

The Heat  
Of Hate & the  
Temperature  
Of Fear

02  
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REACTION TO  
THE DISASTER  
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spring #0

08  
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TECHNOLOGIES  
CHANGING  
OUR MINDS?

10  
THE NETWORK

# spokes

- spokes**, noun, plural of spoke
1. One of the rods or braces connecting the hub and rim of a wheel.
  2. *Nautical* One of the handles projecting from the rim of a ship's steering wheel.



# Are digital technologies changing our minds?



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We humans occupy more ecological niches than any other species on the planet. This is because our brains are superlatively evolved to adapt to our own particular environment: a process known as neuroplasticity. Thanks to their plasticity, the connections between our brain cells will be shaped, strengthened and constantly refined by our individual experiences. It is this personalisation of the physical brain, driven by unique interactions with the external world, that arguably constitutes the biological basis of each individual mind, so what will happen to that mind if the external world changes in unprecedented ways, for example with an all-pervasive digital technology?

A recent survey in the US showed that over half of teenagers aged 13 to 17 spend more than 30 hours a week, outside school, using computers and other web-connected devices. It follows that if the environment is being transformed for so much of the time into a fast paced and highly interactive two-dimensional space that is unprecedented, the brain will adapt accordingly, be it for good or ill, in unprecedented ways. Professor Michael Merzenich, from the University of California, San Francisco, gives a typical neuroscientific perspective. He states: "There is a massive and unprecedented difference in how their (the digital natives') brains are plastically engaged in life compared with those of average individuals from earlier generations, and there is little question that the operational characteristics of the average modern brain substantially differ".

The implications of such a sweeping change in mind set, -let us call it 'Mind Change' - must surely extend deep and wide into future education policy. Most obviously, time spent in front of a screen is time not spent doing other things. Indeed, several studies have already documented a link between the recreational use of computers and a decline in school performance. More basic still, though, is to understand in the first place why a screen environment using only sight and sound out-competes three-dimensional activities with all five senses stimulated. Perhaps most important of all, we need to understand the full impact of the current cyber culture on the emotional and cognitive profile of the 21st century mind. Inevitably, there is no single catch-all sound-bite but rather a variety of diverse issues. Let us look at just three.

WRITER  
Susan Greenfield

First, what is the impact of social networking sites on interpersonal skills and personal identity? Eye contact is a pivotal and sophisticated component of human interaction, as is subconscious monitoring of body language and, most powerful of all, physical contact, yet none of these experiences is available on social networking sites. It follows that if a young brain with the evolutionary mandate to adapt to the environment is establishing relationships through the more sanitised medium of a screen, the skills that are so essential for empathy may not be acquired as naturally, as well or as quickly as in the past. In line with this prediction, a recent study from Michigan University of 14,000 college students has reported a decline in empathy over the past 30 years, which was particularly marked over the past decade.

Such data in themselves do not, of course, prove a causal link, but just as with smoking and cancer some 50 years ago, epidemiologists could investigate any possible connection. Similarly, the factors should be explored that account for the appeal of the cyberworld for those with already recognised impairments in empathy, typifying autistic spectrum disorders. What about exploring other coincidental trends for a causal link, such as the obsession with the solipsistic read-out of unremarkable moment-by-moment daily routines, for example through Twitter? The psychologist Sherry Turkle, from MIT, has argued persuasively in her recent book *Alone Together* that the more continuously connected people are in cyberspace, paradoxically the more isolated they actually feel. More worrying still is the tendency to define oneself by the amount of attention garnered online, particularly when excessive bullying, spitefulness and plain cruelty are used to enhance such attention, as with the pernicious trend of "trolling". Might these phenomena, based as they are on the reassurance



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of incessant feedback, indicate a less robust sense of identity?

Secondly, on video games, neuropsychological studies suggest that frequent and continued playing might lead to enhanced recklessness. Perhaps this is not surprising as it is surely a dangerous lesson to learn that actions do not have consequences and that victims of a shooting can become “undead” the next time around. In addition, data indicate reduced attention spans and even possible addiction. In line with this, significant chemical and even structural changes are being reported in the brains of obsessive gamers that require at the very least wider discussion beyond the scientific community.

No single paper is ever likely to be accepted unanimously as conclusive, but a survey of 136 reports using 381 independent tests and conducted on more than 130,000 participants concluded that video games led to significant increases in desensitisation, physiological arousal, aggression and a decrease in prosocial behaviour. Needless to say this “meta-analysis” has itself been criticised, but then such is the iterative nature of evaluating research. It is outside the scope of this paper to give an exhaustive review of the literature, but there should be a means for all these burgeoning scientific findings to be translated on a rolling basis into simple, jargon-free summaries which the non-specialist can readily access, evaluate, and, most importantly, question.

Thirdly, on search engines, can the internet actually improve cognitive skills and learning, as has been argued? The problem here is that efficient information processing is not synonymous with knowledge or understanding—a point well-argued and supported by empirical evidence and summarised in, for example, Nicholas Carr’s book *The Shallows*. Even the chairman of Google, Eric Schmidt, has claimed: “I worry that the level of interrupt, the sort of overwhelming rapidity of information—and especially of stressful information—is in fact affecting cognition. It is in fact affecting deeper thinking. I still believe that sitting down and reading a book is the best way to really learn something. And I worry that we’re losing that”. We need to understand much more about the impact of search engines on comprehension skills. I suggest that the difference between processing and isolated fact, and understanding it, is the ability to place that fact into a wider conceptual framework that indeed gives it a meaning. Hence, the famous line from “Macbeth”—“Out, out, brief candle”—is power-

ful, not because of the literal image of a flickering flame but because the extinction of that flame can be linked to the extinction of life. Conceptual frameworks can also have a time dimension: hence the meaning of an object or a person can be derived from how that object or person has connected to events and relationships in the past. This is why perhaps the characters in novels are compellingly meaningful in a way that an icon in a computer game is not. When you play a game to rescue the princess, you probably do not care much about her as a person.

Given the plasticity of the human brain, it is not surprising that adaptation to a cyber-environment will also lead to various positives—for example, enhanced performance in a variety of skills that are continuously rehearsed, such as a mental agility similar to that needed in IQ tests or in visuo-motor co-ordination. However, we need urgently to gain a much fuller picture.

I would like to suggest a ‘Mind Change’ initiative, that would involve the commissioning of epidemiological studies exploring the significance of various societal and medical trends in relation to a screen-based lifestyle, as well as ring-fencing funds for basic brain research into, for example, the neural mechanisms of addiction and attention, the long-term effects of various screen-based activities on brain structure and function, and the neural processes perhaps underlying deep understanding and creative insight.

The design of truly innovative software that attempted to offset some of the perceived or agreed deficiencies arising from the current digital culture would also be enormously valuable. Most immediately we need more detailed profiles and breakdowns of computer use, along with surveys of the views and insights of various relevant sectors such as parents, teachers and employers, who until now have had no voice. Then finally, in the light of all this input, this hypothetical initiative would make recommendations for proactively planning the most effective environment. It might well include a root and branch, paradigm-shifting re-examination of education and subsequent training that best equips the citizen of the 21st century to be personally fulfilled and useful to society.

Science and technology is having an unprecedented impact on the length and quality of our lives. We have an extended life span and extended leisure time. Like climate change, this transformational scenario of Mind Change is complex, unprecedented and controversial. However, unlike climate change, the end point

is not one of just damage limitation but rather of ensuring that we deliver to the next generation an environment that can for the first time enable the realisation en masse of each individual’s full potential.—

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