Social studies of domestic information and communication technologies

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Why study the new information and communication technologies?

In the 20th century, new information technology has the potential to influence the lives of ordinary citizens as much as it has influenced business, education, and government. In many of the countries in Europe, North America and Asia, the majority of individuals and households are using personal computers, the Internet, and mobile telephones. In the United States, these are often referred to as information technology. In Europe, the phrase "information and communication technologies" is more commonly used and abbreviated to ICTs. This book is about the potential impact of these new technologies, as they enter our homes and our daily lives, to change the range of activities we pursue, the way we perform old activities, our relationships with other people, and our personal and economic welfare. But will the new ICTs have a *significant* social effect, and if they do, will the change be positive? This book contributes to the investigations needed to answer these questions.

Towards the end of his book, *The Coming of Post-Industrial Society*, Daniel Bell (1973) argues that before the industrial revolution, humankind confronted nature; through the industrial revolution, we confront a sort of "fabricated nature"; but

"[t]he post-industrial society is essentially a game between persons" (p. 488). We have less to do with either unadulterated nature or artifacts. But in the new "knowledge society" we have a lot to do with each other, often mediated by the use of new technology. The new technologies we discuss in this volume are a part of this new social and human environment.

In a sense, of course, nothing is new. While computers, the Internet, and mobile phones are new technologies, the debate over the effects of technology on personal lives is old. In *The Republic*, Plato warned against the pernicious effects of consuming the mass media of the day (drama and poetry), because viewers and readers might have difficulty distinguishing fact from fiction and might emulate the worst rather than the best behavior of the tragic heroes. Such ancient concerns are a strange pre-echo of current social science research findings and argument: for instance, that television and computer games promote violence or other negative behavior (Anderson et al., 2003).

Psychologists, sociologists and communication scholars have long been interested in the impact on everyday life of broadcast media such as radio or television (e.g., Janowitz & Hirsch, 1981; Ball-Rokeach & Cantor, 1986; Gurevitch & Levy, 1987; Huston et al., 1992), as well as interpersonal communications media such as the telephone. The telephone was invented in 1876; by the turn of the 20th century it was reducing the isolation of farm families and helping extended families keep in touch (Fischer, 1992). Today wireless technology,

miniaturization, and new pricing plans are changing the telephone's capabilities, how it is used, and the types of people who use it. A major consequence is that the telephone has become a more personal device, even a fashion accessory, rather than a household appliance used in common by a family. Now telephones are extensively used for social communication, for household logistics, for providing families with a sense of security, for just-in-time coordination among people on the go, and for providing friends and loved ones a continual sense of being in contact. How are these changes in capabilities, services, and usages influencing everyday life?

As older technologies have evolved and newer ones have been accepted by the general public, social scientists have added personal computers, the Internet, and mobile telephones to the mix of technologies whose impact they seek to assess. At the heart of this enquiry is the digital revolution. From the dawn of computing in World War II to the late-1980s, this revolution primarily influenced organizational life. As a result, in the 1980s and 1990s, researchers debated and documented the influence that computerization was having on such domains as organizational productivity, inter-organizational coordination, employment levels, distributed work, and the quality of individual work life (Brynjolfsson, 1993; Hartmann, Kraut, Tilly, Kraut, & Tilly, 1986; McLoughlin & Clark 1994).

In the late 1990s, low-cost personal computers and an extensive, relatively easy to use Internet helped computers spread to the majority of households in many

developed countries. Less than 9% of U.S. households had computers in 1985, but by 2001 that number had risen to 57% (U.S. Department of Commerce, 2002). Horrigan reports in his chapter in this book that by the end of 2003, 64% of American adults had Internet access, and on a typical day, 50-60% went online. In the United Kingdom, 10% of households had Internet access in 1999 but by the beginning 2003, that number had risen to 45% (U.K. Office for National Statistics, 2004). Anderson's chapter in this volume on Internet use reports that 59% of Britons aged 14 and over currently use the Internet, with 89% of these accessing the Internet from home. From the beginning, social scientists have been documenting these developments and examining how individual lives are changing as a result (e.g., Vitalari & Venkatesh, 1985).

The growing availability of mobile telephones, personal computers, and the Internet, as well as the expansion in the range of services they offer, could lead to changes in the lives of the average citizen as profound as those that have affected organizations and economic life. As the chapters in this book document, these technologies are being used in a wide variety of ways to make everyday activities more efficient, more convenient, or just more fun. Figure 1, adapted from the Pew Internet and American Life project, shows the percentage of Internet users who perform various online activities on a typical day. For example, of the approximately 63% of American adults with Internet access, 48% of them send electronic mail in a typical day. Using the Internet to access news or information about hobbies, weather, and reference questions is very common.

[figure 1 here]

Many of the activities for which people use the Internet are one are long-standing and well-rooted in our social system. For instance, one can maintain contacts with friends and family though telephone calls, visits, and letters, or meet new people by joining formal organizations. One can turn to the newspaper for the news or weather, go to the library for research on a variety of topics, look at advertisements and buy consumer magazines for product information, or visit the bank to conduct financial transactions. New technology perhaps makes these activities easier to perform, but it doesn't change their fundamental nature.

Other uses new technology, however, seem qualitatively new. The wholesale sharing of music among strangers is one example. Even though listening to music and other entertainment is routine among teens, giving music from one's own collection to people whom one does not know is a new phenomenon. So, too, is the use of Web logs ("blogs," or online diaries) to publicly broadcast what in the past would have been private writings about one's emotions and experiences. People of course continue to hold neighborhood yard and jumble sales to sell used merchandise, but the extension of these to reach a national market via online auctions, such as eBay, makes them different in kind.

By definition this penetration of the Internet and mobile telecommunications into the way we achieve fundamental goals of connecting to other people, finding information, or entertaining ourselves, is changing how we live our lives. Do these changes have larger consequences, beyond the activities that are directly affected? Does using the Internet change the amount of time people spend on the other activities they engage in? Does performing an activity online take time from comparable offline activities or from different ones? Does the use of mobile phones and online communication change people's social resources—the number of people they communicate with, the type of social ties they start and maintain, and the quality of the relationships they have with other people? Does the time people spend online or using mobile phones influence their commitment and contribution to their local communities? What, in sum, are the social effects of the new information and communication technologies? Our goal in this book is to explore these questions by examining the diverse uses, channels, and people involved with the new ICTs.

What do we mean by social impact?

We identify four broad approaches to describe what researchers mean by the social impact of information technology. One can think of these approaches as arrayed in concentric circles around the activities that the technology directly supports, with the narrowest approach directly concerned with changes in how particular tasks are performed and the broadest considering the impact on society as a whole.

Technology as a tool

In the first and narrowest of these approaches, the new ICTs are seen as mere tools that allow people to achieve relatively static goals and to perform old activities in slightly new ways. In the process, people may change their efficiency in performing these activities. Using the Internet to find product information, to research health information, to make vacation plans, or to bank online are examples where a new technology seems to change the efficiency of routine transactions, although not all commentators agree that personal efficiency is necessarily increasing (e.g., Landauer, 1996). The use of e-mail to exchange birthday greetings or news of the day illustrates this model in the interpersonal realm. Listening to music online serves the same ends as listening to it over the radio with a small shift in mechanism. In these cases, the new technologies are displacing one activity with a functionally equivalent alternative. Although this switch might have important consequences for the companies and institutions involved—as the recording industry's legal moves to prohibit the downloading of music from the Internet demonstrates—from the individual's point of view, downloading music rather than listening to the radio or buying a CD merely swaps one medium for another. The main effects are on cost and convenience. The empirical research reported in chapters in this volume by Robinson and de Haan, and by Kraut, Kiesler, Boneva and Shklovski suggests that the Internet is used in part to substitute among functionally equivalent activities in this manner.

For instance, much of the time people spend online seems to come from time previously spent watching TV.

Technology that shifts goals

A second approach to research on social impacts of new technologies emphasizes the ways in they allows or encourages *qualitative changes in daily life*. People use the technology to accomplish new goals, not just to achieve the old ones more efficiently. Turkle (1997), for example, describes how young adults use the anonymity of online communication as a resource, allowing them to experiment with identities, such as playing at being another gender. To document this type of social impact, researchers often use qualitative research techniques to create rich descriptions of how new technology is used. In this volume, Ito and Okabe's account of the use of the mobile telephones in Japan suggests that teens use these devices to carve out a sphere of privacy in a country where family relationships, architectural styles, and living arrangements otherwise constrict it.

A substantial body of research, much reviewed in the present volume, has examined how the Internet and the mobile phone are expanding and altering our social networks. In this case the new technologies do not simply influence the social but shape it to a substantial degree. It can even be argued that the technologies allow people to enact new kinds of social relationships, therefore bringing a qualitative change to their lives. In addition to the chapter by Ito and Okabe, the chapter by Ling & Yttri emphasizes the way mobile phone allow

young people to achieve a new intimacy with their close friends, while the chapter by Boneva and her colleagues focuses on how instant messaging allows friends to feel part of a larger peer group. McKenna and Seidman's chapter describes how people, especially those who are shy or socially awkward, slowly develop online social relationships from which they might otherwise be excluded. The chapter by Cummings, Lee, and Kraut demonstrates that Internet communications help high school students prevent friendships from fading when those friends move away to college.

Personal welfare outcomes

The third approach to social impact stretches beyond the activity itself to emphasize how changes in people's behavior, as a result of using new ICTs, have consequences for their more general well-being. Researchers consider the impact on personal welfare in many spheres, including physical and mental health, privacy, educational attainments, and even income. As a central example, researchers are interested in how new computer and phone-based technologies change the social relationships for which they are used. They are interested in this not simply because interpersonal communication is one of the most frequent uses of these new technologies (e.g., e-mail is the most frequent use of the Internet in Figure 1; see Kraut et al., 1999, for a fuller discussion), though this plays a part. Rather, a major source of the fascination of the impact of new technologies on social relationships is that these relationships have important consequences for both physical and psychological health (Cohen, Underwood, & Gottlieb, 2000).

People with stronger social networks tend to be both healthier and happier (e.g., Diener, Lucas & Oishi, 2002). If the new ICTs enable larger or more diverse social networks, or if they change the quality of relationships among people who communicate using them, then these technologies could significantly affect well-being.

Many of the chapters in this book focus on how social relationships are supported by the new technologies, on how using the Internet and mobile phones translates into social capital, and on the benefits that often result from having social support. Shklovski, Kiesler and Kraut's chapter is a quantitative review of the literature asking whether Internet use leads to changes in social interaction. Licoppe and Smoreda's chapter examines how people use mobile phones to keep up with people near by and far away. Boneva, Kraut and Shklovski's chapter asks how online communication helps teens feel a connection to their peer groups. McKenna and Seidman's chapter examines how different types of people benefit from online relationships.

Educational researchers have long tried to assess the benefits that students gain from various types of computer-aided instruction in the classroom (see Fletcher-Flinn & Gravatt, 1995, for a review). Computing is now used frequently at home and other settings outside of the classroom by children for communicating, playing games, seeking information about hobbies or other leisure interests as well as for explicitly educational purposes. Researchers want to know whether the

non-educational uses influence educational success. Because Internet use in particular is such a text-intensive experience, there is reason to think that a wide range computing and Internet use will have educational outcomes. Surveys suggest that having a home PC increases students' performance on standardized tests, at least modestly (Attewell & Battle, 1999). The chapter by Jackson et al., in this volume, presents results from an experiment suggesting that spending time online can increase children's scores on standardized reading tests as well as their school grades.

Societal impact

The fourth approach to social impact again extends beyond the specifics of the activity, but this time examines the consequences for the larger society. Sproull and Kiesler (1991) describe these as secondary effects of new technology. As an example, although individual consumers may use the telephone to increase business or household efficiency or to enrich their social networks and reduce isolation, the wholesale adoption of telephony might also have influenced both the development of high rise office buildings concentrated in urban areas and the suburbanization of residential choice (Pool, 1977).

A related area of change involves the relationship between the development of new ICTs and economic growth (Organization for Economic Co-operation and Development, 2003). The knowledge society requires new skills, and it is not only the individuals and institutions that directly use these skills who benefit, since the

gains from increased productivity are widespread (Bell, 1973). This relationship between computing skills and widespread economic well-being is one basis for the concern that educational systems should provide young people with these skills.

Brynin's chapter, this volume, suggests that computer skills are associated with higher wages for both men and women. Some have argued that women lose out from computerization, as their use of work computers is often for routine and poorly paid tasks (Albin & Appelbaum, 1988; Kling, 1996), although this is disputed. People acquire computing skills not only through education but in their daily lives, through use of a home PC or at work. Because men and women use computers at work equally, the effects of computer skills on wages might contribute to some equalization of the benefits of employment between men and women. However, the exact relationship between the balance of social welfare and the general increase in productivity is difficult to test—hence, we cannot be certain that these technological developments are doing quite the job we often think they are doing. While this has a positive outcome for both men and women, those who do not work lose out (Nickell & Bell, 1995). So, too, do those who lack the resources to buy a home PC.

In an influential book, Putnam (2000) documented a broad decline over recent decades in civic engagement and social participation in the United States. Citizens vote less, go to church less, discuss government with their neighbors less, are

members of fewer voluntary organizations, have fewer dinner parties, and generally get together less for civic and social purposes. Putnam argues that this social disengagement has major consequences for the social fabric, leading amongst other things to a more corrupt, less efficient government, and to more crime. Further, he provides evidence to suggest that the introduction and diffusion of television in the 1950 had a major role in causing this social disengagement. In an age of the privatization of entertainment, people spend more time at home compared to earlier generations—isolating from other people and removing them from opportunities for civic dialog.

While elements of this theory are contested, researcher have a concern that the widespread use of computing and the Internet might have similar effects on community and civic engagement. The chapter by Carroll et al., in this volume, considers whether personal uses of the Internet for communication and information gathering has wider effects on the links between citizens and their communities. They suggest a model with two paths. People who were already concerned about community recruit the Internet for these purposes. On the other hand, they suggest that those who use the Internet heavily but do not have already existing concerns about community may become less engaged because of their Internet use.

A theoretical framework for understanding the social impact of technology

We have just identified four approaches to understanding the social impact of new technology, suggesting that use of new information and communication technology can change what people do or how they do it, and can have effects both on individual well-being and on society as a whole. This book concentrates mostly on the first three types of impact. The fourth and most general impact is often difficult to discern as such change could take decades to become visible. In addition, major societal change of this sort has many sources. For example, while telecommunication technology might have contributed to suburbanization, transportation, and climate control technologies did as well. In addition, this demographic tread was also influenced by population growth, tax policies, and shifts in the location of jobs.

The chapters in this book display a diversity of theoretical and empirical approaches, some of which even conflict. Yet there is more agreement among them than appears on the surface, both in terms of theory and of substantive conclusion. All of the chapters are empirical. Their observations and conclusions about the effects of new technologies are grounded in systematically collected data. Most subscribe to a common, albeit implicit, theoretical framework that postulates that technology can have substantial impacts—both on the individual and on society—resulting from an aggregation of small and seemingly inconsequential changes. Substantively, there is some agreement that new information and communication technologies are having moderate impact, especially in terms of qualitative changes in the way users are achieving both old

and new goals. There is less agreement, however, about the personal and social outcomes to which these changes in behavior may be leading.

While technologies "can open, close, and otherwise shape social choices" (Dutton 1996, p. 9), the authors of this volume's chapters all acknowledge that people shape the impact that technology has on their lives. People influence the technology itself, directly as inventors and indirectly through market feedback. More important, people shape the impact that technology has on their lives by choosing which technology to use and how to use it. New technologies are incorporated into people's lives, merging with their old manner of doing things; in the process these new technologies are producing, whether by design or by accident, new ways of achieving goals, new forms of association, and new expectations. This incorporation leads to a *potential* for wider personal and social impact.

This implies an adaptive model of social change, similar to the one spelled out in Fischer's analysis of the impact of the residential telephone, *American Calling* (1992). According to this model, people have relatively stable motives, wants, and needs. The stability may come about because of institutional forces such as the pursuit by wage earners in their peak earning years of more efficient use of their time, or of personal forces, like the needs of teenagers and adults for different types of social contact. When a new technology is perceived as relevant, individuals and organizations appropriate it to serve their old motives. As the

chapters in Section 3 show, people are concerned with exploring social relationships; when new technologies become available, people exploit those same technologies for this purpose.

This adaptive view of the social impact of the new technologies is related to the long tradition of research into the social effects of the mass media. While some early accounts suggested that the mass media have strong effects (e.g., Marcuse, 1972) and a less strong view of this still has adherents (Signorelli & Morgan, 1990; Iyengar, 1997), a common finding of research in this area is that media content is selected, absorbed, and used in ways which are meaningful to consumers or to groups of consumers, and that media content in turn adapts to this.

Yet, paradoxically, the small changes in behavior enabled by new technology can have much larger personal and social consequences. The difficulty or ease of performing certain actions via particular technologies leads to non-deliberate, or perhaps more accurately, non-mindful shifts in activity. This fundamental property of human behavior has been documented since at least the 1940s, with Zipf's *Human Behavior and the Principle of Least Effort* (1949). In particular, we believe that new information and communication technologies typically have features which make them easier and more convenient to use than previous tools, and these features lead to shifts in how people use time. A clear example can be seen in the ability of television to "steal" time from activities that its users really

prefer doing. Most research shows that people strongly prefer visiting and conversing with friends to watching TV (e.g., Kubey & Csikszentmihalyi, 1990). But the fact that TV programming is always available, does not require coordination with others, and is packaged to be consumed in small chunks, means that watching TV can be a less deliberate act than alternative behaviors. Broadcasters exploit this feature by scheduling unproven shows after highly popular ones, knowing that viewers will typically continue watching their channel without deliberately choosing to do so—simply because it requires no explicit action. Television is an easy way to kill time, and therefore people perhaps use it more than they want to. This type of non-deliberate choice about time can have large personal and social consequences. The sedentary leisure associated with TV viewing is one component of the epidemic of obesity affecting most developed societies (see Kaiser Foundation, 2004 for a review of research on TV viewing and childhood obesity). As previously discussed, Putnam (2000) argues that it is also one cause of the lack of civic participation that has characterized America since the 1950s.

Scholars are concerned whether such new ways of communicating have larger consequences on users' health and happiness. The research literature to date on this issue is mixed. For example, longitudinal research by Kraut, Kiesler, et al., using samples of the general population (Kraut et al., 1998; Bessiere, et al., under review) suggests that heavy use of the Internet increases depression, but this finding has not been replicated with college-student samples using cross-sectional

research designs (e.g., LaRose, Eastin, & Gregg, 2001; Sanders, Field, Diego, & Kaplan, 2000; Waestlund, Norlander, & Archer, 2001).

As technology's features change, however, its potential impact on social, psychological, and societal outcomes can also change. In the case of the Internet, we have recently seen three developments that could influence the amount and type of social impact it can have on people who use it. First, although Kraut and his colleagues (Kraut et al., 1999) observed that the early Internet was used primarily for social purposes, prior to 1995, features of both the user-base and the technology favored communication with relative strangers and other weak social ties. Too few people were online in those early days for most people to be able to communicate with their own friends and family. In addition, besides e-mail, the popular communication applications of the day were distribution lists, Usenet groups and chat rooms, all of which brought together strangers interested in common topics. Today, the growth of the Web has expanded options from using the Internet primarily for social purposes to more individualistic, recreational, and informational uses. Second, the growth in the number of people online also means that if people use it socially they have more options to connect to others whom they care about (expressing or reinforcing strong ties) than they had several years ago. Third, the growth of services like Instant Messenger over older services like chat and MUDs may allow users to increase contacts that are characterized by strong ties rather than by weak ones. Thus the potential for social adaptation of the Internet has increased enormously.

Our conceptualization builds on the interweaving of three distinct elements: technology, social networks, and the content of what passes within and between the networks via the technology. Each influences the other; none is dominant. It is even difficulty to disentangle technology from society, as new outcomes evolve through continuous translation of meaning between the two (Latour, 2000). For some researchers "the boundary between the social and the technical is part of the phenomenon to be investigated (Grint & Woolgar, 1997, p. 37).In this view, there is no technological determinism, but there is also no sociological or psychological determinism either. Rather, what we see is an evolving relationship between society and its technologies which builds incrementally on the existing forms of these relationships. The chapters in this volume describe and analyze some of these incremental changes.

How do we determine that the new technologies have a social impact?

The goal of the papers selected for this book is to understand how everyday use of mobile phones, computers, and the Internet is changing the lives of their users and those around them. Rather than relying on speculation or the elaboration of possibilities, which are so frequent in the technology and popular media, this volume's chapters all bring empirical evidence to bear on this question. They address factors that can have a direct domestic or community effect, and which are potentially measurable. We say "potentially measurable" because there are both theoretical and methodological hurdles to overcome before we can

effectively assess the social impact of the new ICTs. We outline these hurdles in this section before going on to describe the contribution this book makes to understanding the social impact of new technologies.

The theoretical framework described previously leads to some ambiguity in assessing the social impact of new technology. It would be easier to write about and to measure the impact of technology if technological determinism were true. If telephones and computers were like medications prescribed by a doctor in standardized doses, then assessing their impacts would be relatively straightforward. One could conduct a randomized trial in which there are two groups, one randomly assigned to use a new technology and the other not. After a suitable period it would be possible to measure how the groups spend their time, the number of friends they have, their grades in school, their income, their knowledge of local political issues, their likelihood of voting, their depression, and other outcomes of interest.

In reality, people choose and appropriate the technologies whose putative impact we are trying to assess. As a result, people's choices influence how the technology is used and, indirectly though market feedback, change what is available to be used. These conditions undercut the rationale for experiments, because interventions such as the adoption or specific usage of a technology are not exogenous events controlled by an experimenter. To a large degree these interventions are controlled by the user. It is then empirically difficult to

distinguish changes associated with use of a technology from changes that are endogenous, caused by the users themselves in deciding how to use technology.

Researchers have adopted a variety of techniques, both qualitative and quantitative, to assess the impact of the new technologies under these circumstances. The qualitative research method used by a number of chapters in this book is especially suited to understanding how people have incorporated new technologies into their lives. The chapters in section three of this volume, focusing on teenagers' use of the Internet and mobile phones, use qualitative techniques to illustrate how teens are expanding the times and places in which they exercise their needs to be social with both intimate partners and peer groups. These qualitative studies are also crucial in assessing the impact of new technology on welfare outcomes. For example, we need to understand whom people are talking to online and what they are talking about in order to understand the impact that Internet use is having on the types of social support available to them.

However, both qualitative and quantitative analyses have difficulties in determining causality. One technique that both methods use is to ask respondents to assess the impact of the technology is having on their lives. Yet people find it very hard to compare their state before and after some event, such as the introduction of technology (Bem & McConnell, 1971). In addition, they are often unable to distinguish their theories of what impact *should be* from has actually

happened (McArthur, 1980). These well-known problems in participants' accounts of social change apply to their assessment of the impact of new technology as well. Take Horrigan's summary in this volume of results from the Pew Internet and American Life project as an example. Although respondents in the Pew studies report that e-mail caused them to increase their interaction with friends and family, longitudinal data from the Pew project actually show that visits with friends and family decreases more for Internet users than for non-Internet users (Shklovski, Kraut, & Rainie, under review).

While quantitative research and especially large-scale survey-based analyses are needed and to test statistical models and to generalize conclusions from a small sample to the population as a whole, using quantitative technologies to determine the causal impact of the new technologies is fraught with ambiguity. The aim of much of the quantitative research is often the same: either to relate change in technology use (e.g. acquisition of the Internet), to change in behavior (e.g. social networks size or technological skill), or to relate change in behavior with some measure of well-being (e.g., depression or income). For example, in assessing how Internet use affects time that people spend on other activities, one technique is to correlate these variables through regression analysis while controlling for other factors that might influence time use. But even if we see an association between Internet use and time devoted to other activities, the resulting cause and effect relationships may still be ambiguous. Because certain types of people *select* into high or low usage or into particular types of usage, it is difficult to

assess the extent to which their Internet use per se is responsible for the final time use we observe. We might instead be observing the effects of unmeasured personal and social characteristics that influence the selection process.

The debate over the effects that Internet use has on social capital illustrates the ambiguities in interpreting correlations between technology use and either behavioral or welfare outcomes. Horrigan in chapter 2 notes that a "consistent finding in the body of work produced by the Pew Internet and American Life Project has been the Internet enhances social connectivity in a variety of ways" (p. XX). Horrigan also notes that "those who go online have more robust social lives than non-users" (p. XX). This assertion, however, is based on cross-sectional comparisons of Internet users to non-users, or on respondents' own claims about the impact that e-mail is having on their social relationships. While the association between Internet use and a robust social life might be correct, the causal conclusion is not clear. Other differences besides their Internet use between Internet users and non-users may account for differences in total social contact. As an example, Internet users are younger and richer than non-users and may be more extraverted as well (see Carroll et al., this volume). These attributes are themselves associated with social interaction. A similar causal ambiguity occurs, if one claims that Internet use is associated with reductions in social contact (Nie, 2001). Here too, we often cannot tell whether the Internet causes this, or whether more socially isolated people are drawn into certain types of Internet use.

In general, cross-sectional data are ill-suited for drawing causal conclusions. Longitudinal data that describe how each person in a sample changes over time are needed in order to model change (Singer & Willet, 2003). Panel data, where the same person is interviewed more than once, creates the opportunity to test causality through "before and after" measures. For instance, Gershuny (2003), responding to the hypothesis that Internet use leads to declines in social contact, uses panel data on changes in time use among both Internet users and non-users to show that time spent online does not reduce sociability. As Shklovski et al. note in chapter 17, and Kraut et al. note in chapter 6, longitudinal and cross-sectional analyses of the same data can lead to different conclusions about the impact of new technology in people's lives. They also observe, though, that panel data are no panacea for the ambiguities in assessing causation. Panel designs are subject to attrition, learning effects, and sometimes to confounding factors, Nevertheless, when panel and cross-sectional results diverge, the former provide stronger inferences about causal impact (Shklovski et al., under review).

Even if one could identify an unambiguous causal link between use of a new technology and change in behavior, this still leaves open the issue of the value of the change. Granted that the new technologies have some social effect, many scholars contest their value and meaning. To some extent this issue can be seen as an extension of older concerns about the mass media. While seen as essential to a functioning democracy, some early critics saw only negative effects—for instance, through globalization and standardization. While many see the increased

flow of information as essential to freedom, others have seen in this only a sort of information overload, so that the fundamental becomes banal and trivial, reducing real freedom. As Marcuse(1972) wrote in the case of religious choice in the modern age, "Why not try God?" (1972, p. 25). The new social system reduces and dissipates meaning. There are parallels with Puttnam's view, already discussed, but the difference is that in a sense the media can be said to provide "too much" society, while in Putnam's view there is too little.

The argument continues into the age of the Internet. On one hand, new developments lead to greater flexibility and choice. For instance, people have greater personal control over their lives through the creation of a "networked individualism" (Haythornthwaite & Wellman 2002, p. 32). On the other hand, the massive expansion of networks, and networks of networks, may simply be an indicator of a postmodern world characterized by "ephemarility and fragmentation" (Harvey, 1990, p. 328), and by a "deculturation of culture" (Baudrillard 1990, p. 92). While Castells acknowledges the ability of the decentralized Internet to cross-cut traditional flows of information and power, societies "are finally and truly disenchanted because all wonders are on-line" (2000, p. 406).

These arguments give some idea of the different theoretical conclusions that can be extracted from the empirical work currently underway. Scholars, technologists, and social critics currently debate whether the new technologies, and the Internet

in particular, are positively or negatively transforming economic and social life (e.g., Anderson, Bikson, Law and Mitchell, 1995; King & Kraemer, 1995). For instance, some argue that Internet use cuts people off from genuine social relationships, as they sit alone at their terminals or communicate with anonymous strangers through a socially impoverished medium (e.g., Stoll, 1995; Turkle, 1996). Others argue that the Internet leads to more and better social relationships by freeing people from the constraints of geography or from isolation brought on by stigma, illness, or schedule. Some claim the Internet allows people to join groups on the basis of common interests rather than convenience and that this community-building has a positive value (e.g., Katz & Aspden, 1997; Rheingold, 1993); others worry about cyber-ghettoization and Balkanization (Ebo, 1998).

However, there is an empirical quandary. How can we confidently conclude that the effects we observe are good or bad? We have limited theoretical means for such an evaluation of social or psychological welfare. This problem does not apply to "harder" outcomes such as the effects of social change on people's incomes or health. With the softer aspects of social welfare, however, it is difficult to relate the outcomes that we observe to real needs or even to preferences. The solution we instinctively adopt is to assume that almost everyone prefers the socially desirable outcomes (such as having either many friends or close friends). Yet, while this people vary in the degree to which they as individuals need or value these same outcomes.

These concerns are not mere caveats but serve to place some limit on what researchers can expect to be able to say. Yet, as this discussion has demonstrated, the range of questions which research is beginning to address is quite startling. Underlying these inquiries are the much larger questions that we asked at the outset: will the new information and communication technologies have a significant social effect, and if they do, will the change be positive? All the following chapters seek to respond to these questions.

The contribution of this book

Information technology and social change

Section one of this book provides a quantitative introduction, first on the extent to which people are using the new information and communication technologies in the United States and in Europe; and second, on the significance of this new behavior in the context of the full range of things that people do in their daily lives; third, on some of the distributional effects of technological change. The chapters together suggest that many technological outcomes are complex but also have potentially important implications for social change.

In Portraits of American Internet Use, Horrigan summarizes research that the Pew Internet and American Life project has been conducting since 2000, in particular describing the diffusion of the Internet in terms of both users and domains of use. Because The Pew Internet Project has conducted national cross-sectional telephone interviews of a sample of Americans since 2000, it can examine how

Internet use has changed over this period. Internet use is still growing, although growth is slowing as a larger fraction of the U.S. population already has Internet access. By the end of 2003, approximately two-thirds of adults in the U.S. used the Internet at least occasionally, with most logging in from home. The Pew project paints a detailed description of the domains in which people use the Internet: developing and maintaining social ties, seeking health care information for themselves and those they care for, maintaining involvement in national and local civic issues, seeking government information and services, searching for product information and making commercial transactions, and creating content that others can read and download. Figure 1 in this introduction comes from the Pew Internet Project.

Anderson's chapter, Passing By and Passing Through, makes good use of panel data. It shows the diffusion of information and communication technologies in Europe. For example, from 1998 to 2001, Internet adoption rates in U.K. households more than doubled from 24% to 51%. Mobile phone use grew even faster, almost tripling from 24% in 1998 to 69% in 2001. However, this aggregate growth conceals some complexities, which form the heart of the paper. In particular, a minority of those who began to use the Internet or a mobile phone drop service. While adoption easily outstrips dropout, the result indicates that we cannot view diffusion of technology as a uniform process. It is much more erratic Moreover, adoption and dropout are distinct processes, influenced by quite

different needs. Those who move in or out of access do not jointly form an intermediate category of less committed users.

Raban and Brynin's chapter, Older People and Newer Technologies, uses some of the same European data that Anderson analyses in order to examine the social distribution of diffusion, concentrating on differences in ICT use that is dependent on age. While adoption of new technologies declines with age, and "technophobic" attitudes increase, there is considerable variation within age groups. We should not dismiss the older population as being technologically illiterate. In fact, the key distinction determining use or nonuse is not age itself but resources. Older people tend to be poorer, and in addition to the effects of age itself, their relative lack of resources also determines their usage of the new information technologies. Regression techniques are applied in order to test the specific impact of resources differences amongst older people.

The differences in the amount and type of use of the Internet by different demographic groups can have consequences both for the other activities people engage in and for aspects of their social welfare. Robinson and de Haan's chapter, Information Technology and Family Time Displacement, asks where does people's online time come from? Prior research showed that time for TV-watching came from functionally equivalent activities: listening to radio, reading newspapers, attending movies, etc. Robinson and de Haan's research uses time-diary data from the United States and from the Netherlands to examine the source

of Internet time. According to their functional equivalence hypothesis, one should expect decreases in daily activities that perform the same functions as the Internet. Since the Internet enhances communication the retrieval of information and entertainment, displacement effects might be expected in time spent on social activities and mass-media use. By comparing Internet users with non-users, both the U.S. and Dutch research suggest that Internet use is displacing television viewing, but not social activities or reading.

The chapter by Kraut, Kiesler, Boneva, and Shklovski, Examining the Impact of Internet Use on TV Viewing, partially replicates Robinson and de Haan's results. Using longitudinal data, their research indicates that people who use the Internet most also show the largest decline in TV viewing. However, this fall is not steepest among those who use the Internet for entertainment or information seeking, as the functional equivalence argument would imply. Rather, the largest drop in TV viewing occurs among people who use the Internet to meet new people and communicate in online groups.

In The Neutered Computer, Brynin's research goes a step beyond the examination of how use of new technology influences time spent on other activities by examining its impact on users' income, specifically looking at gender differences. The goal here is to test the extent to which technology usage is inherently gendered. Using panel data from the U.K. and cross-sectional surveys from other European countries, Brynin shows that while there are a number of differences

between men and women in their technology behavior and attitudes, these are rather superficial. The data suggest, for instance, that attitudes toward computers are highly malleable and follow usage of computers at least as much as they cause it. Moreover, the gender differences in attitudes are declining, and younger women's ICT adoption rates is little different than that of young men. The most important finding concerns the welfare effects, here measured by the impact of computer attitudes on wages. Positive attitudes toward computers are associated with higher wages, and this effect is somewhat greater for men than for women. However, the effect of computer *skills* is slightly greater for women. This suggests that familiarity with computers through the work environment has a potentially significant welfare impact.

Technology in context: home, family, and community

Some of the chapters in the previous section suggest in the aggregate a measure of uncertainty in the adoption of new ICTs. For instance, people drop in or out of usage in rather complicated ways. Bakardjieva's chapter, Consumption Junction Revisited, based on qualitative research, looks at this uncertainty in a different way, through the detailed history of people's decisions to use a computer or the Internet for the first time. Here we can see that a range of influences, which are not easy to predict, need to be taken into account. In Bakardjieva's view it is possible to discern patterns; for instance, in how people use technology as an interface with the real world and in how other people mediate this relationship. Bakardjieva finds that we cannot see either the technology or the individual user

as an “enclosed” entity. Computer behavior is a complex package of inter-relationships.

Venkatesh and colleagues, in Designing the Family Portal for Home Networking, also use qualitative methods to examine how new technology varies between individual and family usage. Computers are primarily individual tools but this research team believes that a family portal device would be desirable for the home because it a shared technology, supporting for example facilities like a shared mailbox or common check book. Families have mixed feelings towards this shared resource compared to the feelings towards individualized PCs. The results suggest an important finding: that domestication of services through new home technologies does not have to run in parallel with individualization. It is possible to design new technologies for groups, like the family, rather than for individuals.

Livingstone’s chapter, Children’s Privacy Online, also looks at the family, but in this case, because of the importance of privacy, sharing is out of the question. Livingstone’s concern is with children, and the imposition of “sharing” by parents who assert a right to oversee children’s use of the Internet. While parents have a rationale for this supervision—to protect children from sexual or financial pressures—the danger is that there is then no boundary around a child’s private life. The online world of children is different from the world of adults, and although we wish to ensure that the online adults online cannot harm our children, the rights of children as individuals needs to be respected.

Jackson and colleagues, in Children's Home Internet Use, present data from the HomeNetToo project, an in-depth study that examines use of computers and the Internet over 16 months among 140 children and their parents. The sample population was primarily lower income and African American. As in Anderson's research, there was churn in Internet use among the children in Jackson's study, with 8% stopping Internet use entirely over the course of the study and 38% stopping e-mail. The research examines the factors predicting the extent to which children in the sample used the Internet: individual characteristics (race, age, computer skills, computer attitudes) and situational factors (ease using the computer and success at solving problems). The most interesting facet of this research is the examination of consequences of Internet use, in terms of affects, social relationships, time allocation, and academic achievement. Among other findings, the research suggests that children who use the Internet most improve their performance on standardized reading exams and on their school grade point averages.

The chapter by Carroll et al., Social and Civic Participation in a Community Network, moves the focus of attention from the individual in the household to the larger community. Their field site is a mid-sized American university town in a rural setting, which has had one of the longest standing community networks in the United States. Eighty-seven percent of the town's residents use the Internet on a regular basis and 75% of the town's businesses advertise online. In this well-

connected community, approximately 5% of Web traffic is local, connecting to Internet hosts located in the area. While by no means the dominant focus of Internet activity in the town, use of local Internet services and content is strong. Given this local community with widespread Internet use, Carroll et al. examine how uses of the Internet for civic and social purposes are related to citizen's connections to the community: knowledge, sense of belonging, participation in community associations, and community activism. Carroll's team concludes that many residents recruit Internet technology in service of their community-oriented goals (e.g., activism, staying informed, participating in groups). At the same time, when people do not have these community-oriented goals, increased use of the Internet may actually *decrease* their level of activity in the community. The Internet can therefore both complement and displace community activities, although for different people.

New technology in teenage life

As many researchers have noted both in this book and elsewhere, youth is a major predictor of use of new ICTs. Young people in their teens and early twenties have adopted new ICTs en mass, integrating computers, mobile phones, and the Internet into their daily routines and then expanding these routines to new uses. The commercial success of some of the most interesting service innovations—instant messaging, music downloads, refillable telephones, among others—were fuelled by the special needs of this demographic group. The chapters in this section use both qualitative and quantitative data to examine in detail how young

people are using these new technologies. The dominant theme in all of the chapters is that teenagers and young adults incorporate the new technologies to handle developmental problems that uniquely characterize their age groups.

In Teens on the Internet, Greenfield et al. attempt to give a detailed examination of the functions for which teens use the Internet. They report that interpersonal communication and downloading music dominate teens' time online. Almost all of teens' online communication is with other teens whom they know from school and other local contexts, although online gaming and participation in chat rooms put them in contact with strangers. By analyzing the multiple conversational threads intertwined in an online chat room, this chapter provides a rich description of how teenagers use online conversation to cope with the perennial concerns of adolescent life, such as gender and racial identity, sexual development, and romantic partners.

Boneva and colleagues, in Teenage Communication in the Instant Messaging Era, also examine how teens use Internet communication to deal with traditional concerns in adolescent life. These researchers review quantitative survey data, interviews with teens, and observations of teens using the Internet for communication, to compare instant messaging communication with communication by phone calls and in-person visits. Although most teen communication is with local friends and acquaintances, instant messaging supports more communication at a distance than other modalities. A central

question that this chapter addresses is why teens use instant messaging so frequently even though they report enjoying instant messaging conversations substantially less than those conducted by phone or in person, and report feeling less close to the people with whom they communication using it. The answer seems to be that instant messaging serves a specific function of allowing young people both to build and to maintain social ties with particular friends, and to create a sense of belonging with groups of peers, with whom they do not necessarily feel close.

The graphs by Ling and Yttri, in their chapter, *Control, Emancipation and Status*, show that in Europe young people in their teens and early 20s are the ones mostly likely to have Internet access and to own a mobile phone. These young people use the technologies to create a lifestyle which is distinct from that of the adult world and even in opposition to it. The technologies therefore play a part in a sort of domestic power play. Ling and Yttri examine this tension for the case of mobile phones, which is also apparent in Livingstone's paper in the previous section, where the focus was the Internet.

Ito and Okabe's chapter, *Intimate Connection*, describes how teenager's easy access to mobile phones (compared to a home landline phone) frees them from reserving the phone for consequential communication. Teens can then use their mobile phones to exchange moment-by-moment experiences in their daily lives with special partners, and thus to have a more continuous sense of connection

with friends and lovers. The technology can shift how much time users spend with others and alter the nature of their interaction with them. Although Ito and Okabe describe problems of adolescence, they go beyond this to identity how mobile telephones are used to handle some concerns that may be unique to Japanese life and how previous generations of pagers and other technologies, again a Japanese phenomenon, paved the way for mobile phones.

The Internet and social relationships

One of the central questions animating much social science research on the social impact of new technology is the specific impact this has on social relationships. Chapters by Horrigan and by Robinson and de Haan in previous sections address this theme through a general overview of how people use the Internet, and of its influence on how they spend their time. Chapters by Greenfield and colleagues, by Boneva and colleagues, and by Ito and Okabe provide rich descriptions of how teens are incorporating both Internet and mobile telephone technology into their lives to communicate with friends and to solve problems of social relationships. The chapters in the final section of this book focus on the consequences of Internet use for social interaction and social relationships.

In their chapter, *The Internet and Social Interaction*, Shklovski, Kiesler, and Kraut report on a quantitative literature review, a meta-analysis, of 16 empirical studies investigating the association of Internet use with measures of social activity. They reach both substantive and methodological conclusions.

Collectively, the data show little influence of Internet use on social activities. Effect sizes were generally small and inconsistent. However, research methods make a difference in the conclusions one draws. The results depend both upon the type of social relationship analyzed (family versus friend) and the type of research method deployed (cross-sectional versus panel surveys). For instance, studies using panel suggest that Internet use increases social interaction with friends more than it does interaction for other types of relationships.

Cummings, Lee and Kraut's chapter, *Communication Technology and Friendship During the Transition from High School to College*, examines use of the Internet by young people to maintain social ties after they move from high school to college. They find that when young adults move away from home to go to college, technology-mediated communication retards the natural decline in social relationships that young adults often experience as a result of the move. However, this effect varies by type of technology. Even though speaking by phone with a partner is a strong predictor of a close personal relationship, much stronger than Internet-based communication, it is Internet-based communication that is most likely to prevent declines in relationships. The authors argue that this effect of communication on psychological closeness does not reflect intrinsic properties of the communication media, but instead the marketing and regulatory decisions in the United States that lower the cost of Internet communications. If it is possible to generalize from this, in recent years and in the U.S. at least, Internet

communication rather than telephone communication has had the largest effect on preserving friendships.

McKenna and Seidman's chapter, *Considering the Interactions,* reviews several studies conducted by their research team on the mechanisms though which computer-mediated communication influences the development of social relationships. Unlike the other research presented in this volume, their research includes both laboratory experiments as well as surveys. Experiments, in which participants are randomly assigned to communication either over the computer or through another modality, have the advantage of unraveling the causal direction in the link between communication modality and strength of social relationships. They are able to show that students who are assigned to meet in an Internet chat room grow to like each other more than those who first meet face-to-face. Whether the very short-term interactions that participants have in the laboratory experiment, however, can be generalized to the longer term development of social relationships is an open question. McKenna and Seidman's main conclusions is that there are few unqualified effects of using the Internet. Although they believe Internet communication can have transformational effects, these effects depend on individual differences in personality and motivations and on the nature of the online groups to which they become attached.

We argued above that it is difficult to evaluate the real welfare significance of the new technologies, in particular those which relate to social ties. Are strong ties

"better" than weak ties? Licoppe and Smoreda in their chapter on French telecommunications usage go further in breaking the concept of social ties into more revealing formulations. They show that people use technologies in different ways to support different types of relationships, and each has its different mode. For instance, a "connected presence" is maintained not through the communication of information in detail and depth but through little gestures, which are easier with some technologies than with others. Reminiscent of Ito and Okabe's findings among Japanese youth, Licoppe and Smoreda find that portable forms of communication are especially important here. Technology is used to enable people to find an effective "rhythm" to their social lives. While most of this research is qualitative, the authors use quantitative data to show that the frequency of phone calls decreases, and their duration increases, when people move further away from those they are emotionally close to, but frequency increases and duration falls when the distance decreases. People try to maintain their strong ties, but they use different techniques depending upon the behavioral costs of communication. If communication is cheap, they can maintain their ties with large quantities of relatively meaningless chitchat, while when communication is expensive, each communication episode is made to count more. Here we have a perfect metaphor of the rhythm of social ties.

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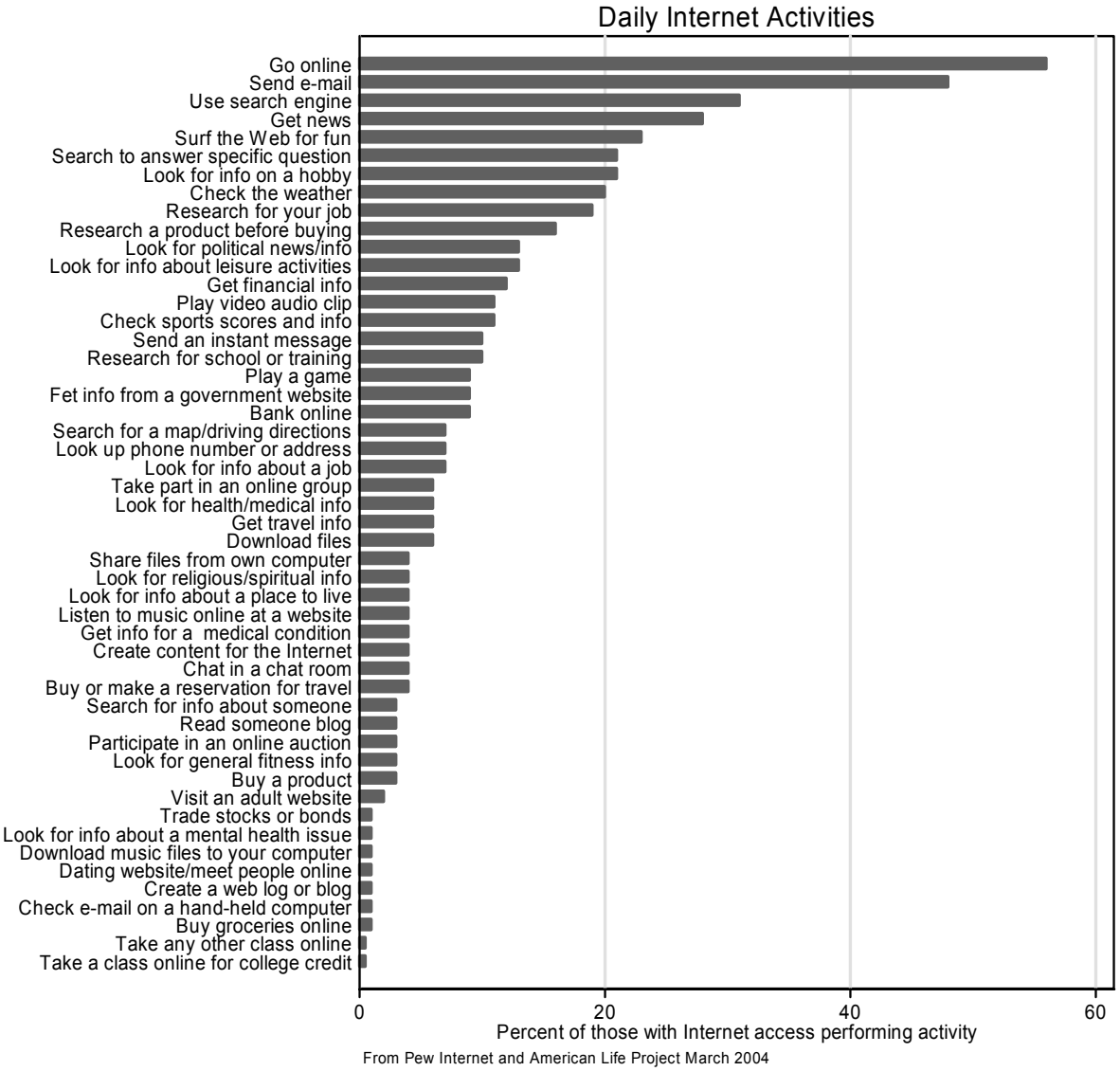
Chapter 1, Figure 1



Chapter 1, Figure 1 Note: Bar represents the percentage of U.S. adults with Internet access who perform the listed activities on a randomly selected day. As of this writing, approximately 62% of U.S. adults have Internet access.

Acknowledgements. This book was based upon a workshop supported by the National Science Foundation under Grant No. 0227969. This chapter was partially supported by National Foundation Grant ISS 9900449.

Captions

Chapter 1, Figure 1: Daily Internet Activities