



Computer games can have a serious purpose — *Evoke* promises a 'crash course in changing the world'.

TECHNOLOGY

Game for change

Sara de Freitas applauds a bold argument that online gaming can save the planet.

After giving a presentation on the use of serious computer games for learning at the second World Innovation Summit in Education in Doha, Qatar, last December, I was asked a challenging question: what will happen to the real world if everyone spends much of their time in virtual worlds? As I gave my balanced response, it struck me that someone should write a book on the issue. Jane McGonigal, games developer and futurist, has penned that book.

Reality is Broken is brave and comprehensive. McGonigal declares controversially that the current state of our planet and society — damaged through widespread environmental destruction, social disintegration and conflict — can be repaired through games.

Challenges such as motivating individual action on climate change or improving poor health can be addressed through learning that is centred on play. McGonigal lists 14 fixes, including using games to raise work satisfaction, increase success and contribute to a sustainable economy. She explains how we can live less selfish and more rewarding lives through greater collaboration and better-designed games.

The author embraces the findings of positive psychology, a field that looks at human behaviour in terms of happiness and well-being. Pointing to the ideas of researchers such as Hungarian

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psychologist Mihaly Csikszentmihalyi — who has shown that happiness results from 'flow', a state of full, focused engagement with our activities — McGonigal argues that positive behaviours are mirrored in good game play. Positive emotions and social connectivity can be enhanced through good game design.

Her compelling argument combats the widespread prejudice she has observed

against gaming. This bias has been stoked, she notes, by the many traditional psychologists who have found controversial links between violence and game play, just as other studies have associated violent behaviour with some types of film and television programme. Widely aired negative stories have amplified a one-sided understanding of game play as damaging. Similarly, derision of virtual worlds is rife in the media: inhabitants of *Second Life* are often generalized as geeky freaks and sad loners.

McGonigal argues that, in fact, many gamers are social, collaborative and involved in political issues. Through our greater understanding of this game culture, she says, altruistic and positive benefits can be gained for wider society. Gamers could show researchers and policy-makers new ways of modelling real-world scenarios, which might change standard work practices to make them more engaging; for example, motivating employees by creating collaborative team goals.

I have noticed in my own research that the tone of game playing has changed over the past decade. The growth of casual games on mobile devices — as well as multiplayer online games such as *World of Warcraft*, with 12 million subscribers — has broadened the number of players internationally and made inroads into traditionally non-gaming communities, such as women, and adults over 40 years old. For example, a 2010 survey of 73,000 people by the Interactive Software Foundation of Europe found that 25% of adults had played an electronic game in the past six months, which equates to 95 million adult gamers across 18 European Union countries. Twenty per cent of females and 31% of males are gamers, and almost 30% of those aged 30–49 play computer games. Gaming is no longer the preserve of young males, and this trend is growing.

Play is important in the development and maturation of humans and animals. A 1998 study by US psychiatrist Stuart Brown showed that "normal play behaviour was virtually



Reality is Broken: Why Games Make Us Better and How They Can Change the World

JANE MCGONIGAL
Jonathan Cape/
Penguin: 2011.
320 pp./400 pp.
£12.99/\$26.95

absent throughout the lives of highly violent, anti-social men regardless of demography". Games and play are thus powerful tools for socialization. They have potential for therapy, too: in children with attention deficit hyperactivity disorder, and in military personnel with post-traumatic stress disorder.

McGonigal gives vivid case studies of how games can be used for serious purposes, as well as for entertainment. She describes *World Without Oil*, a game she helped develop to encourage players of all ages to envisage possible scenarios for the world when oil has run out. *Quest to Learn* is a US school programme that uses role play and challenges to teach science to children aged 12–17 years. *Superbetter* is a superhero-themed, multiplayer game that aims to accelerate your recovery time after injury. Others include *Foldit*, a game in which players compete to discover how proteins fold; *Free Rice*, an educational game that helps fight real-world hunger; and *Lost Joules*, which investigates ways to save energy.

McGonigal is best known as a developer of alternate-reality games, which bring together real-world concerns and game-world experiences. She outlines, for example, *Chore Wars*, which introduces a competitive element into household tasks. Through a system of points and rewards, it can get people so motivated that they end up sneaking home to vacuum.

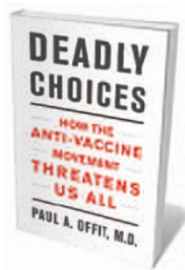
At the Serious Games Institute at Coventry University, UK, my colleagues and I are using games to foster learning about a diverse range of problems: for example, to train global emergency-response teams, to promote good hygiene in hospitals, to reduce misdiagnosis by physicians and to help children cross the road safely. Our research has shown that play can change behaviour among non-gamers and alter attitudes in those who play games regularly. But more investment and capacity-building are needed to reach out to wider sectors of the community.

As the cost of producing computer games drops, and as new devices become more mainstream — such as brain-computer interfaces and haptics that mimic the feel of objects in virtual environments — their appeal will continue to broaden and games will become more pervasive socially. In the future, the use of artificial intelligence will allow even more people to participate in immersive learning environments.

Games, McGonigal concludes, do more than engage, motivate and inspire. Increasingly part of our communities, online and offline, they support social interaction and are part of a collective intelligence. By playing together, she argues, we will be able to save the world and design a beautiful future. ■

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Books in brief



Deadly Choices: How the Anti-Vaccine Movement Threatens Us All
Paul A. Offit BASIC BOOKS 288 pp. £18.99 (2011)

Following on from his widely praised book *Autism's False Prophets* (Columbia Univ. Press, 2008), vaccine researcher Paul Offit vigorously tackles claims that childhood inoculations cause autism, diabetes and cancer. He dismantles the reasoning of the anti-vaccine lobby and warns of the risks of the re-emergence of deadly childhood diseases owing to declining vaccination rates. With a greater focus on the underlying science, his book complements Seth Mnookin's recent work *The Panic Virus* (Simon & Schuster, 2011; reviewed in *Nature* **469**, 468–469; 2011).



Antibiotic Resistance: Understanding and Responding to an Emerging Crisis

Karl S. Drlica & David S. Perlin FT PRESS 288 pp. \$49.99 (2011)
The evolving resistance of bacteria to available antibiotics is of growing concern for public health and medicine. In their thorough primer, microbiologists Karl Drlica and David Perlin explain how such resistance arises and the array of difficulties it causes in the treatment of infectious diseases. They describe how drug resistance can be exacerbated by human activities such as the misuse of antibiotics, and set out strategies for minimizing resistance and extending the clinical life of these drugs.



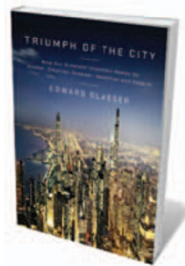
Quirk: Brain Science Makes Sense of Your Peculiar Personality

Hannah Holmes RANDOM HOUSE 288 pp. \$26 (2011)
Why are people so different? Science writer Hannah Holmes explains the brain science and human psychology behind our myriad personalities. She describes how we have evolved a range of character traits, such as extraversion, neuroticism or agreeableness, which allow us to navigate our social world. She details genetic clues behind mental disorders such as depression, schizophrenia and anxiety. And she explains how personality dictates other behaviours — from the political party you support to the type of car you drive.



The Quantum Story: A History in 40 Moments

Jim Baggott OXFORD UNIVERSITY PRESS 320 pp. \$29.95 (2011)
The story of twentieth-century physics is essentially a shift from our belief in certainty to our acceptance of uncertainty. The reason is the development of quantum theory, a set of counter-intuitive ideas about the atomic world that are hugely successful but still make physicists feel uncomfortable. Science writer Jim Baggott describes 40 major episodes in the growth of quantum ideas, from physicist Max Planck's musings on the energetics of black-body radiation to the latest aspects of particle physics being unearthed at CERN, Europe's high-energy physics lab near Geneva, Switzerland.



Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier

Edward Glaeser THE PENGUIN PRESS 352 pp. \$29.95 (2011)
Rather than being ridden with crime, filth and poverty, cities are healthy, green and rich, argues economist Edward Glaeser. Travelling to metropolitan areas around the globe, he reports that urbanites from New York to Kolkata have access to better health care and education and use less energy than those who live in the suburbs or in rural communities. We should feel more positively toward our cities, he feels, as they are great places to live and thrive.