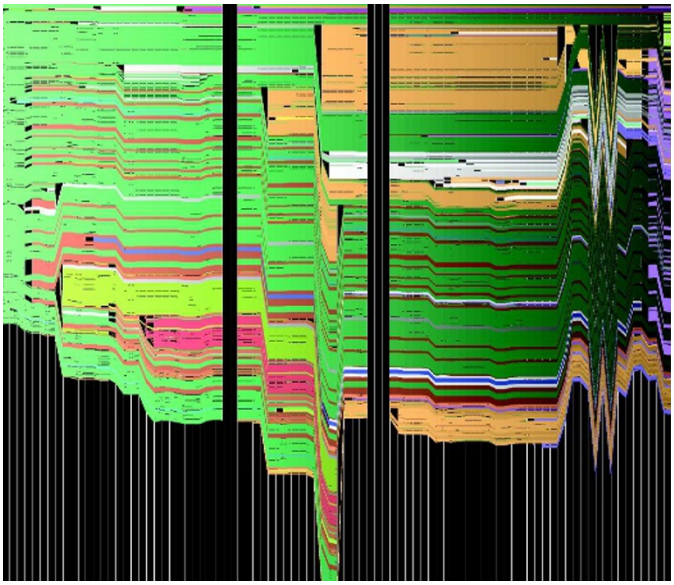
A shared digital future?

Will the possibilities for mass creativity on the Internet be realized or squandered, asks **Tony Hey**.

The potential of the Internet and the web for creating a better, more innovative and collaborative future is discussed in three books. Together, they make a convincing case that we are in the midst of a revolution as significant as that brought about by Johannes Gutenberg's invention of movable type. Sharing many examples, notably Wikipedia and Linux, the books highlight different concerns and opportunities.

The Future of the Internet addresses the legal issues and dangers involved in regulating the Internet and the web. Jonathan Zittrain, professor of Internet governance and regulation at the University of Oxford, UK, defends the ability of the Internet and the personal computer to produce "unanticipated change through unfiltered contributions from broad and varied audiences", a concept he defines as 'generativity'. He describes how networks that offer centralized, subscription-based services — such as CompuServe, AOL and Prodigy — have lost out to the Internet, which is open to modification by the user. Surprisingly, the brain behind the Internet, J. C. R. Licklider, is not mentioned in any of these books.

Zittrain identifies two core values of the Internet that originated in the computer science research community. The 'procrastination principle' occurs because the network was designed to carry data between two end points, at which all other features could be implemented. The 'trust your neighbour' approach worked well before the 1980s when few expert users were connected, making abuses of the network rare. In 1994, Peter Tattam of the University of Tasmania wrote the Trumpet Winsock program that enabled home computers to connect to the Internet. He gave his software away, asking only for a voluntary donation of US$25. When Microsoft bundled the software into its Windows 95 operating system, the Internet began its astonishing expansion.



F. BERTINI VIÉGAS/M. WATTENBERG

An editing history of the Wikipedia entry on abortion shows the numerous contributors (in different colours) and changes in text length (depth).

Zittrain believes that the generativity of the Internet and the computer is under threat from viruses and other malicious software, or malware. The first Internet virus was created in 1988 by Robert Morris, then a graduate student at Cornell University in Ithaca, New York. In those days, hacking was regarded as an intellectual challenge rather than a serious threat. Today's network is a specialist system that has been scaled up for use by hundreds of millions of non-experts, and is still open to exploitation. Zittrain explains that there is now a viable business model for malware. Bespoke viruses can be developed that compromise and command a computer, perhaps to act as a source for the distribution of spam e-mails, unbeknownst to the owner. The book states that in 2006, zombie computers generated more than 80% of the world's spam, and spam accounted for more than 80% of global e-mail. In 2007, as many as 150 million computers were involved in these 'botnets'. Zittrain sees this 'death by a thousand cuts' scenario by many individual hackers as a more serious threat than a coordinated grand-scale attack, such as that dramatized in the 2007 movie *Live Free or Die Hard* (also titled *Die Hard 4.0*).

Zittrain argues that security problems could lead to the 'appliancization' of the Internet, a return to managed interfaces and a trend towards tethered devices, such as the iPhone and Blackberry, which are subject to centralized control and are much less open to user innovation. He also argues that the shared technologies that make up Web 2.0, which are reliant on remote services offered by commercial organizations, may reduce the user's freedom for innovation. I am unconvinced that these technologies will kill generativity: smart phones are just computers, and specialized services, such as the image-hosting application SmugMug, can be built from generic 'cloud' components available through the Internet.

Like Zittrain's book, Clay Shirky's *Here Comes Everybody* and Charles Leadbeater's *We-think* highlight Wikipedia as an example of the power of mass collaboration. Zittrain goes into most detail. All three books credit Ward Cunningham as the creator of the Wiki in 1995, but Jimbo Wales and Larry Sanger are given varying amounts of credit for the creation of Wikipedia. None of the authors thinks Wikipedia is perfect: two cite the examples of John Siegenthaler, who was wrongly cited in a Wikipedia entry as being involved in the Kennedy assassinations, and that of the Wikipedia administrator Essjay, who resigned after it was discovered he had falsely claimed to be a professor with a graduate degree. Zittrain sees Wikipedia as a new model for interpersonal relations that goes beyond a traditional business–customer relationship, and as the epitome of 'netizenship'; Shirky compares Wikipedia to a Shinto shrine and concludes that it exists because enough people love it and are willing to defend it. Leadbeater uses Wikipedia as the prime example of the concept that gives his book its title: "We-Think", he says, describes "how we think, play, work and create, together, en masse, thanks to the web".

Like others, I admire Wikipedia and find it a useful starting point for finding information, but I am concerned about its reliability. A respected mathematician friend recently asked a Wikipedia administrator to delete the spurious names of some equations. To his surprise,

The Future of the Internet: And How to Stop It
by Jonathan Zittrain
Allen Lane/Yale University Press: 2008. 352 pp. £20/$30

Here Comes Everybody: The Power of Organizing Without Organizations
by Clay Shirky
Allen Lane/Penguin: 2008. 336 pp. £20/$25.95

We-think: The Power of Mass Creativity
by Charles Leadbeater
Profile Books: 2008. 256 pp. £12.99

the administrator retorted "We don't care if the theories we write about are right, wrong, seriously flawed, downright ignorant or otherwise really, really bad. We only care that the subject is notable." As someone who believes passionately in the value of scholarship, I find this disdain for expert opinion alarming. One hopes that this is an isolated incident, but it does make one wonder whether Google's Knol project or Sanger's Citizendium, which are collecting encyclopaedic articles contributed by named experts, may eventually generate sufficient critical mass to compete with Wikipedia.

Zittrain's book contains more of interest, notably his discussion of 'Privacy 2.0', which includes Scott McNealy's famous quote: "You have zero privacy anyway. Get over it." However, I fear that his concluding example of the One Laptop Per Child project as embodying "both the promise and challenge of generativity" could prove unfortunate if it fails to live up to expectations. He quotes Nicholas Negroponte, the project's founder, as saying "The hundred-dollar laptop is an education project. It's not a laptop project." Negroponte is quoted as saying exactly the opposite in the recent 'resignation' blog of Ivan Krstic, one of the project's early supporters.

Shirky's enjoyable book *Here Comes Everybody* has insights beyond examples of the power of the web and social networking tools. The collapse of transaction costs for people to join or create groups, he claims, is the driving force behind the Internet revolution. The book describes how mass amateurization has displaced media professionalism, and emphasizes that the web is not merely a new competitor but a whole new ecosystem. Publishers still control the production of print articles and books, but this is increasingly irrelevant now that the costs of print reproduction and distribution have disappeared as a result of the web. On websites such as iStockphoto, photographs by amateurs can be found and purchased as easily as those of professionals, removing any distinction.

Shirky explains how "the difference between communication tools and broadcasting tools was arbitrary, but the difference between conversing and broadcasting is real." Many web postings are tedious because they are meant for a few friends, but the web allows thousands of others to listen in. Shirky discusses how the web is creating new models of organization, yet the arguments are not new — I was reminded of Ricardo Semler's paper on 'Managing Without Managers', published in the *Harvard Business Review* back in 1989.

Shirky provides the most detailed discussion of the open-source software movement of the three books, although none undertakes a thorough analysis. Shirky states that "Open-source software has been one of the successes of the digital age" and characterizes one of its key features as allowing "failure for free". Software companies need to be conservative and to minimize risk; by contrast, the open-source community can explore a vast landscape of different ideas. Leadbeater believes the community behind development of the Linux operating system is "the most impressive example of sustained We-Think", although he acknowledges the paradox of companies such as Google, IBM and HP making money using open-source software. All three authors subscribe to the idea that open-source software is produced by an unpaid army of volunteers from around the world. The situation is not so simple.

> **"I would like to think that the web will change the world, but it seems naive to think that it will change human nature."**

Open-source projects can be divided into two clusters, 'money-driven' and 'community-driven', according to a 2006 paper by Marco Iansiti and Gregory L. Richards of Harvard Business School. The first type has received billions of dollars in investment from vendors over the past decade; for example, more than 70% of the Linux kernel development is carried out by professional software developers. Community-driven open-source projects constitute well over 95% of the 150,000 or so projects in the SourceForge open-source software repository, but the vast majority of these have a handful of users and developers. Nonetheless, Shirky points out, the tendency of open-source projects to fail is also the movement's strength: "Open source is a profound threat, not because the open-source ecosystem is outsucceeding commercial software but because it is outfailing them."

Leadbeater's *We-Think* is the least convincing book. He gives interesting examples of social networks and a fascinating survey of the origins of 'We-Think', attributing the idea to pioneers such as Doug Engelbart, inventor of the computer mouse, the electronics enthusiasts of Silicon Valley's Homebrew Computer Club and radical philosophers such as Ivan Illich. Leadbeater claims that the web has the potential to "spread democracy, promote freedom, alleviate inequality and allow us to be creative together" and claims that "community and conversation are the roots of creativity". Yet I find it difficult to take seriously his basic premise that mass participation will generate collaborative creativity. I concede that collaboration between specialists will become more important as we attack challenging global problems. In my experience, creativity and inspiration are the rare gifts of individuals, following much scholarship and hard work. Although I would like to think that the web will change the world for the good — and I am sure that it will in some ways — it seems naive to think that it will cause a fundamental change in human nature.

These three books contain much that is perceptive, informative and downright silly, much like the Internet itself. It is this 'generativity' that they celebrate. ■

Tony Hey is Corporate Vice President for External Research, Microsoft Research, One Microsoft Way, Redmond, Washington 98052, USA.
e-mail: tony.hey@microsoft.com
All opinions in this review are personal and do not represent the views of the Microsoft Corporation.

Virtual similarities

Coming of Age in Second Life: An Anthropologist Explores the Virtually Human
by Tom Boellstorff
Princeton University Press: 2008. 328 pp. $29.95, £17.95

In his book *Secondary Worlds*, W. H. Auden wrote that "present in every human being are two desires, a desire to know the truth about the primary world … and the desire to make new secondary worlds of our own or, if we cannot make them ourselves, to share in the secondary worlds of those who can". Auden, in 1968, was writing about literature, not cyberspace, but his thoughts help explain why virtual worlds are popular today.

The conflicts that arise from this desire to live in both a primary world and a secondary world removed from physical reality are examined in *Coming of Age in Second Life*. Anthropologist Tom Boellstorff paints an ethnographic portrait of the online virtual world, Second Life, that is fully immersed in its subject. To prove that virtual worlds are cultures in their own right, Boellstorff conducted all his research from within Second Life, using the ethnographer's toolkit of interviews, focus groups and participant observation. Unlike other studies that take an outside perspective, he made no attempt to make real-life contact with his fellow residents.

Some may argue that it is not possible to