Chapter 4   
Ethical and Social Issues in Information Systems 141 significant ethical, social, and political issues. Digital media differ from books, periodicals, and other media in terms of ease of replication; ease of transmission; ease of alteration; difficulty in classifying a software work as a program, book, or even music; compactness—making theft easy; and difficulties in establishing uniqueness. The proliferation of electronic networks, including the Internet, has made it even more difficult to protect intellectual property. Before widespread use of networks, copies of software, books, magazine articles, or films had to be stored on physical media, such as paper, computer disks, or videotape, creating some hurdles to distribution. Using networks, information can be more widely reproduced and distributed. The Seventh Annual Global Software Piracy Study conducted by the International Data Corporation and the Business Software Alliance reported that the rate of global software piracy climbed to 43 percent in 2009, representing $51 billion in global losses from software piracy. Worldwide, for every $100 worth of legitimate software sold that year, an additional $75 worth was obtained illegally (Business Software Alliance, 2010). The Internet was designed to transmit information freely around the world, including copyrighted information. With the World Wide Web in particular, you can easily copy and distribute virtually anything to thousands and even millions of people around the world, even if they are using different types of computer systems. Information can be illicitly copied from one place and distributed through other systems and networks even though these parties do not willingly participate in the infringement. Individuals have been illegally copying and distributing digitized MP3 music files on the Internet for a number of years. File-sharing services such as Napster, and later Grokster, Kazaa, and Morpheus, sprung up to help users locate and swap digital music files, including those protected by copyright. Illegal file sharing became so widespread that it threatened the viability of the music recording industry. The recording industry won some legal battles for shutting these services down, but has not been able to halt illegal file sharing entirely. As more and more homes adopt high-speed Internet access, illegal file sharing of videos will pose similar threats to the motion picture industry. Mechanisms are being developed to sell and distribute books, articles, and other intellectual property legally on the Internet, and the Digital Millennium Copyright Act (DMCA) of 1998 is providing some copyright protection. The DMCA implemented a World Intellectual Property Organization Treaty that makes it illegal to circumvent technology-based protections of copyrighted materials. Internet service providers (ISPs) are required to take down sites of copyright infringers that they are hosting once they are notified of the problem. Microsoft and other major software and information content firms are represented by the Software and Information Industry Association (SIIA), which lobbies for new laws and enforcement of existing laws to protect intellectual property around the world. The SIIA runs an antipiracy hotline for individuals to report piracy activities, offers educational programs to help organizations combat software piracy, and has published guidelines for employee use of software. ACCOUNTABILITY, LIABILITY, AND CONTROL Along with privacy and property laws, new information technologies are challenging existing liability laws and social practices for holding individuals and institutions accountable. If a person is injured by a machine controlled, in part, by software, who should be held accountable and, therefore, held liable? Should a public bulletin board or an electronic service, such as America Online, 142 Part One Organizations, Management, and the Networked Enterprise permit the transmission of pornographic or offensive material (as broadcasters), or should they be held harmless against any liability for what users transmit (as is true of common carriers, such as the telephone system)? What about the Internet? If you outsource your information processing, can you hold the external vendor liable for injuries done to your customers? Some real-world examples may shed light on these questions. Computer-Related Liability Problems During the last week of September 2009, thousands of customers of TD Bank, one of the largest banks in North America, scrambled to find their payroll checks, social security checks, and savings and checking account balances. The bank’s 6.5 million customers were temporarily out of funds because of a computer glitch. The problems were caused by a failed effort to integrate systems of TD Bank and Commerce Bank. A spokesperson for TD Bank, said that “while the overall integration of the systems went well, there have been some speed-bumps in the final stages, as you might expect with a project of this size and complexity.” (Vijayan, 2009). Who is liable for any economic harm caused to individuals or businesses that could not access their full account balances in this period? This case reveals the difficulties faced by information systems executives who ultimately are responsible for any harm done by systems developed by their staffs. In general, insofar as computer software is part of a machine, and the machine injures someone physically or economically, the producer of the software and the operator can be held liable for damages. Insofar as the software acts like a book, storing and displaying information, courts have been reluctant to hold authors, publishers, and booksellers liable for contents (the exception being instances of fraud or defamation), and hence courts have been wary of holding software authors liable for booklike software. In general, it is very difficult (if not impossible) to hold software producers liable for their software products that are considered to be like books, regardless of the physical or economic harm that results. Historically, print publishers, books, and periodicals have not been held liable because of fears that liability claims would interfere with First Amendment rights guaranteeing freedom of expression. What about software as a service? ATM machines are a service provided to bank customers. Should this service fail, customers will be inconvenienced and perhaps harmed economically if they cannot access their funds in a timely manner. Should liability protections be extended to software publishers and operators of defective financial, accounting, simulation, or marketing systems? Software is very different from books. Software users may develop expectations of infallibility about software; software is less easily inspected than a book, and it is more difficult to compare with other software products for quality; software claims actually to perform a task rather than describe a task, as a book does; and people come to depend on services essentially based on software. Given the centrality of software to everyday life, the chances are excellent that liability law will extend its reach to include software even when the software merely provides an information service. Telephone systems have not been held liable for the messages transmitted because they are regulated common carriers. In return for their right to provide telephone service, they must provide access to all, at reasonable rates, and achieve acceptable reliability. But broadcasters and cable television stations are subject to a wide variety of federal and local constraints on content and facilities. Organizations can be held liable for offensive content on their Web sites, and online services, such as America Online, might be held liable for postings by their Chapter 4 Ethical and Social Issues in Information Systems 143 users. Although U.S. courts have increasingly exonerated Web sites and ISPs for posting material by third parties, the threat of legal action still has a chilling effect on small companies or individuals who cannot afford to take their cases to trial. SYSTEM QUALITY: DATA QUALITY AND SYSTEM ERRORS The debate over liability and accountability for unintentional consequences of system use raises a related but independent moral dimension: What is an acceptable, technologically feasible level of system quality? At what point should system managers say, “Stop testing, we’ve done all we can to perfect this software. Ship it!” Individuals and organizations may be held responsible for avoidable and foreseeable consequences, which they have a duty to perceive and correct. And the gray area is that some system errors are foreseeable and correctable only at very great expense, an expense so great that pursuing this level of perfection is not feasible economically—no one could afford the product. For example, although software companies try to debug their products before releasing them to the marketplace, they knowingly ship buggy products because the time and cost of fixing all minor errors would prevent these products from ever being released. What if the product was not offered on the marketplace, would social welfare as a whole not advance and perhaps even decline? Carrying this further, just what is the responsibility of a producer of computer services—should it withdraw the product that can never be perfect, warn the user, or forget about the risk (let the buyer beware)? Three principal sources of poor system performance are (1) software bugs and errors, (2) hardware or facility failures caused by natural or other causes, and (3) poor input data quality. A Chapter 8 Learning Track discusses why zero defects in software code of any complexity cannot be achieved and why the seriousness of remaining bugs cannot be estimated. Hence, there is a technological barrier to perfect software, and users must be aware of the potential for catastrophic failure. The software industry has not yet arrived at testing standards for producing software of acceptable but not perfect performance. Although software bugs and facility catastrophes are likely to be widely reported in the press, by far the most common source of business system failure is data quality. Few companies routinely measure the quality of their data, but individual organizations report data error rates ranging from 0.5 to 30 percent. QUALITY OF LIFE: EQUITY, ACCESS, AND BOUNDARIES The negative social costs of introducing information technologies and systems are beginning to mount along with the power of the technology. Many of these negative social consequences are not violations of individual rights or property crimes. Nevertheless, these negative consequences can be extremely harmful to individuals, societies, and political institutions. Computers and information technologies potentially can destroy valuable elements of our culture and society even while they bring us benefits. If there is a balance of good and bad consequences of using information systems, who do we hold responsible for the bad consequences? Next, we briefly examine some of the negative social consequences of systems, considering individual, social, and political responses. 144 Part One Organizations, Management, and the Networked Enterprise Balancing Power: Center Versus Periphery An early fear of the computer age was that huge, centralized mainframe computers would centralize power at corporate headquarters and in the nation’s capital, resulting in a Big Brother society, as was suggested in George Orwell’s novel 1984. The shift toward highly decentralized computing, coupled with an ideology of empowerment of thousands of workers, and the decentralization of decision making to lower organizational levels, have reduced the fears of power centralization in institutions. Yet much of the empowerment described in popular business magazines is trivial. Lower-level employees may be empowered to make minor decisions, but the key policy decisions may be as centralized as in the past. Rapidity of Change: Reduced Response Time to Competition Information systems have helped to create much more efficient national and international markets. The now-more-efficient global marketplace has reduced the normal social buffers that permitted businesses many years to adjust to competition. Time-based competition has an ugly side: The business you work for may not have enough time to respond to global competitors and may be wiped out in a year, along with your job. We stand the risk of developing a “just-in-time society” with “just-in-time jobs” and “just-in-time” workplaces, families, and vacations. Maintaining Boundaries: Family, Work, and Leisure Parts of this book were produced on trains and planes, as well as on vacations and during what otherwise might have been “family” time. The danger to ubiquitous computing, telecommuting, nomad computing, and the “do anything anywhere” computing environment is that it is actually coming true. The traditional boundaries that separate work from family and just plain leisure have been weakened. Although authors have traditionally worked just about anywhere (typewriters have been portable for nearly a century), the advent of information Although some people enjoy the convenience of working at home, the “do anything anywhere” computing environment can blur the traditional boundaries between work and family time. Chapter 4 Ethical and Social Issues in Information Systems 145 systems, coupled with the growth of knowledge-work occupations, means that more and more people are working when traditionally they would have been playing or communicating with family and friends. The work umbrella now extends far beyond the eight-hour day. Even leisure time spent on the computer threatens these close social relationships. Extensive Internet use, even for entertainment or recreational purposes, takes people away from their family and friends. Among middle school and teenage children, it can lead to harmful anti-social behavior, such as the recent upsurge in cyberbullying. Weakening these institutions poses clear-cut risks. Family and friends historically have provided powerful support mechanisms for individuals, and they act as balance points in a society by preserving private life, providing a place for people to collect their thoughts, allowing people to think in ways contrary to their employer, and dream. Dependence and Vulnerability Today, our businesses, governments, schools, and private associations, such as churches, are incredibly dependent on information systems and are, therefore, highly vulnerable if these systems fail. With systems now as ubiquitous as the telephone system, it is startling to remember that there are no regulatory or standard-setting forces in place that are similar to telephone, electrical, radio, television, or other public utility technologies. The absence of standards and the criticality of some system applications will probably call forth demands for national standards and perhaps regulatory oversight. Computer Crime and Abuse New technologies, including computers, create new opportunities for committing crime by creating new valuable items to steal, new ways to steal them, and new ways to harm others. Computer crime is the commission of illegal acts through the use of a computer or against a computer system. Computers or computer systems can be the object of the crime (destroying a company’s computer center or a company’s computer files), as well as the instrument of a crime (stealing computer lists by illegally gaining access to a computer system using a home computer). Simply accessing a computer system without authorization or with intent to do harm, even by accident, is now a federal crime. Computer abuse is the commission of acts involving a computer that may not be illegal but that are considered unethical. The popularity of the Internet and e-mail has turned one form of computer abuse—spamming—into a serious problem for both individuals and businesses. Spam is junk e-mail sent by an organization or individual to a mass audience of Internet users who have expressed no interest in the product or service being marketed. Spammers tend to market pornography, fraudulent deals and services, outright scams, and other products not widely approved in most civilized societies. Some countries have passed laws to outlaw spamming or to restrict its use. In the United States, it is still legal if it does not involve fraud and the sender and subject of the e-mail are properly identified. Spamming has mushroomed because it only costs a few cents to send thousands of messages advertising wares to Internet users. According to Sophos, a leading vendor of security software, spam accounted for 97 percent of all business e-mail during the second quarter of 2010 (Schwartz, 2010). Spam costs for businesses are very high (estimated at over $50 billion per year) because of the computing and network resources consumed by billions of unwanted e-mail messages and the time required to deal with them. 146 Part One Organizations, Management, and the Networked Enterprise Internet service providers and individuals can combat spam by using spam filtering software to block suspicious e-mail before it enters a recipient’s e-mail inbox. However, spam filters may block legitimate messages. Spammers know how to skirt around filters by continually changing their e-mail accounts, by incorporating spam messages in images, by embedding spam in e-mail attachments and electronic greeting cards, and by using other people’s computers that have been hijacked by botnets (see Chapter 7). Many spam messages are sent from one country while another country hosts the spam Web site. Spamming is more tightly regulated in Europe than in the United States. On May 30, 2002, the European Parliament passed a ban on unsolicited commercial messaging. Electronic marketing can be targeted only to people who have given prior consent. The U.S. CAN-SPAM Act of 2003, which went into effect on January 1, 2004, does not outlaw spamming but does ban deceptive e-mail practices by requiring commercial e-mail messages to display accurate subject lines, identify the true senders, and offer recipients an easy way to remove their names from e-mail lists. It also prohibits the use of fake return addresses. A few people have been prosecuted under the law, but it has had a negligible impact on spamming. Although Facebook and MySpace have won judgments against spammers, most critics argue the law has too many loopholes and is not effectively enforced (Associated Press, 2009). Another negative impact of computer technology is the rising danger from people using cell phones to send text messages while driving. Many states have outlawed this behavior, but it has been difficult to eradicate. The Interactive Session on Organizations explores this topic. Employment: Trickle-Down Technology and Reengineering Job Loss Reengineering work is typically hailed in the information systems community as a major benefit of new information technology. It is much less frequently noted that redesigning business processes could potentially cause millions of mid-level managers and clerical workers to lose their jobs. One economist has raised the possibility that we will create a society run by a small “high tech elite of corporate professionals . . . in a nation of the permanently unemployed” (Rifkin, 1993). Other economists are much more sanguine about the potential job losses. They believe relieving bright, educated workers from reengineered jobs will result in these workers moving to better jobs in fast-growth industries. Missing from this equation are unskilled, blue-collar workers and older, less well-educated middle managers. It is not clear that these groups can be retrained easily for high-quality (high-paying) jobs. Careful planning and sensitivity to employee needs can help companies redesign work to minimize job losses. Equity and Access: Increasing Racial and Social Class Cleavages Does everyone have an equal opportunity to participate in the digital age? Will the social, economic, and cultural gaps that exist in the United States and other societies be reduced by information systems technology? Or will the cleavages be increased, permitting the better off to become even more better off relative to others? These questions have not yet been fully answered because the impact of systems technology on various groups in society has not been thoroughly studied. What is known is that information, knowledge, computers, and access Chapter 4 Ethical and Social Issues in Information Systems 147 Cell phones have become a staple of modern society. Nearly everyone has them, and people carry and use them at all hours of the day. For the most part, this is a good thing: the benefits of staying connected at any time and at any location are considerable. But if you’re like most Americans, you may regularly talk on the phone or even text while at the wheel of a car. This dangerous behavior has resulted in increasing numbers of accidents and fatalities caused by cell phone usage. The trend shows no sign of slowing down. In 2003, a federal study of 10,000 drivers by the National Highway Traffic Safety Administration (NHTSA) set out to determine the effects of using cell phones behind the wheel. The results were conclusive: talking on the phone is equivalent to a 10- point reduction in IQ and a .08 blood alcohol level, which law enforcement considers intoxicated. Handsfree sets were ineffective in eliminating risk, the study found, because the conversation itself is what distracts drivers, not holding the phone. Cell phone use caused 955 fatalities and 240,000 accidents in 2002. Related studies indicated that drivers that talked on the phone while driving increased their crash risk fourfold, and drivers that texted while driving increased their crash risk by a whopping 23 times. Since that study, mobile device usage has grown by an order of magnitude, worsening this already dangerous situation. The number of wireless subscribers in America has increased by around 1,000 percent since 1995 to nearly 300 million overall in 2010, and Americans’ usage of wireless minutes increased by approximately 6,000 percent. This increase in cell phone usage has been accompanied by an upsurge in phone-related fatalities and accidents: In 2010, it’s estimated that texting caused 5,870 fatalities and 515,000 accidents, up considerably from prior years. These figures are roughly half of equivalent statistics for drunk driving. Studies show that drivers know that using the phone while driving is one of the most dangerous things you can do on the road, but refuse to admit that it’s dangerous when they themselves do it. Of users that text while driving, the more youthful demographic groups, such as the 18–29 age group, are by far the most frequent texters. About three quarters of Americans in this age group regularly text, compared to just 22 percent of the THE PERILS OF TEXTING 35–44 age group. Correspondingly, the majority of accidents involving mobile device use behind the wheel involve young adults. Among this age group, texting behind the wheel is just one of a litany of problems raised by frequent texting: anxiety, distraction, failing grades, repetitive stress injuries, and sleep deprivation are just some of the other problems brought about by excessive use of mobile devices. Teenagers are particularly prone to using cell phones to text because they want to know what’s happening to their friends and are anxious about being socially isolated. Analysts predict that over 800 billion text messages will be sent in 2010. Texting is clearly here to stay, and in fact has supplanted phone calls as the most commonly used method of mobile communication. People are unwilling to give up their mobile devices because of the pressures of staying connected. Neurologists have found that the neural response to multitasking by texting while driving suggests that people develop addictions to the digital devices they use most, getting quick bursts of adrenaline, without which driving becomes boring. There are interests opposed to legislation prohibiting cell phone use in cars. A number of legislators believe that it’s not state or federal government’s role to prohibit poor decision making. Auto makers, and some safety researchers, are arguing that with the proper technology and under appropriate conditions, communicating from a moving vehicle is a manageable risk. Louis Tijerina, a veteran of the NHTSA and Ford Motor Co. researcher, notes that even as mobile phone subscriptions have surged to over 250 million during the past decade, the death rate from accidents on the highways has fallen. Nevertheless, lawmakers are increasingly recognizing the need for more powerful legislation barring drivers from texting behind the wheel. Many states have made inroads with laws prohibiting texting while operating vehicles. In Utah, drivers crashing while texting can receive 15 years in prison, by far the toughest sentence for texting while driving in the nation when the legislation was enacted. Utah’s law assumes that drivers understand the risks of texting while driving, whereas in other states, prosecutors must prove that the driver knew about the risks of texting while driving before doing so. INTERACTIVE SESSION: ORGANIZATIONS 148 Part One Organizations, Management, and the Networked Enterprise 1. Which of the five moral dimensions of information systems identified in this text is involved in this case? 2. What are the ethical, social, and political issues raised by this case? 3. Which of the ethical principles described in the text are useful for decision making about texting while driving? Utah’s tough law was the result of a horrifying accident in which a speeding college student, texting at the wheel, rear-ended a car in front. The car lost control, entered the opposite side of the road, and was hit head-on by a pickup truck hauling a trailer, killing the driver instantly. In September 2008, a train engineer in California was texting within a minute prior to the most fatal train accident in almost two decades. Californian authorities responded by banning the use of cell phones by train workers while on duty.  
these resources through educational institutions and public libraries are inequitably distributed along ethnic and social class lines, as are many other information resources. Several studies have found that certain ethnic and income groups in the United States are less likely to have computers or online Internet access even though computer ownership and Internet access have soared in the past five years. Although the gap is narrowing, higher-income families in each ethnic group are still more likely to have home computers and Internet access than lower-income families in the same group. A similar digital divide exists in U.S. schools, with schools in high-poverty areas less likely to have computers, high-quality educational technology programs, or Internet access availability for their students. Left uncorrected, the digital divide could lead to a society of information haves, computer literate and skilled, versus a large group of information have-nots, computer illiterate Chapter 4 Ethical and Social Issues in Information Systems 149 and unskilled. Public interest groups want to narrow this digital divide by making digital information services—including the Internet—available to virtually everyone, just as basic telephone service is now. Health Risks: RSI, CVS, and Technostress The most common occupational disease today is repetitive stress injury (RSI). RSI occurs when muscle groups are forced through repetitive actions often with high-impact loads (such as tennis) or tens of thousands of repetitions under low-impact loads (such as working at a computer keyboard). The single largest source of RSI is computer keyboards. The most common kind of computer-related RSI is carpal tunnel syndrome (CTS), in which pressure on the median nerve through the wrist’s bony structure, called a carpal tunnel, produces pain. The pressure is caused by constant repetition of keystrokes: in a single shift, a word processor may perform 23,000 keystrokes. Symptoms of carpal tunnel syndrome include numbness, shooting pain, inability to grasp objects, and tingling. Millions of workers have been diagnosed with carpal tunnel syndrome. RSI is avoidable. Designing workstations for a neutral wrist position (using a wrist rest to support the wrist), proper monitor stands, and footrests all contribute to proper posture and reduced RSI. Ergonomically correct keyboards are also an option. These measures should be supported by frequent rest breaks and rotation of employees to different jobs. RSI is not the only occupational illness computers cause. Back and neck pain, leg stress, and foot pain also result from poor ergonomic designs of workstations. Computer vision syndrome (CVS) refers to any eyestrain condition related to display screen use in desktop computers, laptops, e-readers, smartphones, and hand-held video games. CVS affects about 90 percent of people who spend three hours or more per day at a computer (Beck, 2010). Its symptoms, which are usually temporary, include headaches, blurred vision, and dry and irritated eyes. The newest computer-related malady is technostress, which is stress induced by computer use. Its symptoms include aggravation, hostility toward humans, impatience, and fatigue. According to experts, humans working continuously with computers come to expect other humans and human institutions to behave like computers, providing instant responses, attentiveness, and Repetitive stress injury (RSI) is the leading occupational disease today. The single largest cause of RSI is computer keyboard work. 150 Part One Organizations, Management, and the Networked Enterprise an absence of emotion. Technostress is thought to be related to high levels of job turnover in the computer industry, high levels of early retirement from computer-intense occupations, and elevated levels of drug and alcohol abuse. The incidence of technostress is not known but is thought to be in the millions and growing rapidly in the United States. Computer-related jobs now top the list of stressful occupations based on health statistics in several industrialized countries. To date, the role of radiation from computer display screens in occupational disease has not been proved. Video display terminals (VDTs) emit nonionizing electric and magnetic fields at low frequencies. These rays enter the body and have unknown effects on enzymes, molecules, chromosomes, and cell membranes. Long-term studies are investigating low-level electromagnetic fields and birth defects, stress, low birth weight, and other diseases. All manufacturers have reduced display screen emissions since the early 1980s, and European countries, such as Sweden, have adopted stiff radiation emission standards. In addition to these maladies, computer technology may be harming our cognitive functions. Although the Internet has made it much easier for people to access, create, and use information, some experts believe that it is also preventing people from focusing and thinking clearly. The Interactive Session on Technology highlights the debate that has emerged about this problem. The computer has become a part of our lives—personally as well as socially, culturally, and politically. It is unlikely that the issues and our choices will become easier as information technology continues to transform our world. The growth of the Internet and the information economy suggests that all the ethical and social issues we have described will be heightened further as we move into the first digital century. INTERACTIVE SESSION: TECHNOLOGY Do you think that the more information managers receive, the better their decisions? Well, think again. Most of us can no longer imagine the world without the Internet and without our favorite gadgets, whether they’re iPads, smartphones, laptops, or cell phones. However, although these devices have brought about a new era of collaboration and communication, they also have introduced new concerns about our relationship with technology. Some researchers suggest that the Internet and other digital technologies are fundamentally changing the way we think—and not for the better. Is the Internet actually making us “dumber,” and have we reached a point where we have too much technology? Or does the Internet offer so many new opportunities to discover information that it’s actually making us “smarter.” And, by the way, how do we define “dumber” and “smarter” in an Internet age? Wait a second, you’re saying. How could this be? The Internet is an unprecedented source for acquiring and sharing all types of information. Creating and disseminating media has never been easier. Resources like Wikipedia and Google have helped to organize knowledge and make that knowledge accessible to the world, and they would not have been possible without the Internet. And other digital media technologies have become indispensable parts of our lives. At first glance, it’s not clear how such advancements could do anything but make us smarter. In response to this argument, several authorities claim that making it possible for millions of people to create media—written blogs, photos, videos—has understandably lowered the quality of media. Bloggers very rarely do original reporting or research but instead copy it from professional resources. YouTube videos contributed by newbies to video come nowhere near the quality of professional videos. Newspapers struggle to stay in business while bloggers provide free content of inconsistent quality. But similar warnings were issued in response to the development of the printing press. As Gutenberg’s invention spread throughout Europe, contemporary literature exploded in popularity, and much of it was considered mediocre by intellectuals of the era. But rather than being destroyed, it was simply in the early stages of fundamental change. As people came to grips with the new technology and TOO MUCH TECHNOLOGY? the new norms governing it, literature, newspapers, scientific journals, fiction, and non-fiction all began to contribute to the intellectual climate instead of detracting from it. Today, we can’t imagine a world without print media. Advocates of digital media argue that history is bound to repeat itself as we gain familiarity with the Internet and other newer technologies. The scientific revolution was galvanized by peer review and collaboration enabled by the printing press. According to many digital media supporters, the Internet will usher in a similar revolution in publishing capability and collaboration, and it will be a resounding success for society as a whole. This may all be true, but from a cognitive standpoint, the effects of the Internet and other digital devices might not be so positive. New studies suggest that digital technologies are damaging our ability to think clearly and focus. Digital technology users develop an inevitable desire to multitask, doing several things at once while using their devices. Although TV, the Internet, and video games are effective at developing our visual processing ability, research suggests that they detract from our ability to think deeply and retain information. It’s true that the Internet grants users easy access to the world’s information, but the medium through which that information is delivered is hurting our ability to think deeply and critically about what we read and hear. You’d be “smarter” (in the sense of being able to give an account of the content) by reading a book rather than viewing a video on the same topic while texting with your friends. Using the Internet lends itself to multitasking. Pages are littered with hyperlinks to other sites; tabbed browsing allows us to switch rapidly between two windows; and we can surf the Web while watching TV, instant messaging friends, or talking on the phone. But the constant distractions and disruptions that are central to online experiences prevent our brains from creating the neural connections that constitute full understanding of a topic. Traditional print media, by contrast, makes it easier to fully concentrate on the content with fewer interruptions. A recent study conducted by a team of researchers at Stanford found that multitaskers are not only more easily distracted, but were also surprisingly poor at Chapter 4 Ethical and Social Issues in Information Systems 151 CASE STUDY QUESTIONS 1. What are some of the arguments for and against the use of digital media? 2. How might the brain affected by constant digital media usage? 3. Do you think these arguments outweigh the positives of digital media usage? Why or why not? 4. What additional concerns are there for children using digital media? Should children under 8 use computers and cellphones? Why or why not? multitasking compared to people who rarely do so themselves. The team also found that multitaskers receive a jolt of excitement when confronted with a new piece of information or a new call, message, or e-mail. The cellular structure of the brain is highly adaptable and adjusts to the tools we use, so multitaskers quickly become dependent on the excitement they experience when confronted with something new. This means that multitaskers continue to be easily distracted, even if they’re totally unplugged from the devices they most often use. Eyal Ophir, a cognitive scientist on the research team at Stanford, devised a test to measure this phenomenon. Subjects self-identifying as multitaskers were asked to keep track of red rectangles in series of images. When blue rectangles were introduced, multitaskers struggled to recognize whether or not the red rectangles had changed position from image to image. Normal testers significantly outperformed the multitaskers. Less than three percent of multitaskers (called “supertaskers”) are able to manage multiple information streams at once; for the vast majority of us, multitasking does not result in greater productivity. Neuroscientist Michael Merzenich argues that our brains are being ‘massively remodeled’ by our constant and ever-growing usage of the Web. And it’s not just the Web that’s contributing to this trend. Our ability to focus is also being undermined by the constant distractions provided by smart phones and other digital technology. Television and video games are no exception. Another study showed that when presented with two identical TV shows, one of which had a news crawl at the bottom, viewers retained much more information about the show without the news crawl. The impact of these technologies on children may be even greater than the impact on adults, because their brains are still developing, and they already struggle to set proper priorities and resist impulses. The implications of recent research on the impact of Web 2.0 “social” technologies for management decision making are significant. As it turns out, the “always-connected” harried executive scurrying through airports and train stations, holding multiple voice and text conversations with clients and co-workers on sometimes several mobile devices, might not be a very good decision maker. In fact, the quality of decision making most likely falls as the quantity of digital information increases through multiple channels, and managers lose their critical thinking capabilities. Likewise, in terms of management productivity, studies of Internet use in the workplace suggest that Web 2.0 social technologies offer managers new opportunities to waste time rather than focus on their responsibilities. Checked your Facebook page today? Clearly we need to find out more about the impacts of mobile and social technologies on management work