bruce Brooks of Microsoft Corporation. Also important is to develop the understanding of which practices can be scaled effectively and which cannot. Brooks asks “are there some attributes of organizations that are successful that people can point to that, in fact, may actually be replicable?”

Specific Topics or Initiatives

1. *Participating in Online Communities.* What might one get from being online? What does it mean to participate fully in society? How do information technologies promote participation? One example is the microcontributions idea described by Lee Sproull through which people make small contributions (e.g., 30 minutes) to community efforts. What are the differences with respect to different technologies? Ben Shneiderman of the University of Maryland said that “this idea of the online discussion group and online community is such a powerful force and a great opportunity for study. There has been some work in this area, but it’s one of those interesting situations where the social forces play a role, but the interfaces also play a role. If you make it easy enough for people to communicate and express themselves—if you can provide the protection and trust—then you get a strong empathic community. If you don’t do those things and don’t have the interfaces as well as the policies in place, then, they fall apart.”
2. *Economic Impact Within Communities.* How do evolving information technologies affect the economic circumstances of communities—work opportunities, quality of life, and work processes? What are the implications for workplaces, institutions, and communities? Are particular industries affected more adversely than others?
3. *Negative Effects of Access.* As a general proposition, greater access to information technology and information may be beneficial. However, some kinds of access can be viewed negatively. For example, Elsa Macias pointed out that because Latinos are very family oriented, large amounts of time in front of a computer can be perceived negatively—by taking away time with family members. Greater access can also facilitate the homogenization of culture: “Isn’t it better for indigenous people like the Eskimo in Alaska not to be connected, in order to preserve their own unique traditions and not have them washed away by a flood of pop culture and smut that comes in through the Internet?”⁹
4. *Avoiding the Promotion of Existing Inequities in Education.* While research and initiatives should focus on mitigating the effects of the digital divide, efforts should also be placed on discouraging the transfer of known inequities in the classroom to digitally-based activities, argued Alice Agogino of the University of California at Berkeley. For instance, classroom discussions have many known inequities in terms of who is called on, who is active, who is engaged in classroom participation. Is there a potential to do something different (better) online?
5. *Research to Promote Usability.* According to Deborah Kaplan, the population of people with disabilities in this country is about 20 percent of the population. In some sense, this population is more vulnerable than the general population to technological changes, while it may well benefit from the advances in technology...if only such efforts were supported. Usability in general is not a monolithic concept, as explained by Nancy Frishberg of Sun Microsystems (formerly of the New Media Centers). Lisa Schwartz of the Bureau of Labor Statistics offered a cautionary note on the elderly. “There’s an unspoken assumption that the lack of connectivity among the elderly is really a cohort effect...I don’t believe that to be the case. I think all of us will be challenged as this technology moves forward. We should not lose sight of this issue.”
6. *Improving (Technological) Literacy.* What skills does one need to participate in online communities? Is the ability to use email and online chat (and the accompanying norms of etiquette) sufficient? There is also the basic question of literacy. Nolan Bowie of Harvard University made the point that the Internet is basically still a text-based technology. So even if it were available to everyone in the United States, tens of millions of adults—many in inner cities, southern rural counties and in Appalachia—would still be unable to use it.
7. *Education.* There’s a whole set of issues around IT and education: does IT promote constructivist learning practices is one question; even if teachers are not constructivists to begin with, is there an

⁹ A question posed and discussed in “Digital Divide or Dividend?” Thomas L. Friedman, *New York Times*, March 16, 2001.

interaction with the technology that's related to these constructivist ideas? Also, there are impacts on student attendance, the likelihood of attending college, interest in subject matter, etc.

8. *International Dimensions*. Is the spread of information technology contributing directly to growing inequality between richer and poorer countries? Is it helping to moderate such inequity? Under what circumstances could it?
9. *Public v. Private*. What are the appropriate roles for the public sector versus the private sector? Which activities can be best addressed by which sector?
10. *Measurement*. There needs to be a focused consideration of what it is that should be measured, and how. Ernest Wilson commented that "...the data are simply not available and reliable. I think that's one thing we need to keep saying as a mantra, even domestically. We have outcome data; we have income data, but we don't know what goes on in the black box that relates these two things."
11. *Information Indicators*. "There's a long history of developing indicators in this country," explained Janet Schofield.¹⁰ Participants recommended that a panel should be convened to develop information indicators (I-squared). These indicators would include metrics related to access, plus broader metrics such as the ability to make effective use of information and the level of technical support available. Such indicators would help us understand the current extent of information and equality in society. Indicators should be developed both for individuals and institutions (and not limited to the Internet) and should also relate to things like democratic participation. Indicators must facilitate time-trend analysis. There are some resources that should be consulted in beginning this task, such as the General Social Survey,¹¹ which recently added some relevant measurements.
12. *Meta-analytic Studies*. Participants felt that there is little awareness of what others are doing that might affect digital divide work and therefore there is a strong need for a series of meta-analytic studies to draw across disciplines and studies. The National Research Council is urged to support the creation of a central mechanism to locate relevant studies, databases, and other resources. An additional benefit of this undertaking would be to encourage multi-disciplinary efforts.
13. *Deviant Case Analysis*. Look at places where there are unexpected successes. For example, look at somebody who grew up in an economically and educationally poor environment, but who achieved something really amazing in terms of information. How does that happen? One might be able to learn something about how it happened with the hope of perhaps generalizing that or finding ways to make it happen more broadly.

¹⁰ See, for example, the science and engineering indicators developed and maintained by the National Science Foundation (<<http://www.nsf.gov/sbe/srs/seind00/start.htm>>). For further discussion, see *Fostering Research on the Economic and Social Impacts of Information Technology*, Computer Science and Telecommunications Board, National Research Council, National Academy Press, 1998.

¹¹ The General Social Survey is a regular, ongoing omnibus personal interview survey of U.S. households. See <www.norc.uchicago.edu/gss/homepage.htm>.

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APPENDIX

Agenda and Participant List for the May 1-2, 2000 Meeting in Washington, D.C.

EXPLORING THE DIGITAL DIVIDE: CHARTING THE TERRAIN OF TECHNOLOGY ACCESS AND OPPORTUNITY

National Research Council
2001 Wisconsin Avenue, N.W.
Green Building, Room 104
Washington, D.C.

May 1-2, 2000

Agenda

Monday, May 1

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| 8:00 – 8:30 | Continental Breakfast |
| 8:30 – 9:15 | Welcome and Introductions
<i>Marjory Blumenthal, Computer Science and Telecommunications Board</i>
<i>Barbara Boyle Torrey, Division on Behavioral and Social Sciences and Education</i> |
| 9:15 – 9:30 | Overview of Meeting
<i>Jorge Schement, Pennsylvania State University</i> |
| 9:30 – 10:00 | Profile of National Telecommunications and Information Administration (NTIA)
“Falling Through the Net” Series
<i>James McConnaughey, Office of Policy Analysis and Development, NTIA</i> |
| 10:00 – 10:15 | Break |
| 10:15 – 11:45 | Panel: What is the Digital Divide? Who Comprises the Digital Divide?
<i>Lee Sproull, New York University (facilitator)</i>
<i>Jorge Schement, Pennsylvania State University</i>
<i>Bill Wresch, University of Wisconsin, Oshkosh</i>
<i>Ernest Wilson, University of Maryland</i> |

Is there really a “divide?” How significant is it? Who is affected? Should there be “divides?” How temporal might the divide be? Which groups need public intervention to overcome the divide? Why worry about the digital divide?

- 11:45 – 12:45 p.m. Panel: Data Collection on the Digital Divide
Stephen Fienberg, Carnegie Mellon University
Andrea Kavanaugh, Blacksburg Electronic Village, Virginia Tech
- What data support the claim of the digital divide? How do we collect data on the have-nots? How reliable is it? What data might be useful to collect?
- 12:45 – 1:30 Lunch
- 1:30 – 3:00 Panel: Current Initiatives, Possible Initiatives
Andrew Blau, Flanerie Works (facilitator)
B. Keith Fulton, AOL Time Warner
Margie Shields, Packard Foundation
Anthony Wilhelm, Benton Foundation
- What current initiatives are showing promise? Do many programs include an assessment component, and if so, what kind? What is the typical duration for a program? What additional programs could be useful?
- 3:00 – 3:15 Break
- 3:15 – 5:00 Panel: Considering Research Topics in Social Science and Information Technology
Tora Bikson, RAND (facilitator)
Rob Kling, Indiana University
Ben Shneiderman, University of Maryland
Paul Resnick, University of Michigan
- What is the range of research topics pertinent to the digital divide? How might the transformation of information technology itself impact the digital divide? What research appears to be missing from the prevalent discussions of the digital divide?
- 5:00 – 5:45 Plenary Discussion. Key Issues from the Panels.
- 5:45 – 6:00 Wrap-up and preview of Day 2
Jorge Schement
- 6:00 – 8:00 Reception and Buffet Dinner in South Prefunction area
- Tuesday, May 2*
- 8:00 - 8:30 a.m. Continental Breakfast
- 8:45 – 9:00 Overview of Day 2 – Break out topics to be revised based on the day’s discussion
Jorge Schement
- 9:00 – 10:00 Profile of Federal Initiatives
Carole Wacey, Markle Foundation (formerly of the Office of Educational Technology, U.S. Department of Education)

10:00 – 12:00	Break Out Sessions (break as needed)
	<p>A. Digital Divide and Economic Participation How much of the divide is tied to issues of access versus the ability to use computers fluently? What technological solutions may affect the divide? What will the market produce, what needs governmental incentive? What can be deduced from the adoption of technologies in different countries?</p> <p>B. Digital Divide and Social and Political Change and Education What other societal functions might be impacted by the digital divide? For instance, how might the divide affect democratic processes? Will online voter registration improve voter turnout? Will “haves” merely extend and solidify their political strength? What about online healthcare transactions? Inequalities already exist in different population groups’ access to healthcare information. How might online healthcare applications either improve or exacerbate community healthcare resources?</p> <p>C. Research and Data Collection What research is needed or available to develop solutions to close the divide? What role should the federal government play? What role should be entrusted to industry? What role might foundations, associations, and advocacy organizations play?</p>
12:00 – 1:00 p.m.	Lunch
1:00 – 2:00	Report-outs from Breakout Sessions <i>Breakout Discussion Leaders</i>
2:00 – 3:00	Plenary Discussion – Identifying Key Issues
3:00 – 3:15	Concluding Remarks: Where Do We Go From Here? <i>Jorge Schement</i>

PARTICIPANTS

Robert	Ahdoot	University of Maryland
Tora	Bikson	RAND Corporation
Andrew	Blau	Flanerie Works
Marjory	Blumenthal	Computer Science and Telecommunications Board
Nolan	Bowie	Harvard University
Barbara	Boyle Torrey	Division of Behavioral and Social Sciences and Education
Jeff	Carver	University of Maryland
Eileen	Collins	National Science Foundation
Mark	Cooper	Consumer Federation of America
Cathryn	Dippo	U.S. Bureau of Labor Statistics
Stephen	Fienberg	Carnegie Mellon University
Charles	Firestone	Aspen Institute
B. Keith	Fulton	AOL Time Warner

Amy	Garmer	Aspen Institute
Ingrid	Gould Ellen	New York University
Karen	Hein	William T. Grant Foundation
Margaret	Huynh	Computer Science and Telecommunications Board
Suzanne	Iacono	National Science Foundation
Alan	Inouye	Computer Science and Telecommunications Board
John	Jung	University of Maryland
Andrea	Kavanaugh	Virginia Tech
Michele	Kipke	Division of Behavioral and Social Sciences and Education
Rob	Kling	Indiana University
Bill	Kules	University of Maryland
Herb	Lin	Computer Science and Telecommunications Board
Elsa	Macias	Tómas Rivera Policy Institute
Jim	McConnaughey	U.S. Dept of Commerce, NTIA
Faith	Mitchell	Division of Behavioral and Social Sciences and Education
Katherine	Montgomery	Center for Media Education
Russell	Neuman	University of Pennsylvania
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Carol	Petrie	Division of Behavioral and Social Sciences and Education
Gail	Pritchard	Computer Science and Telecommunications Board
Paul	Resnick	University of Michigan
John	Robinson	University of Maryland
Sheila	Sager	Pennsylvania State University
Jorge	Schement	Pennsylvania State University
Janet	Schofield	University of Pittsburgh
Lisa	Schwartz	U.S. Bureau of Labor Statistics
Margie	Shields	David and Lucile Packard Foundation
Ben	Shneiderman	University of Maryland
Lee	Sproull	New York University
Miron	Straf	Division of Behavioral and Social Sciences and Education
Sharon	Strover	University of Texas, Austin
Carole	Wacey	U.S. Department of Education
Eric	Wanner	Russell Sage Foundation
Anthony	Wilhelm	Benton Foundation
Robert	Willard	U.S. National Commission on Libraries and Information Science
Ernest	Wilson III	University of Maryland
Bill	Wresch	University of Wisconsin, Oshkosh

Agenda and Participant List for the August 3-4, 2000 Meeting in Menlo Park, California

EXPLORING THE DIGITAL DIVIDE AND DIGITAL DEMOCRACY

SRI International
Conference Center
333 Ravenswood Avenue
Menlo Park, California
(415) 326-6200

August 3-4, 2000

Agenda

Thursday, August 3

7:45 – 8:30 a.m. Continental Breakfast

8:30 – 8:45 Welcome and Introduction to the National Academies
*Susan Graham, University of California at Berkeley and National Academies/
Computer Science and Telecommunications Board (Meeting Chair)*
*Herbert S. Lin, National Academies/Computer Science and
Telecommunications Board*

8:45 – 9:15 Participant Introductions
Susan Graham

9:15 – 10:45 What is the Digital Divide?
Is there really a “divide?” How significant is it? Who is affected? Which groups
need public intervention to overcome the divide? Why worry about the digital
divide? How much of the divide is tied to issues of access versus the ability to
use computers fluently? What technological solutions may affect the divide?
What will the market produce; what needs governmental incentive?

What research is needed or available to develop solutions to close the divide?
What role should the federal government play? What role should be entrusted to
industry? What role might foundations, associations, and advocacy organizations
play?

Findings from the May 1-2 Workshop at the National Academies,
Washington, D.C.
Jorge Schement, Pennsylvania State University

International Considerations of the Digital Divide
Ernest Wilson, III, University of Maryland

Participant Discussion

10:45 – 11:00 Break

11:00 – 12:30 p.m. What is Digital Democracy?
What is “digital democracy” and how does it differ from “democracy?” Is digital democracy an incremental change from democracy, or will it lead to a fundamental shift in political processes? What is the promise of IT in promoting democracy? What could be done that hasn’t been attempted yet? Are there limitations in the technology that are inhibiting digital democracy? If so, what needs to be developed to overcome these limitations? What assumptions about democracy do the Internet and other information technologies challenge? What new forms of governance are made possible and practical because of the revolution in information technologies that make information so much more accessible and make it possible to solicit input from individuals at a much reduced cost? What are the practical implications of these new forms of governance (i.e., how can we get from here to there?). What are the risks involved?

Findings from the June 1-2 Workshop at the National Academies,
Washington, D.C.
Nolan Bowie, Harvard University

Improving American Democracy: the Promise of Digital Democracy
Morris Fiorina, Stanford University

The Requirement for Fluency in IT
Larry Snyder, University of Washington

Participant Discussion

12:30 – 1:30 Lunch

PROMOTING CIVIC ENGAGEMENT OR SOCIAL FRAGMENTATION?
A SYMPOSIUM ON THE SOCIAL IMPACTS OF INFORMATION TECHNOLOGY

Developments in information technologies are fundamentally changing the way information is accessed. The initial effect may be to extend access as novel technologies (for which use may require significant cost or particular skills or training) provide new mechanisms for access while established technologies continue in use. As novel technologies become more widely used, new services (i.e., content) are often developed. For those with access to these new technologies and services, the options for accessing information increase in new and exciting ways, making it possible for the creation of services that were previously unforeseen or thought impossible. But what of the consequences to those who are unable to obtain access to these new technologies and services. The purpose of this symposium is to explore the current and likely future developments in how information technology facilitates information access and then address the question—do these developments promote civic engagement or do they promote social fragmentation? Who will be better off? Who will be worse off? What are the tradeoffs?

1:30 – 3:10	<p>Computer and Communications Technology</p> <p>Human-Computer Interaction <i>Tora Bikson, RAND</i></p> <p>Machine Intelligence, Speech and Natural Language, Virtual Perception and Visual Sciences <i>William Mark, SRI International</i></p> <p>Learning Technologies <i>Roy Pea, SRI International</i></p> <p>Wireless Communications <i>Yale Braunstein, University of California at Berkeley</i></p> <p>Other Technologies and General Discussion</p>
3:10 – 3:30	Break
3:30 – 5:20	<p>Digital Content and Information Services</p> <p>Commercial Content Providers <i>Ram Mohan, Infonautics Inc.</i></p> <p>E-Health: Bridging the “Content Divide” <i>Linda Neuhauser, University of California at Berkeley</i></p> <p>Archiving and Accessing Content on the Internet <i>Gail Feldman, Internet Archive</i></p> <p>Enabling Use of Digital Information <i>Howard Besser, University of California at Los Angeles</i></p> <p>Online News Delivery <i>Pamela Moreland, San Jose Mercury News</i></p>
5:20 – 5:30	Summary Remarks and Preview of Friday <i>Susan Graham</i>
5:30 – 7:30	Reception
<i>Friday, August 4</i>	
8:15 – 9:00 a.m.	Continental Breakfast
9:00 – 10:15	<p>The Promise and Perils of Information Technology: Widening or Narrowing the Digital Divide? Improving or Impairing Democracy? <i>Susan Graham</i></p>

Roundtable discussion—reflections from the technology symposium

Rapporteurs:

Tora Bikson, RAND

Rod Hart, University of Texas at Austin

10:15 – 11:00

Initiatives on the Digital Divide and Digital Democracy

This session focuses on particular initiatives, studies, and ongoing research related to the digital divide and digital democracy. Participants will discuss their own projects and priorities as well as highlight other important activities being conducted or planned by those not attending this workshop.

Initiatives and Perspectives at Microsoft

Bruce Brooks, Microsoft Corporation

Report on Access Efforts in Canada

Richard Rosenberg, University of British Columbia

11:00 – 11:15

Break

11:15 – 12:30 p.m.

Access for the Rest of Us

Hosiah Huggins, Jr., Zebraa Communications

The Davis Community Network

Richard Lowenberg, Davis Community Network

Digital Steppingstones: Technology Models Serving Underserved Communities

Elsa Macias, Tomás Rivera Policy Institute

Report on Community Technology Centers in the San Francisco Bay Area

Bill Penuel, SRI International

12:15 – 2:00

Capstone Discussion: Where Do We Go From Here? [includes lunch]

Susan Graham

Discussion of desirable actions by technologists, guidance for policy makers, and ideas for researchers.

2:00

Adjourn

PARTICIPANTS

Alice	Agogino	University of California, Berkeley
Kate	Arms	Weil, Gotshal & Menges, LLP
Howard	Besser	University of California, Los Angeles
Tora	Bikson	RAND Corporation
Nolan	Bowie	Harvard University
Yale	Braunstein	University of California, Berkeley
Bruce	Brooks	Microsoft Corporation
Ruth	Davis	Santa Clara University

Paula	DiPerna	Joyce Foundation
Debbie	Drennan	iTECH Center
Gail	Feldman	Internet Archive
Morris	Fiorina	Stanford University
Nancy	Frishberg	Sun Microsystems (formerly of the New Media Centers)
Susan	Graham	University of California, Berkeley
Peter	Hart	Ricoh Silicon Valley Inc.
Chuck	House	Intel Corporation
Hosiah	Huggins, Jr.	Zebraa Communications
Margaret	Huynh	Computer Science and Telecommunications Board
Alan	Inouye	Computer Science and Telecommunications Board
Deborah	Kaplan	World Institute on Disability
James	Koch	Santa Clara University
Herb	Lin	Computer Science and Telecommunications Board
Richard	Lowenberg	Davis Community Network
Elsa	Macias	Tómas Rivera Policy Institute
William	Mark	SRI International
Barbara	Means	SRI International
Peter	Mich	Joyce Foundation
Ram	Mohan	Infonautics, Inc.
Pam	Moreland	San Jose Mercury News
Linda	Neuhauser	University of California, Berkeley
Roy	Pea	Center for Technology and Learning, SRI
Bill	Penuel	Center for Technology and Learning, SRI
Richard	Rosenberg	University of British Columbia
Jorge	Schement	Pennsylvania State University
Margie	Shields	David and Lucile Packard Foundation
Lawrence	Snyder	University of Washington
Ernest	Wilson III	University of Maryland
Terry	Winograd	Stanford University