Due to the growing dominance of the Internet as the primary medium for commerce, entertainment and social communications, Americans are using more electronic media than ever. Some worry that the Internet, with its visual stimulation and constant distractions, is altering the way we think — and not for the better. Some studies indicate that it may alter physical mechanics of the brain that lead to long-term memory formation. And China and South Korea have declared “Internet addiction” a primary public health concern. But every new medium that comes on the scene has elicited similar fears about ill effects on popular taste and capacity for reflection and deep thinking. Still, there’s no question that the Internet is having profound effects on our lives — perhaps as great as any technological change since the advent of the printing press.
IMPACT OF THE INTERNET ON THINKING

THE ISSUES

775

• Does the Internet make us smarter?
• Does the Web shorten attention spans?
• Are people addicted to the Internet?

BACKGROUND

781

Ever Since Socrates
Even ancient Greeks worried about technology’s impact on their minds.

782

New Ways to Go Faster
Standardized postal rates and the telegraph revolutionized communications.

785

Rise of the Net
In 1969 the first computer network went live.

CURRENT SITUATION

787

The Dominant Medium
Americans now say Internet is more vital than TV.

790

Too Much Information
Does the Internet flood our brains with too much data?

OUTLOOK

791

Only Disconnect
More people may go offline in the future to give their brains a rest.

SIDEBARS AND GRAPHICS

776

Electronic Multitasking Is on the Rise
But multitasking while reading has changed little.

Social Networking Is Kids’ Top Online Activity
Kids spend a quarter of their time on networking sites.

777

779

Will Google Make Us Stupid?
Internet experts say the Internet is not damaging reading and writing skills.

Light Internet Users Are Happier
Heavy users make poor grades.

Chronology
Key events since 1969.

783

784

More Classrooms Cater to ‘Mobile Generation’
But does technology improve student performance?

So You Think You Can Multitask?
Research finds that multitasking as we know it “is a myth.”

Early Worries About Information Overload
Concern predated the Internet by several centuries.

At Issue
Is the Internet making students smarter?

FOR FURTHER RESEARCH

793

For More Information
Organizations to contact.

794

Bibliography
Selected sources used.

The Next Step
Additional articles.

Citing CQ Researcher
Sample bibliography formats.

Cover: AFP/Getty Images/Emmanuel Dunand
Impact of the Internet on Thinking

BY ALAN GREENBLATT

THE ISSUES

Recently at lunch, Eric Wohlschlegel announced, “I have to take a BlackBerry pause.”

Plenty of people interrupt social and business meetings to check messages on their mobile devices. There was a time just a few years ago, Wohlschlegel recalls, when his employer didn’t require him to have a BlackBerry. Now, as a spokesman for the influential American Petroleum Institute, Wohlschlegel is expected to be in constant contact with the world at large, fielding some 200 work e-mails a day.

He doesn’t have the option of tuning them out. But when circumstances forced him to, he had a hard time adjusting. His BlackBerry stopped working at just the same time that his home computer crashed, leaving him disconnected, and disoriented.

“You always fantasize about that one day when you sit back and go golfing,” he says. “But then when you have a moment without being connected, you realize how significant it is and what you’re missing.”

Meanwhile, Wohlschlegel kept checking the empty holster on his hip, out of habit. Many people describe feeling “phantom vibrations” signaling incoming messages after their smartphones have gone bust.

People today are more connected than ever, visiting social-media sites, checking headlines on the Web and texting, e-mailing and instant-messaging. The Internet has become the focus of many people’s lives — the place where they socialize, shop, do their work and view and listen to entertainment.

“Texting and IMing my friends gives me a constant feeling of comfort,” a University of Maryland student wrote after being asked to refrain from using electronic media for a day. “When I did not have those two luxuries, I felt quite alone and secluded from my life.”

There’s no question that Americans are engaging more than ever with electronic media. According to a Ball State University study conducted last year, most Americans spent at least 8.5 hours per day looking at screens — a television, computer monitor or mobile phone, and frequently two or three at once. Television viewing has not gone down in the Age of the Internet — but reading printed works has.

Near-constant use of the Internet can not only be habit forming but also something that comes to be expected by others. Because text-messaging and Twitter allow people to respond instantly, friends may expect you to respond instantly. Noting that one teen in California had sent 300,000 texts in a month, William Powers writes in Hamlet’s BlackBerry, his 2010 book about the impact of technology on contemporary life, “The goal is no longer to be ‘in touch,’ but to erase the possibility of ever being out of touch.”

Use of the Internet and handheld devices while driving can also be deadly, Transportation Secretary Ray LaHood warned Sept. 21, calling for a crackdown on distracted driving. More than 5,000 deaths and nearly half a million accidents were caused last year by distracted driving, he said, citing National Highway Safety Administration figures. Automakers have supported bans on text-messaging and using handheld cell phones while driving, but they have introduced other distractions, he said. “In recent days and weeks, we’ve seen news stories about carmakers adding technology in vehicles that lets drivers update Facebook, surf the Web or do any number of other things instead of driving safely,” he said.

Technology is also creating expectations that people will be available to work at virtually any time of the night or day. A Chicago police sergeant has filed a federal lawsuit, arguing that his availability during off hours via BlackBerry entitles him to overtime pay.

“Giving a workaholic a laptop is like giving an alcoholic a bottle of gin,” says
E. Jeffrey Hill, a sociologist at Brigham Young University. “It enables just that kind of compulsive behavior.”

There’s now a serious debate going on within therapeutic circles about whether people can become addicted to the Internet in the way that they might become addicted to chemical substances. And there’s a broader debate taking place about whether the Internet is changing the way people think.

Much of that debate has been triggered by journalist Nicholas Carr, author of the controversial 2008 Atlantic article “Is Google Making Us Stupid?” 7 He has since expanded his ideas into a book called The Shallows: What the Internet Is Doing to Our Brains.

Carr says the Internet is an unmatched tool for communications and information but argues that it can have bad effects on our brains. The Internet, he says, speaks to the parts of our brain that are attracted to movement, visual imagery and novelty — primitive parts of the brain that do not lend themselves to deep thought and contemplation.

“There’s a whole realm of thought that I think is very important to the richness of our personal intellectual lives, and also very important to the building of culture, that requires an attentive decision-making, and a blogger for Wired, the technology publication, argues that Carr’s concerns are overstated. Sure, people need to put down their devices once in a while to allow themselves to daydream, he says, but he argues that the Internet provides far more than enough information to justify the distractions that come along with its use.

“There’s no doubt that we’ve come to depend on these tools radically in the last five to 10 years,” Lehrer says. “When an iPhone gets dropped and smashed and we have to wait for it to be fixed — we’ve all had that anxiety. But I would frame that anxiety as a sign of how useful these tools are for us, not how they’re corrupting our Pliocene brain.”

Some people have compared the Internet to an outboard brain or separate hard drive, capable of remembering far more than a human brain can — or needs to. “It’s no longer terribly efficient to use our brains to store information,” according to Peter Suderman, a writer for the American Scene, an online magazine. “Rather than memorizing information, we now store it digitally and just remember what we stored.” 10

It may be that having to remember information such as friends’ phone numbers was just a “frozen accident” of history, something that we won’t miss, as New York University technology professor Clay Shirky writes. 11 But Carr argues that the Internet makes it harder to remember anything, that the influx of competing messages interferes with the physical mechanics of the brain that move information into long-term memory.

“Almost certainly, downtime lets the brain go over experiences it’s had, solidify them and turn them into permanent long-term memories,” says Loren Frank, a psychologist at the University of California, San Francisco. When the brain is constantly stimulated, he said, “you prevent this learning process.” 12

Carr cites studies that suggest that the Internet can change the way the brain acts. One, by Gary Small, a psychiatrist at the University of California,
Los Angeles, and coauthor of the book *iBrain: Surviving the Technological Alteration of the Modern Mind*, found that people’s brains changed in response to Internet use.

Experienced Google users displayed different neurons on brain imaging scans than novices — but the novices’ brains reacted the same way after just a few days of limited Web surfing. 13 “You can change the brain relatively quickly,” Small says.

Small isn’t worried the Internet is “going to rot our brains.” But he does say it’s having profound effects on our lives that we’re only starting to grapple with. “It’s created a whole new age, or stage of human development,” Small says.

“You think of the printing press or the development of agriculture,” he continues. “This is up there, or even beyond it.”

As people grapple with the idea that the Internet may be changing thought and behavior, here are some of the questions they’re debating:

**Does the Internet make us smarter?**

The Pew Internet & American Life Project put a variation of Nicholas Carr’s question — “Does Google make us stupid?” — to hundreds of technology experts. 14 A majority disagreed with Carr’s premise, but their ideas about how intelligence had been reshaped by the Internet ranged widely.

Some felt that people were freed up from rote tasks such as memorization of facts. That could end up meaning that we have to redefine what we mean by intelligence, as machines take up a greater share of the tasks once left to the human mind. Some stated their belief that the Internet had helped create a “hive brain” that allows people to share thoughts and come to collective solutions to complex problems together.

“There’s a pretty broad feeling among lots of technology users that these tools can serve their needs in new ways,” says Lee Rainie, who directs the Pew project.

“You can gather up information quickly and easily, which might have taken you enormous amounts of time in an earlier age,” he says. “At the same time, people will moan and groan about the distractions that these devices bring into their lives.”

No one disputes that the Internet has made much more information readily available to just about anyone. “It’s been a boon in that it gives access to all kinds of stuff that a crummy high-school library wouldn’t have even come close to having,” says Robert Thompson, a professor of popular culture at Syracuse University.

But Thompson worries that the way Google filters information makes it potentially less useful, in certain respects. He jokes that good students will cite material from the third page of links that a Google search calls up, while bad students will not look past the first page.

“The problem is that so much of the stuff that would really be a boon is not used, because it’s not on the first page of a Google search,” he says.

The narrowing of information — necessary given the glut that’s now available — can cause problems even among serious researchers. Lehrer, the author of *How We Decide*, cites a study indicating that since scientific papers have been widely available online, fewer of them are being cited.

“Even though we have access to all sorts of information, we seem to be citing the same texts,” Lehrer says. “The Internet allows us to filter our world, to cherry-pick our facts. It’s just human nature writ large.”

### Social Networking Is Kids’ Top Online Activity

Youngsters using computers for recreational purposes spend a quarter of their time on social networking sites and about 20 percent of their time playing video games. Visiting video sites is the third most popular online activity.

**Proportion of Recreational Computer Time Spent on Various Activities**

(Among 8- to 18-year-olds)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social networking</td>
<td>25%</td>
</tr>
<tr>
<td>Playing games</td>
<td>19%</td>
</tr>
<tr>
<td>Visiting non-video sites</td>
<td>12%</td>
</tr>
<tr>
<td>Checking e-mail</td>
<td>6%</td>
</tr>
<tr>
<td>Instant-messaging</td>
<td>13%</td>
</tr>
<tr>
<td>Visiting video sites</td>
<td>16%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
</tbody>
</table>

*Note: Percentages do not add to 100 due to rounding.*

*Source: “Generation M²: Media in the Lives of 8- to 18-Year-Olds,” Kaiser Family Foundation, January 2010*
David Levy, a professor at the University of Washington’s Information School, says that the rapid transmission and accumulation of knowledge made possible by technology is helpful, but he worries that information overload can have some ill effects.

Namely, he’s concerned that the flood of information leaves people with no time to think. “There’s another piece of the process of learning and growing and getting information further assimilated, and that’s the time for contemplation,” he says. “We’re just not allowing ourselves sufficiently the time to do deeper reflection.”

Paul Saffo, managing director for Discern Analytics, a Silicon Valley forecasting firm, says there’s a case to be made that the Internet is helping to make individuals smarter. There have been studies showing that not just Web searches but also video games are good at stimulating and strengthening parts of the brain.

“Video games turn out to be amazing for the brain,” Lehrer says. “They’re like doing pushups for the brain.”

But Saffo worries, too, that the Internet ethos of instant and ever-changing information can have its deleterious effects on society as a whole. “The collective impact of this technology causes more people to look at and concentrate on the immediate at the expense of the long-term,” he says.

This effect of everyone concentrating solely on the moment can lead to catastrophic mistakes and have an ill effect on democracy, Saffo suggests. “This is the dark side of the eternal present,” he says. “There’s no capacity to step back and frame things in different ways. Anyone who dares think long-term will be taken down.”

In his Atlantic article and follow-up book The Shallows, Carr is careful to state that the Internet has been enormously beneficial in a number of ways. Critics of his book nevertheless contend that he has overstated the extent of the problems of concentration and deep thought created or exacerbated by technology.

To the extent that people skim, get distracted or fail to think deeply about the words and images flitting across their screens — well, people have always found ways to avoid thinking too deeply. Long before Twitter, there were television sitcoms, Lehrer points out. And long before people could waste time playing Minesweeper and Scrabble online, there were plenty of games made out of cardboard and plastic.

But Carr argues that the Internet is not simply a tool for distraction and time wasting. He says it affects how the brain processes information.

In his book, Carr cites studies showing that people reading short stories with hyperlinks embedded in them retain a good deal less of the content than people who read them on the printed page, because the need to make decisions about whether to click on the links keeps them from concentrating on the text at hand. 15

“Dozens of studies by psychologists, neurobiologists, educators and Web designers point to the same conclusion: When we go online, we enter an environment that promotes cursory reading, hurried and distracted thinking and superficial learning,” Carr writes in The Shallows.

“It’s possible to think deeply while surfing the Net, just as it’s possible to think shallowly while reading a book,” Carr continues, “but that’s not the type of thinking that technology encourages and rewards.” 16

Getting used to technological distraction can cause problems in social settings, suggests Small, the UCLA psychiatrist.

“We have a generation of digital natives with very strong techno-skills and very strong neuro pathways for multitasking and experiencing partial continuous attention and other wonderful adaptive skills,” Small says. “But they’re not developing the face-to-face human contact skills.”

There isn’t strong data about this, Small says, but the idea that young people, especially, have more difficulty interacting with people in person when they are texting other people with near-constancy is evident all around us, he suggests.

“The Internet’s not making us stupid or smarter — it’s changing the way we’re processing information,” Small says.

“You cannot stop the technology train,” he adds. “It’s way out of the station, coming down the tracks. You have to adapt.”

Does the Web shorten attention spans?

Human beings have always had a hard time sitting alone and staying quietly focused. The Internet has made this problem worse for many.

It’s become common for people to complain that they no longer seem able to concentrate on one thing for very long. Most participants in a 2003 San Jose State University study said that they were reading more online but had difficulty giving “sustained attention” to the material. “I find that my patience with really long documents is decreasing,” a study participant said. “I want to skip ahead to the end of long articles.” 17

There are millions, if not billions, of Web pages and tens of thousands of smartphone applications, or “apps.” On any given screen, demands for a user’s attention may come from text, audio, video, competing graphics and hyperlinks to yet more pages. View ing a busy Web page may be interrupted by e-mail alerts and status updates from social-media sites.

“I love the iPad,” said Nicholas Negroponte, founder of MIT’s Media Lab, “but my ability to read any long-form narrative has more or less disappeared, as I am constantly tempted to check e-mail, look up words or click through.” 18

Not everyone thinks the Internet and mobile devices are shortening their
attention spans. A May New York Times/CBS News survey found that less than 30 percent of those under age 45 believed the use of such technology made it more difficult for them to focus, while fewer than 10 percent of older users agreed.19

“People who do need to focus find the time to focus,” says Tim O’Reilly, president of O’Reilly Media, a technology research firm. “There’s plenty of focused thinking going on.”

Even apparent distractions — getting pulled every which way by various stimuli — are not necessarily evidence that people are having a harder time paying attention, says Thompson, the professor of popular culture.

“It’s a different kind of attention span than a Victorian gentleman sitting down with a leather-bound book for two hours,” he says. “When I look at an 8-year-old playing these complex video games with other people, I’m not sure what’s going on there, but it’s sure not a lack of attention span. They’re completely focused with all these multiple inputs.”

But a recent study showed that young children and college students who exceeded a two-hour-per-day limit on watching television and playing video games had a harder time paying attention in class. “In just one year, we would see attention problems in the classroom getting worse related to how much time kids are in front of television and video games,” said study coauthor Douglas Gentile, an associate professor of psychology at Iowa State University.20

And, Thompson concedes, playing video games and surfing the Net — a term that itself suggests skimming the surface — may lead only to facile thinking and not any great depth. To get at something valuable on the Web, often a user will have to dig through a great deal of extraneous material — a task from which many people are distracted by the constant possibility of interruption.

Will Google Make Us Stupid?

Internet experts overwhelmingly disagree with the assertion that the Internet is damaging human intelligence or people’s reading and writing skills, according to an online survey of nearly 900 Internet experts and users.

Percentage Who Agreed with the Prediction:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>76%</td>
<td>By 2020, use of the Internet will have enhanced human intelligence; as people are allowed unprecedented access to more information, they become smarter and make better choices.</td>
</tr>
<tr>
<td>21%</td>
<td>By 2020, use of the Internet will not have enhanced human intelligence and it could even be lowering the IQs of most people who use it a lot.</td>
</tr>
<tr>
<td>65%</td>
<td>By 2020, it will be clear that the Internet has enhanced and improved reading, writing and the rendering of knowledge.</td>
</tr>
<tr>
<td>32%</td>
<td>By 2020, it will be clear that the Internet has diminished and endangered reading, writing and the intelligent rendering of knowledge.</td>
</tr>
</tbody>
</table>

Source: “Future of the Internet IV,” Pew Research Center’s Internet & American Life Project and Elon University’s Imagining the Internet Center, Feb. 19, 2010

And other media are coming to resemble Web pages. Magazine designs now include multiple fonts, myriad graphics and shorter stories than used to be the case. Television news channels have also reformatted their presentations, including more than one video presentation at a time, lots of graphics and scroll bars of texts — “a ton of competing information everywhere,” says Larry D. Rosen, a psychologist at California State University-Dominguez Hills and author of two books about young people’s use of technology.

“Our attention span basically has diminished,” he says. “Our ability to focus on a task without switching to another task has diminished. It’s not an inherent change in the way we’re thinking. It’s a change in technology that forces us to change focus often.”

But some studies suggest that the Internet may, in fact, be changing the way we’re thinking. “There is research that suggests the traits of attention deficit disorder are higher than they were a few years ago,” says Elias Aboujaoude, a professor of psychiatry and behavioral science at Stanford University.

There’s not yet good data showing a causal effect, he points out, noting it’s possible that people who already had attention-span problems may be more drawn to technology. “But there’s a lot of correlational research that, at any point in time, people who spend a lot of time online have shorter attention spans,” Aboujaoude says.

The amount of distractions now available to people is taking its toll, Aboujaoude argues. “The price we pay for all this is that we live in a
sound-bite culture now," he says. "Anything that requires concentration, deliberation, pondering, deep, entrenched difficult thought, we don’t have the attention for."

It’s easy to make such claims and “to write scare stories about attention spans,” says Lehrer, the Wired blogger. But there’s value to the distractedness, too.

Paying attention to a variety of things is a skill the Internet helps foster, Lehrer says. He compares it to the difference between walking for two miles through a busy city and walking through a quiet park.

There’s a big supply of studies that walking through a city puts a “cognitive burden” on people because there are so many more things that compete for attention, he says. But there’s real value to being in cities, which afford people all kinds of interactions and access to more commerce and culture — much like a few of the benefits of the Internet.

“The Internet is just like a city,” Lehrer says. “It’s a trade-off, but in the end we’re willing to make the trade-off because it allows all sorts of new connections.”

Are people addicted to the Internet?

California entrepreneur Kord Campbell uses technology — a lot. Not only is he running an Internet startup company, but he plays video games, follows 1,100 people on Twitter and often falls asleep with a laptop or an iPhone cradled on his chest.

He has a hard time putting his devices away, whether on family vacations or commuting by subway to San Francisco. He knows that one tunnel will cost him exactly 221 seconds of time online.

Just before an important meeting is about to begin, Campbell can’t resist clicking on a link on Twitter to a story about a corpse. He finds himself annoyed that the article wasn’t interesting and gets distracted by a pop-up ad for jeans. “It’s some article about something somewhere,” he said. 21

Campbell looks at so many screens so much that he sometimes misses important e-mails, makes costly mistakes in online stores, burns hamburgers on the grill and forgets to pick up his children. His difficulty with the concept of logging off may be extreme, but it’s not unusual.

“I have friends and relatives that carry BlackBerrys with them 24 hours a day, fully prepared to drop anything in their lives and work at a moment’s notice,” said Tim O’Leary, the head of a marketing firm. “I’m tethered to my laptop as if it were an oxygen machine I must cart around to keep me breathing.” 22

For Hilarie Cash, the problems people describe in trying to stay away from their computers and smartphones — such as poor nutrition, anxiety, irritability and the costs their habits impose on their relationships and work or schoolwork — are signs of “classic addiction.”

Cash runs a treatment center for Internet and video game addiction in Redmond, Wash. She notes that both China and South Korea have named Internet addiction as primary public-health concerns.

It doesn’t matter, she says, whether people are addicted to pornography, games or simply the small thrill of getting a new message in their e-mail inbox. “If you’re Facebooking, you’re chatting, you’re doing something sexual that’s a lot of fun, then those reward pathways in the brain are lighting up and you’re in danger of getting addicted,” Cash says.

The hit-and-miss nature of the Internet — with some websites being interesting, while many are not — may make it an especially seductive medium. People talk about the “dopamine squirt,” the little bit of chemical excitement that

---

### Light Internet Users Are Happier

Youngsters who use the Internet the least make better grades, get along with their parents more and are generally happier than those who use the Internet a lot. Heavy Internet users, on the other hand, make poor grades, are bored and get into trouble more often than light users.

<table>
<thead>
<tr>
<th>Percentage of Heavy, Moderate and Light Media Users (ages 8 to 18) Who Say They:</th>
<th>Heavy users</th>
<th>Moderate users</th>
<th>Light users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get good grades (A’s and B’s)</td>
<td>20%</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>Get fair/poor grades (C’s or below)</td>
<td>80%</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>Have a lot of friends</td>
<td>30%</td>
<td>50%</td>
<td>70%</td>
</tr>
<tr>
<td>Get along with their parents</td>
<td>40%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>Are happy at school</td>
<td>60%</td>
<td>80%</td>
<td>100%</td>
</tr>
<tr>
<td>Are often bored</td>
<td>100%</td>
<td>90%</td>
<td>70%</td>
</tr>
<tr>
<td>Get into trouble a lot</td>
<td>100%</td>
<td>90%</td>
<td>80%</td>
</tr>
<tr>
<td>Are often sad or unhappy</td>
<td>50%</td>
<td>30%</td>
<td>10%</td>
</tr>
</tbody>
</table>

occurs in the brain when something of interest pops up on the computer screen.

Surfing the net or opening up e-mail, in this sense, is just like playing slot machines—you never know when you're going to hit a winner, a state of uncertainty that leads sometimes to the strongest habits. "That means that rather than reward an action every time it is performed, you reward it sometimes, but not in a predictable way," said Tom Stafford, a lecturer in psychology at England's University of Sheffield. "So with e-mail, usually when I check it there is nothing interesting, but every so often there's something wonderful—an invite out, or maybe some juicy gossip—and I get a reward." 25

The standard diagnostic manual for mental disorders does not refer to excessive Internet use as an addiction. "I like to save 'addiction' for obsessions that are rooted in a chemical basis," such as drug and alcohol use, says John M. Staudenmaier, the editor of Technology and Culture.

Many other technology experts shy away from the term addiction, which they think is a term too lightly used in media accounts. Most people under the age of 20 may be clutching some kind of handheld device, says Syracuse University's Thompson, but that has more to do with an expectation of availability to communicate at any given time than with a true compulsion.

"We have to be careful not to slip into generational nostalgia about this," he says. "Someone from 1870 looking at us before the Internet would have thought our lives were insanely complicated—allowing movie theaters into our homes with television, with constant music in the background."

Rosen, the Cal State psychologist, says it's not the amount of time you spend doing something that defines addiction, but its impact on other parts of your life. "If you can't be on vacation and not check your e-mail, then it's disrupting your family life," he says. "If your wife is always complaining that she can't get you off the computer to go to bed, then we're talking about addiction."

Others argue that, while people may spend excessive amounts of time browsing the Internet or texting, they can also spend too much time doing lots of other things. "If you applied these criteria to all kinds of behavior, it's true about a lot of activities," says Rainie, at the Pew Internet & American Life Project. "If you're a passionate user, you lose sleep, it takes away from other parts of your life."

But kicking the Internet habit may take more than just a bit of self-discipline, says the University of Washington's Levy. Just as doctors concerned with obesity talk about a "toxic food environment" in which it's easy to make bad choices about food, the ubiquity of the Internet makes it especially hard for some people to shut it off.

"The culture is making available and selling to us all kinds of things," Levy says. "It would be a hell of a lot easier to exercise personal discipline if we weren't constantly being exposed to things."

The term "addiction" itself may not be clinically accurate, suggests Aboujaoude, the Stanford psychiatrist, but certainly there is something tempting for many people about Internet use. "It's only a matter of time before we isolate those parts of the brain that light up when we're browsing or killing time on an app," he says.

For many observers, the question of whether people can truly be said to be addicted to the Internet is a matter of semantics. For millions of people, like California entrepreneur Campbell, it's the first thing they turn to when they wake up and the last thing they do at night.

"Call it addiction, call it human nature," says Silicon Valley consultant Saffo. "Samuel Johnson [the renowned 18th-century British author] observed that too often we go from anticipation to anticipation, and not from satisfaction to satisfaction."

"The problem is, we have more and more media temptations. With ever more capable technologies comes a greater burden to choose wisely and well."

**BACKGROUND**

Ever Since Socrates

The idea that technology is leading to major changes in communications and thought—and causing anxiety—is nothing new. "Even in ancient Greece, people worried about what the latest technology was doing to their minds," writes Powers in *Hamlet's BlackBerry*. 24

In Plato's dialogue "Phaedrus," the philosopher Socrates complains that the written word and books are hampering memory. Instead of remembering things for themselves, people had begun trusting written characters. "The library was ruining the mind," Wired blogger Lehrer writes of this "first technology scare." 25

It's true that writing did, in fact, damage memory, the cultural critic Neil Postman points out in *Technopoly: The Surrender of Culture to Technology*. But the error that Socrates makes is assuming that writing will impose nothing but burdens on society, failing "to imagine what writing's benefits might be, which, as we know, have been considerable." 26

Those worried about technology have traditionally highlighted its ill effects without sufficiently considering the benefits that make its spread possible and sometimes unstoppable.
That certainly proved to be the case with the 15th-century invention of the printing press. Movable type, pioneered by German goldsmith Johannes Gutenberg, turned books into a mass commodity. No longer were books and literacy confined solely to those wealthy enough to afford books hand-copied by scribes. “It was no longer just scholars and monks who sat reading words in quiet rooms,” Carr writes in The Shallows. “Even a person of fairly modest means could begin to assemble a library of several volumes, making it possible not only to read broadly but to draw comparisons between different works.”

As with the written word, the printed word elicited concern among elites that not everyone would be capable of handling such knowledge with adequate care. As early as 1471, Italian scholar Niccolo Perotti worried that the lower cost of printing meant that because now “anyone is free to print whatever they wish, they often disregard what is best and instead write, merely for the sake of entertainment, what would best be forgotten, or, better still be erased from all books.”

What Perotti wrote about books is not too distant from what critics have said in our own time about blogs and tweets.

There is always a tension between freedom to publish and quality, New York University’s Shirky argues in Cognitive Surplus.

“Before Gutenberg, the average book was a masterpiece,” Shirky writes. “After Gutenberg, people got throwaway erotic novels, dull travelogues and hagiographies of the landed gentry.”

By 1845, American short-story master Edgar Allan Poe wrote, “The enormous multiplication of books in every branch of knowledge is one of the greatest evils of this age; since it presents one of the most serious obstacles to the acquisition of correct knowledge by throwing in the reader’s way piles of lumber in which he must painfully grope for the scraps of useful lumber.”

Meanwhile, the standardization of U.S. postal rates sparked an explosion in letter writing. The Postal Acts of 1845 and 1851 reduced the letter rate to 3 cents for mail sent anywhere in the United States — a rate that didn’t change until 1958. In 1840, notes John Freeman in his 2009 book The Tyranny of E-Mail, the average American mailed three letters per year. By 1900, the number had risen to 69 and by 1960 it was 350, or roughly one per day.

Writing and responding to letters were soon regarded as chores, while businessmen and newspapers complained that the telegraph and telephone led to constant demands for quick responses. “The faster we relay information and the more we share what goes on in our heads with others, the busier our society becomes,” Freeman writes.

Continued on p. 784
1960s-1980s

Internet becomes a popular communications tool.

1969
First Internet message is sent from UCLA to Stanford, allowing otherwise incompatible computer systems to communicate. . . . IBM sells software separately from hardware.

1973
First call is made on handheld cellular phone. . . . The @ symbol is used to separate an address from a domain name.

1974
Telenet, a civilian equivalent of Arpanet, the original military progenitor of the Internet, is established.

1975
Bill Gates and Paul Allen launch Microsoft.

1978
First "spam" message is sent over the Internet, inviting about 400 people to a computer model show.

1983
CompuServe allows customers to send private e-mail to other subscribers and to read an Associated Press news feed.

1988
About 60,000 computers are connected to the Internet, mostly mainframes and other professional devices; only about 10 percent of the world’s 19 million personal computers (PCs) are connected to the Internet.

1990s Internet spreads from the realms of researchers and hobbyists to communications, commerce.

1991
World Wide Web is launched.

1995
First wiki is created, setting a template for user-editable websites. . . . AOL, CompuServe and Prodigy offer e-mail services to subscribers.

1996
Congress updates telecommunications law in first comprehensive legislation since 1930s. . . . Yahoo!, an Internet portal, raises $35 million with its initial public offering of stock. . . . SixDegrees.com, the first social networking site, is launched.

1998
Former Stanford students Sergey Brin and Larry Page launch Google.

1999
BlackBerry is introduced. . . . Blogging software becomes widespread.

2000s Internet becomes dominant mass medium, allowing two-way communication.

2001
Wikipedia, a free interactive online encyclopedia, is started.

2002
Number of Americans with access to e-mail at work nearly doubles, to 57 million, from 30 million in 2000.

2003
First successful flash mob — a seemingly spontaneous gathering that actually is synchronized using Web tools — is formed at Macy’s department store in Manhattan.

2004
Google offers unlimited storage to users of its Gmail e-mail service, launches Book Search program. . . . Harvard student Mark Zuckerberg begins Facebook in his dorm room.

2006
“Crackberry,” a term used to describe excessive BlackBerry use, is Webster’s dictionary “word of the year.” . . . Time names “You” — or Internet users — as its Person of the Year for the creation of user-generated content. . . . Work on the microblogging service Twitter begins.

2007
Apple’s iPhone revolutionizes smartphone market. . . . Amazon introduces Kindle e-reader. . . . 35 trillion messages travel between the world’s 1 billion computers. . . . Number of spam messages jumps to 100 billion a day, from 30 billion in 2005.

2008
Percentage of people checking e-mail on handheld devices doubles from 2004. . . . Two-thirds of people in AOL “Internet addiction” poll say they check e-mail in bed.

2009
Number of BlackBerry users hits 28.5 million, from 1 million in 2004.

2010
More Classrooms Cater to ‘Mobile Generation’

But does technology improve student performance?

Cedars School of Excellence, an elementary school in Scotland, is trying something new. It has gotten rid of chalkboards, textbooks, pens and paper to create what is believed to be the first school in the world in which all instruction is conducted using computers.

Last year, more than 100 students at the school competed for time using a total of 12 laptops. Now, every student has been issued an iPad.

“Before we had the solution, the children were only able to get around 45 minutes a week on computing studies as they were sharing the existing laptops,” said instructor Fraser Spiers.

“But now they’ll be some of the most technologically advanced in the world.”

Technology is encroaching into nearly every classroom. Smartboards — modern white boards that can display Web pages, spreadsheets or other visual and interactive materials — have become staples. Schools that just a couple of years ago banned cell phones are now offering lessons that incorporate smartphones. Some districts are even equipping their school buses with wireless routers for laptop users.

The National Broadband Plan released by the Federal Communications Commission encourages greater use of the Internet and telecommunications in schools by simplifying federal subsidies for broadband adoption and removing barriers to online courses.

“Within five years, every child in every grade in every school in America will be using a mobile learning device — a netbook or smartphone, something less than two pounds,” says Elliot Soloway, a professor of education and computer science at the University of Michigan. “Because it’s the mobile generation’s tool, kids are saying, ‘If the school’s letting me use my tool, I’m going to meet the school [halfway].’”

Soloway says that schools where he’s helped design instruction using mobile devices have seen notable improvement in test scores and student participation.

But access to technology doesn’t always improve student performance. A recent Duke University study of computer use among a half-million elementary and junior high students in North Carolina found that increased high-speed Internet access at home was associated with significant declines in math and reading.

Of course, heavy use of the Internet at home is not the same as using technology in the classroom. But the data are mixed there, too. “You look at the studies about schools and technology adoption, they’re all over the place,” says Levy, at the University of Washington’s Information School.

Both proponents and critics of computers for coursework seem to agree it’s not a panacea. Nor is all the information on the Web a substitute for quality instruction.

“One of the interesting things about these kinds of technology is that in some sense, people have been looking to them to be what we used to call ‘teacher-proof,’ a way of getting around a lack of teacher expertise,” says William H. Teale, a professor of education at the University of Illinois at Chicago.

“What we’ve seen so far with technology and the way it’s been used in classroom settings, is it doesn’t take the place of the teacher,” he says. “It can complement.”

Continued from p. 782

Production of the written word altered dramatically during the 19th century as well. In 1868, Christopher Latham Sholes, an American politician, printer and newsman, perfected the typewriter. Marketed by gun maker Frederick Remington five years later, it had an immediate and lasting impact. The number of stenographers and typists leapt from 154 in 1870 to 11,364 in 1900, Freeman writes.

Not only did typing become common, but it changed the way people wrote. Novelist Henry James had suffered from writer’s block but began dictating his works, producing much faster by going at the rhythm of the typewriter. The German philosopher Friedrich Nietzsche, who had poor eyesight, learned to touch type in 1882. When a friend noticed a change in his writing, Nietzsche wrote, “Our writing equipment takes part in the forming of our thoughts.”

The increases in the production and distribution of text were followed by the expansion of electronic media. By the end of the 1930s, almost all homes had a radio or phonograph, or both, and most Americans saw one or more movies per week.

The development of early electronic media contributed to a mass, common culture shaped by countless sources, such as ethnic and immigrant groups. “For both artist and audience, radio broke down the formidable geographical and racial barrier that had separated the rich veins of American folk music,” the media historian Daniel J. Czitrom wrote in 1982. As always, the new, more rapid forms of communication raised concern that the mass of people would not be able to handle all the information, or that standards would be demeaned. “Can a whole new uneducated public be aesthetically enfranchised without lowering aesthetic standards?” the British critic Martin Cooper asked in 1951.
Rise of the Net

Levy, the University of Washington computer scientist, sees the Internet as part of a continuum with earlier Industrial Age technologies. “Over the last 150 years, we have developed much richer, more powerful and increasingly widespread practices that are intensifying the acceleration and the information overload in ways that were never possible before,” he says. “In a sense, there’s nothing new about the Internet and digital media. They’re just another way to go faster.”

In 1936, English mathematician Alan Turing showed it would be possible to build a machine that could act like a problem-solving human being, and, indeed, the notion of merging man and thinking machines was an explicit goal of early computer designers. J.C.R. Licklider, an MIT engineering professor, wrote 50 years ago “the hope is that in not too many years, human brains and computer machines will be coupled . . . tightly, and that the resulting partnership will think as no human brain has ever thought.”

As computers became increasingly important in the second half of the 20th century, keeping data secure became an important Cold War priority.

Paul Baran, an electrical engineer at the RAND Corporation, a think tank focusing on military issues, proposed a network with many nodes, each able to route data to another network point until the data reached its destination. He also proposed chopping messages into smaller “packets” of digitized information. The network plan — which several other researchers envisioned at the same time — seemed inefficient but was in truth “extremely rugged,” designed with doomsday in mind, explained technology and science fiction writer Bruce Sterling. Each digital packet “would be tossed like a hot potato from node to node to node, more or less in the direction of its destination, until it ended up in the proper place. If big pieces of the network...
So You Think You Can Multitask?

Research finds that multitasking as we know it “is a myth.”

William Powers finds himself wishing he could be doing more things. When he brushes his teeth, his attention begins to wander, so he starts to sort his sock drawer. If he had a third hand, he writes in his 2010 book, about the impact of technology on our lives, *Hamlet’s Blackberry*, he would perform a third task.

“On a screen, it’s easy to jam more busyness into each moment, so that is exactly what we do. Eventually, the mind falls into a mode of thinking, a kind of nervous rhythm that is inherently about finding new stimuli, new jobs to perform,” Powers writes. “This carries into the rest of our lives; even when we’re away from screens, it’s hard for our minds to stop clicking around and come to rest.” 1

Multitasking is not a behavior that was created by the Internet, but certain modern technology encourages it. (See graph, p. 776.) People sitting at a computer screen — if they are indeed looking at just one — face multiple open Web browsers, an e-mail server, perhaps an instant-messaging chat or two and myriad other potential tasks among which to toggle.

“Technologies in the last decade not only allow task switching but demand task switching,” says Larry Rosen, a psychologist at California State University-Dominguez Hills.

But Rosen doesn’t see anything fundamentally new in terms of the brain switching rapidly between tasks on the Internet. It did that long before the dawn of the computer age.

“If you look at the human brain, it’s always been able to switch back and forth,” says Jonah Lehrer, author of *How We Decide*, a 2009 book about how the brain makes decisions. “That’s clearly a big part of what our brain is all about. It’s a big defining thing — attention is something we can quickly allocate to many different things.”

Indeed, recent studies indicate there’s really no such thing as multitasking — that people can’t concentrate on more than one thing at a time, even if they are switching back between them quite rapidly.

“So you’re doing two things at once, you’re almost always just switching rapidly between them, leaking a little mental efficiency with every switch.” 2

“People may be able to switch rapidly — but can they switch efficiently? Can full attention really turn on a dime? Studies at Stanford University, for instance, suggest that people who claim to be adept multitaskers are, in fact, easily distractible — too ready to turn attention away from useful information at hand in favor of other stimuli that are novel.

Scientists were enthusiastic about ARPANET, which gave them access to hard-to-come-by user time on remote fast computers. By 1972, the network had 37 nodes. Through the 1970s, other computer networks in the United States and abroad were linked to the so-called ARPANET, and the Internet — the network of networks — was born.

From its earliest days the Internet’s radically decentralized structure gave it an unprecedented ability to develop in ways that its inventors never anticipated. ARPANET was built to facilitate high-tech computing and government communications. But, to the surprise of many, high-tech users quickly adapted the system to a down-to-earth pursuit — sending mail electronically for free. By 1973, e-mail made up 75 percent of network traffic.

During the 1980s the decentralized Internet mushroomed from fewer than 1,000 host computers, mostly in the United States, to millions worldwide, but the telephone and cable companies largely continued to ignore it. The Internet expanded from the research sector to the commercial sector in the mid- to late-90s and began spawning e-commerce businesses and new ways to communicate, such as websites.

A new world emerged in the late 1990s when broadband technology, using cable and optical fiber to transmit data at high speeds, allowed Internet users to send not just text but video and voice messages. By 2004, people were buzzing about “Web 2.0” — a term referring to interactivity on the Internet including social media, blogs, photo sharing and “wikis,” or Web pages that were editable by users.
The Internet has become the dominant communication medium in American and perhaps world culture. A poll of 1,753 Americans released in April by Arbitron and Edison Media Research found, for the first time, that more people would rather live without television than the Internet. It was close — 49 percent to 48 percent — but the trend line is clear: Nine years earlier, TV outpaced the Internet 72 percent to 26 percent. 45

Padmasree Warrior, the chief technology officer for Cisco, the networking device company, predicts that 1 trillion computers, cell phones and other devices will be connected to the Internet in 2013, up from 500 million in 2007. 46

But it’s not just a question of whether more people are using the Internet than older media such as television and newspapers. The Internet has posed a challenge to all older forms of media, including telecommunications, movies and now books. Each has had to adapt as the Internet has speeded up and changed the average person’s access to all manner of content.

The Internet is actually a relatively new player on the scene, and it’s not finished evolving itself. Indeed, the cover story of Wired's September issue provocatively proclaimed “The Web Is Dead.” At a time when the Internet is the source of content for more and more devices and applications, or apps, that may seem like a ridiculous contention.

But as authors Chris Anderson and Michael Wolff note, the Web now accounts for less than 25 percent of Internet traffic — down from about 40 percent at the start of the decade. An increasingly large share of traffic is taken up by peer-to-peer sites, such as Facebook, and video streaming.

Anderson and Wolff note that you may start your day checking e-mail on your iPad and then browsing Facebook, Twitter and The New York Times. You listen to a podcast and then read...
Early Worries About Information Overload

Long before the advent of the Internet, people have worried that new media were cheapening discourse and causing information overload. Here’s a sampling of such concerns from earlier times:

Now that anyone is free to print whatever they wish, they often disregard that which is best and instead write, merely for the sake of entertainment, what would best be forgotten, or, better still be erased from all books. And even when they write something worthwhile they twist it and corrupt it to the point where it would be much better to do without such books, rather than having a thousand copies spreading falsehoods over the whole world.

— Niccolo Perotti, Italian scholar, 1471, soon after invention of printing press

The enormous multiplication of books in every branch of knowledge is one of the greatest evils of this age, since it presents one of the most serious obstacles to the acquisition of correct knowledge by throwing in the reader’s way piles of lumber in which he must painfully grope for the scraps of useful lumber.

— Edgar Allan Poe, author, 1845

[N]ew technologies are pretty toys, which distract us from serious things . . . We are in great haste to construct a magnetic telegraph from Maine to Texas; but Maine and Texas, it may be, have nothing important to communicate.

— Henry David Thoreau, author, 1854

The merchant goes home after a day of hard work and excitement to a late dinner, trying amidst the family circle to forget business, when he is interrupted by a telegram from London directing, perhaps, the purchase in San Francisco of 20,000 barrels of flour; and the man must dispatch his dinner as hurriedly as possible in order to send off his message to California.

— W.E. Dodge, businessman, late 1800s

Present-day life, more fragmented and faster-moving than preceding periods, was bound to accept as its means of expression an art of dynamic ‘divisionism.’

— Fernand Leger, artist, 1913, on Cubism

[The publication of new material] has been extended far beyond our present ability to make use of the record. The summation of human experience is being expanded at a prodigious rate, and the means we use for threading through the consequent maze to the momentarily important item is the same as was used in the days of square-rigged ships.

— Vannevar Bush, presidential science adviser, 1945

Whether this revolution in the reading habits of the American public means that we are being inundated with a flood of trash which will debase farther the popular taste, or that we shall now have available cheap editions of an ever-increasing list of classics, is a question of basic importance to our social and cultural development.

— Harvey Swados, author, 1951

Life today in America is based on the premise of ever-widening circles of contact and communication. It involves not only family demands, but community demands, national demands, international demands on the good citizen, through social and cultural pressures, through newspapers, magazines, radio programs, political drives, charitable appeals and so on. My mind reels with it . . . It does not bring grace; it destroys the soul.

— Anne Morrow Lindbergh, author, 1955

through RSS feeds and talk on Skype or converse via instant-messaging. “At the end of the day, you come home, make dinner while listening to Pandora, play some games on Xbox Live and watch a movie on Netflix’s streaming service,” they write. “You’ve spent the day on the Internet — but not on the Web. And you are not alone.” 47

Their thesis is that Internet communications may be returning to the “closed garden” model that prevailed before the World Wide Web became the dominant format in the mid-1990s. In the early days of commercial and personal use of the Internet, people browsed within closed, proprietary

Continued on p. 790
Is the Internet making students smarter?

The Internet is just a roadway. But with mobile devices in the palms of their hands, all children, rich or poor, can hop onto that roadway to find answers to their own questions. Lest you missed it, let us repeat: A mobile device connected to the worldwide highway enables all children, regardless of economic situation, to explore their ideas, collaborate with friends and establish new contacts. For a youth living below the poverty line in Detroit, an Internet-connected smartphone is arguably the most empowering opportunity in that child's life.

Of course, adults must provide instruction and guidance to help children make the best use of this truly unique opportunity. Although the temptations to squander the opportunity are but a finger-tap away, we are seeing that with proper adult support children can and do make effective use of their Internet-connected smartphones. As a young African-American girl commented to a CNN interviewer in describing her fifth-grade lesson on the Revolutionary War, "Now I can do something interesting with my phone, not just text."

The Internet naysayers say the Web encourages shallowness in thinking. But, in the context of the level of engagement that an Internet-connected smartphone affords and engenders, the naysayers' comments are mere quibbles. Paper, pencils, textbooks, blackboards — the stuff of America's classrooms — simply do not engage today's "mobile generation."

For better or worse, this generation needs the interactivity and feedback provided by Internet-connected mobile devices.

In classrooms from Singapore to the U.K. to Toms River, N.J., where students use such devices as essential tools for learning for 40 to 70 percent of the school day — plus time on the school bus or in the bleachers at their brother's soccer match — understanding is improving, and so are test scores. "All 150 students in the project did every lick of homework on time," says Mike Citta, principal of Hooper Avenue Elementary School in Toms River.

There is no magic in these devices; test scores improve because the students are spending more time on task because they are more engaged in their studies when using curriculum that is based on Internet-connected mobile devices.

There is no going back. Within five years every child in every grade in every school in America will be using mobile learning devices 24/7. And watch the test scores skyrocket!
environments such as AOL and CompuServe that were ultimately made obsolete by the wide-open Web.

That may be changing. Anderson and Wolff cite a projection that, within the next five years, more people will access the Net from mobile devices than from personal computers. “Because the screens are smaller, such mobile traffic tends to be driven by specialty software, mostly apps, designed for a single purpose,” they write. That will give more power — and commercial clout — to content providers and curators such as Facebook and Apple.

Their article prompted a great deal of discussion, but many disagreed with their premise and conclusions. Syracuse University’s Thompson says, “We’re really a long way away from the Web being dead. Social networks are “a new packaging and distribution structure” that, he predicts, won’t be evolving in separate directions from the Web.

Bernard Golden, a technology blogger, thinks Anderson and Wolff have missed the bigger picture. The Internet is evolving in ways that may take away from traditional Web browsers and perhaps render them obsolete, Golden argues. But that doesn’t mean the Internet will soon be controlled by a small group of companies. “A more interesting observation would be how the nature of the Internet renders these monopolies so brittle,” Golden writes. “I actually think Wired . . . misses the much larger story, which is the penetration of the Internet into every element of everyday life and the changing nature of how we work based on the shift to digital interaction.”

The continuing question about the Internet, especially given its rapid growth and penetration, is how companies will make money from content distribution. Or whether, as Anderson wrote in one of his books, information will continue to be free. "Long, long term, one of the interesting questions is the idea that the Wild West period of the Internet may be ending," Thompson says. "It has astounded me how much information is available for absolutely free."

Facebook’s 26-year-old founder, Mark Zuckerberg, believes society is moving to a place where a person’s identity — whether online or off, regarding our work and perhaps render them obsolete, Golden argues. But that doesn’t mean the Internet will soon be controlled by a small group of companies. “A more interesting observation would be how the nature of the Internet renders these monopolies so brittle,” Golden writes. “I actually think Wired . . . misses the much larger story, which is the penetration of the Internet into every element of everyday life and the changing nature of how we work based on the shift to digital interaction.”

Too Much Information

People today often hold up a hand and say “TMI” — “too much information” — when another person is sharing more highly personal information than the other person wants to hear. Both that pop-parlance meaning and the phrase’s literal meaning — information overload — have triggered recent debates about Internet use.

Facebook's 26-year-old founder, Mark Zuckerberg, believes society is moving to a place where a person's identity — whether online or off, regarding our work and perhaps render them obsolete, Golden argues. But that doesn’t mean the Internet will soon be controlled by a small group of companies. “A more interesting observation would be how the nature of the Internet renders these monopolies so brittle,” Golden writes. “I actually think Wired . . . misses the much larger story, which is the penetration of the Internet into every element of everyday life and the changing nature of how we work based on the shift to digital interaction.”

The continuing question about the Internet, especially given its rapid growth and penetration, is how companies will make money from content distribution. Or whether, as Anderson wrote in one of his books, information will continue to be free. "Long, long term, one of the interesting questions is the idea that the Wild West period of the Internet may be ending," Thompson says. "It has astounded me how much information is available for absolutely free.

Facebook’s 26-year-old founder, Mark Zuckerberg, believes society is moving to a place where a person’s identity — whether online or off, regarding our work and perhaps render them obsolete, Golden argues. But that doesn’t mean the Internet will soon be controlled by a small group of companies. “A more interesting observation would be how the nature of the Internet renders these monopolies so brittle,” Golden writes. “I actually think Wired . . . misses the much larger story, which is the penetration of the Internet into every element of everyday life and the changing nature of how we work based on the shift to digital interaction.”

The continuing question about the Internet, especially given its rapid growth and penetration, is how companies will make money from content distribution. Or whether, as Anderson wrote in one of his books, information will continue to be free. "Long, long term, one of the interesting questions is the idea that the Wild West period of the Internet may be ending," Thompson says. "It has astounded me how much information is available for absolutely free."
ment in which it asked students to turn off social media for a week. “I feel obligated to check my Facebook. I feel obligated to check my Twitter. Now I don’t,” said Ashley Harris, 22. “I can just solely focus.” 55

Today, people sometimes declare “e-mail bankruptcy,” informing friends and acquaintances that they can’t handle the load in their in-box and that they’ll have to be reached through some other means. Some businesses have sought to create “no e-mail Fridays,” usually without much success.

The problem of abundance in the online environment is starting to trouble scholars, too. A well-stocked university library might have 1 million books, while Google has already digitized 10 million books.

Dan Cohen, who runs the Center for New Media and History at George Mason University, in Fairfax, Va., notes that Bill Clinton’s White House, fairly early in the Internet Age during the 1990s, generated 40 million e-mails. Compare that, he says, to 40,000 White House memos generated under Lyndon B. Johnson in the 1960s. “Now you have a problem of scale where you can’t read it all, as we’re taught to do in grad school,” Cohen says.

Scientists, whose work has always tended to be more collaborative, have adapted more rapidly to this changed environment than scholars in the arts and humanities. But with its fall issue, Shakespeare Quarterly became the first humanities journal to “crowd source” its peer review process by opening it up to the World Wide Web.

The journal posted onto Media-Commons, a digital scholarly network, four essays that had not yet been accepted for publication, along with comments from a group of experts. Other people were allowed to add further comments, if they had registered with their own names. Ultimately, 41 people made more than 350 comments, which triggered comments in turn from the authors of the articles. 54

“Human beings are social creatures — not occasionally or by accident, but always . . . new technology enables new kinds of group-forming,” writes Shirky in his 2008 book about digital networking, Here Comes Everybody. 55

“We now have communications tools — and, increasingly, social patterns that make use of these tools — that are a better fit for our native desires and talent for group effort.” 56

But Cohen, the George Mason professor, says scholars in the humanities remain skittish about what the Internet and its propensity for collaboration mean for scholarship. “The ways people can collaborate online are very intriguing, and there are problems that can best be tackled by large-scale crowds,” he says. “But the idea of the single genius in the carrel working on a breakthrough book has defined the humanities since the Renaissance.”

Over the next five to 10 years, technology experts seem to believe two seemingly contradictory things will occur — that devices will connect more people to each other and to more applications online, and that people will learn how to adapt to information overload in part by going offline more.

“Our use of the Net will only grow, and its impact on us will only strengthen, as it becomes more present in our lives,” Carr writes in The Shallows. 57

The idea that users should take a break and think thoughts and conduct relationships offline is one that is shared both by people such as Carr, who worry that the Internet is fundamentally damaging our thought process, and Wired blogger Lehrer, who thinks Carr’s concerns are overblown.

No less a prophet of Internet use than Schmidt, the chairman and CEO of Google, told the graduating class of 2009 at the University of Pennsylvania’s commencement ceremonies that they should find the off switch on their computers.

“Turn off your computer,” Schmidt said. “You’re actually going to have to turn off your phone and discover all that is human around us.” 58

Lehrer says that taking a walk in the park — and leaving the smartphone at home — is a healthy way to allow for daydreaming, “what neuroscientists call the default mode of thoughts, which is a very important part of the creative process.”

“Our use of the Net will only grow, and its impact on us will only strengthen, as it becomes more present in our lives.”

— Nicolas Carr, The Shallows

OUTLOOK

Only Disconnect

Predicting the future is particularly tricky in an area where innovation and change have been both rapid and constant. The spread of mobile devices and the amount of interactivity available online have exceeded predictions anyone could have made a decade ago.

P
Lehrer says it’s easy for him to leave his mobile device behind and that his editors and other people have grown used to the idea that they may not be able to reach him for a couple of hours at a stretch — just as people have gotten used to people perhaps not answering their phones every time you call.

One of the ways that we’ll be able to carve out more time for contemplation, Lehrer believes, is that we’ll “increasingly see a premium placed on technologies that help us control technology.” Saffo, the Stanford instructor and Silicon Valley forecaster, agrees. People need to learn to turn off their computers, Saffo says, but they will also come to value “intelligent agents” that help manage their information flow online.

On Aug. 31, Google unveiled a system to help prioritize the flow of e-mail, based on an individual’s previous actions in replying to or deleting previous messages. According to the company, the new system helped testers save a week’s worth of time over the course of a year.

It’s not clear that everyone will embrace such tools, says Rainie, of the Pew Internet & American Life Project, or whether people will resent algorithms that attempt to decide what’s more important for them to hear about most immediately. Nonetheless, he expects that both technology and social mores will change to allow people the option of regulating their own information streams. “Over the next couple of years,” Rainie says, “some pretty interesting tools and social norms will allow people to capture back some element of their personal integrity, and still not annoy all the people” trying to reach them.

Rosen, the Cal State psychologist, predicts that online tools and devices are going to become “completely and utterly individualized,” helping to guide each person through the ever-expanding morass of online information and communication according to his or her desires — and tolerance levels.

Eventually, predicts, UCLA psychiatrist Small, people will communicate directly with their thoughts. Next month, some of his university’s computer science students will demonstrate technology that allows sensors in people’s heads to communicate simple thoughts, with a light showing whether a person is concentrating or relaxing.

In time, he says, this will lead to a world of pure thought communication using implants in our brains. Such a vision of the future is not welcomed by everyone. And the hope that technology can solve problems that technology has helped create is not universally shared.

“I’m very pessimistic,” says Stanford psychiatrist Aboujaoude. “We’re not pausing as a society to ask ourselves what the Internet and its effects on our brains all means. We’re much better at creating faster and more addictive gadgets than asking ourselves these bigger questions.”

Levy, at the University of Washington’s Information School, says that “the way things are 10 years from now is going to depend crucially on how responsive we are as a society to some of the things we’re recognizing” about Internet use.

“One possibility is that we are going to slow down in some ways and better modulate all this,” Levy says. “Another is that we will adapt to these changes. Maybe we’re not at all at the limit. Maybe we actually will be going faster.”

**Notes**


9 Carr, op. cit., p. 2.

10 Ibid., p. 181.


13 Carr, op. cit., p. 121.


15 Carr, op. cit., p. 127.
FOR MORE INFORMATION

Berkman Center for Internet and Society, Harvard University, 23 Everett St., 2nd Floor, Cambridge, MA 02138; (617) 495-7547; cyberlaw.harvard.edu. Conducts research about a wide variety of Internet issues, including governance, privacy, intellectual property and electronic commerce.

Center for Internet Addiction Recovery, P.O. Box 72, Bradford, PA 16701; (814) 451-2405; www.netaddiction.com. Psychological treatment center where practitioners research the problem of compulsive use of online devices and sites.

Center for the Neurobiology of Learning and Memory, University of California, 320 Quereshy Research Laboratory, Irvine, CA 92697; (949) 824-5193; www.cnlm.uc Irvine. Research center for brain processes that underlie human ability to learn and remember.

New Media Literacies, School for Communication & Journalism, University of Southern California, 5202 Watt Way, ASC 103, Los Angeles, CA 90089; (207) 799-4889; www.newmedialiteracies.org. Academic project devoted to researching the impacts of technology on education and promoting successful strategies.

Pew Internet & American Life Project, 1615 L St., N.W., Suite 700, Washington, DC 20036; (202) 419-4500; www.pewinternet.org. Foundation-sponsored project that conducts research and publishes surveys and reports exploring the impact of the Internet on families, work, education, health care and civic and political life.

Rough Type, www.roughtype.com. Blog by Nicholas Carr, author of *The Shallows*, in which he presents thoughts, research and links about how the Internet is affecting the way we think.

UCCLA Memory & Aging Center, Semel Institute for Neuroscience and Human Behavior, 760 Westwood Plaza, Suite 88-201, Los Angeles, CA 90095; (310) 825-0545; www.semel.ucla.edu/memory. Treatment and research center developing brain-scanning methods that detect the first signs of age-related memory loss and conducting research on the effects of the Internet on brain function.

Wired, 520 Third St., Suite 305, San Francisco, CA 94107; (415) 276-5000; www.wired.com. Monthly magazine and website devoted to coverage of technology, including its impact on thinking.
Books


The writer builds on his celebrated 2008 *Atlantic* article — “Is Google Making Us Stupid?” — in exploring the ways that the Internet is affecting thought.


The *Granta* editor traces the history of communication technologies, arguing that the move from snail mail to e-mail has contributed to an overwhelming deluge of information.


The *Boston Globe* columnist concludes that constant electronic interruptions are eroding cultural literacy and creativity.


The former *Washington Post* media reporter worries that too much time spent looking on screens is hindering our ability to think and to connect with other people.


The New York University professor argues that digital tools have unleashed a tremendous desire to share information that can be harnessed to foster innovation and solve societal problems.

Articles


The Web may be giving way to a series of “closed gardens” — applications and social networking sites — that may ultimately prove more profitable for content delivery companies.


Scientists have spread a good deal of concern over “attention meltdown,” arguing that connectivity and multitasking are essential to the way we live and work.


In a review of *The Shallows*, the *Wired* blogger notes that people have historically lodged complaints that media is harming thought, which turns out not to be the case.


Excessive use of the Internet and smartphones may be reshaping personality, causing people to become more impatient, forgetful and impulsive.


People need to take a break from information in order to process and absorb it — something Internet use discourages.


Neuroscientists and anecdotal evidence suggest that technology is making people more impatient and forgetful.

Studies and Reports


In response to Nicholas Carr’s controversial *Atlantic* article, the researchers surveyed hundreds of technology experts who, for the most part, disagreed with Carr’s notion.


American children are spending increasing amounts of time with electronic media, with those spending the most earning lower grades.


A study of computer use among 500,000 elementary and junior high students in North Carolina finds that increased high-speed Internet access at home is associated with significant declines in math and reading levels.
Addiction


A warning sign for Internet addiction is when an individual becomes so preoccupied with online activities that it affects relationships.


Internet addiction is a compulsive behavior that interferes with daily living and causes stress on the people around you.


A Chinese study suggests that otherwise healthy teenagers are more vulnerable to depression if they spend an excessive amount of time on the Internet.


Nothing has aggravated Internet addiction as much as the advent of online social media networks.

Intelligence


Our ability to think, focus and learn will not be adversely affected by spending too much time on the Internet.


Cell phones can be used to take advantage of new learning technologies and boost student achievement.


A survey of 895 experts by the Pew Research Center concludes that Google and other Internet destinations aren’t making users stupid.

Multitasking


New research concludes that high-level multitaskers are really not that much better at anything than anybody else.


Apple’s iPhone and iPad devices will soon be able to run more than one program at once.


Multitasking is a poor long-term strategy for learning because it adversely affects how the brain processes things.

Social Networking


Facebook has lured users away from their routine activities into an addiction that is hard to break, especially for teenagers.


Social networks won’t offer much unless users are able to connect with real-world friends or meet new ones.


Social networks provide teenagers countless conveniences that parents could never have imagined when they were kids.


A county government in Indiana reports 270,000 hits on Facebook among its employees within one week.

CITING CQ RESEARCHER

Sample formats for citing these reports in a bibliography include the ones listed below. Preferred styles and formats vary, so please check with your instructor or professor.

MLA STYLE

APA STYLE

CHICAGO STYLE
For more than 80 years, students have turned to *CQ Researcher* for in-depth reporting on issues in the news. Reports on a full range of political and social issues are now available. Following is a selection of recent reports:

**Civil Liberties**
- Cybersecurity, 2/10
- Press Freedom, 2/10
- Government and Religion, 1/10
- Closing Guantánamo, 2/09
- Affirmative Action, 10/08

**Crime/Law**
- Drone Warfare, 8/10
- Prosecuting Terrorists, 3/10
- Prisoner Reentry, 12/09
- Interrogating the CIA, 9/09
- Legalizing Marijuana, 6/09

**Education**
- Housing the Homeless, 12/09
- Bilingual Education, 12/09
- Value of a College Education, 11/09

**Environment/Society**
- Social Networking, 9/10
- Abortion Debates, 9/10
- Reality TV, 8/10
- Water Shortages, 6/10
- Teen Pregnancy, 3/10
- Youth Violence, 3/10
- Sex Scandals, 1/10

**Health/Safety**
- Health-Care Reform, 6/10
- Caring for Veterans, 4/10
- Earthquake Threat, 4/10
- Breast Cancer, 4/10
- Modernizing the Grid, 2/10

**Politics/Economy**
- Financial Industry Overhaul, 7/10
- Jobs Outlook, 6/10
- Campaign Finance Debates, 5/10
- Gridlock in Washington, 4/10
- Tea Party Movement, 3/10

**Upcoming Reports**

<table>
<thead>
<tr>
<th>In-depth Reports on Issues in the News</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preventing Obesity, 10/1/10</td>
</tr>
<tr>
<td>Journalism Standards, 10/8/10</td>
</tr>
<tr>
<td>States and Federalism, 10/15/10</td>
</tr>
</tbody>
</table>

**ACCESS**

*CQ Researcher* is available in print and online. For access, visit your library or www cqresearcher.com.

**STAY CURRENT**

For notice of upcoming *CQ Researcher* reports or to learn more about *CQ Researcher* products, subscribe to the free e-mail newsletters, *CQ Researcher Alert!* and *CQ Researcher News*: http://cqpress.com/newsletters.

**PURCHASE**

To purchase a *CQ Researcher* report in print or electronic format (PDF), visit www cqpress.com or call 866-427-7737. Single reports start at $15. Bulk purchase discounts and electronic-rights licensing are also available.

**SUBSCRIBE**

Annual full-service *CQ Researcher* subscriptions—including 44 reports a year, monthly index updates, and a bound volume—start at $803. Add $25 for domestic postage.

*CQ Researcher Online* offers a backfile from 1991 and a number of tools to simplify research. For pricing information, call 800-834-9020, or e-mail librarymarketing@ cqpress.com.

---

**CQ RESEARCHER PLUS ARCHIVE**

Get Online Access to Vital Issues from 1923 to the Present

*CQ Researcher Plus Archive* delivers fast, online access to every *CQ Researcher* report from 1991 to the present. PLUS lets you explore the complete archive of *Editorial Research Reports* from 1923-1990. Search and browse more than 3,600 in-depth reports.

Loaded with handy online features, *CQ Researcher Plus Archive* provides the trustworthy reporting and the advanced online functionality today’s researchers demand. The new "Issue Tracker" feature provides quick links to past and present reports on the specific topics you need.

For a free trial, visit http://library cqpress.com/trials.

For pricing information, call 1-800-834-9020, ext. 1906 or e-mail librarymarketing@ cqpress.com.

*Editorial Research Reports, the predecessor to *CQ Researcher*, provides the same expert, nonpartisan reporting on the vital issues that have shaped our society.

CQ Press • 2300 N Street, NW, Suite 800 • Washington, DC 20037