From Blogs to Bombs

The Future of Digital Technologies in Education

Mark Pegrum

UWA PUBLISHING

First published in 2009 by
UWA Publishing
Crawley, Western Australia, 6009
www.uwap.uwa.edu.au

THE UNIVERSITY OF
WESTERN AUSTRALIA
Achieving International Excellence

A full CIP record for this book is available from the National Library of Australia
ISBN: 978-1-921401-34-3

Typeset in 10pt Bembo
Printed by Griffin Press

For Stephen

ACKNOWLEDGEMENTS

A book like this has, naturally, been shaped by conversations over many years with colleagues, students and friends (including many who fit into two or even all three of the above groups) in venues ranging from classrooms to conference halls and channels ranging from webmail and Facebook to Twitter and Skype. I'd like to particularly thank those who took time out of busy schedules to comment on earlier drafts of this work: Margaret Adamson, Lisa Cluett, Jim Coleman, Mirjam Hauck, Sandy Heldsinger, Amy Hightower, Sarah Hopkins, Charles Lancaster, Rosemary Lancaster, Gary Motteram and Vance Stevens. I've also benefited from discussions of this project with Stephen Bax and Gavin Dudeney. All provided useful feedback which helped enrich my ideas and clarify my arguments. Any shortcomings, however, remain entirely mine. I'd also like to thank my patient proofreaders: Stephen Morris, Brian Pegrum and Margaret Pegrum. Finally, I'm indebted to Olivier Breton, my efficient and accommodating editor at UWA Publishing.

Unlike digital technology, which continues to evolve at breakneck speed, books eventually have to take a fixed form. The cut-off point for this book was around mid-July, 2009. For updates after that point, please feel free to take a look at the *E-language* wiki or follow my Twitter feed, as detailed at the end of the book.

KEY ABBREVIATIONS

artificial intelligence	AI
Advanced Research Projects Agency Network	ARPANET
computer-assisted language learning	CALL
Creative Commons	CC
electronic learning	e-learning
electronic portfolio	e-portfolio
electronic waste	e-waste
information and communication technologies	ICTs
instant messaging	IM
internet service provider	ISP
information technology	IT
One Laptop Per Child	OLPC
peer-to-peer	p2p
personal computer	PC
personal learning environment	PLE
professional–amateur	pro-am
really simple syndication	RSS
short message service	SMS
textspeak	txtspk
user-generated content	UGC
virtual learning environment	VLE
virtual private network	VPN

1

Many lenses

An introduction

There was a time when students began essays about their holidays with phrases like 'During the holidays…' or 'Over the term break…' Many still begin that way. So imagine the surprise of a teacher in the west of Scotland who, wading through students' essays in 2003, came across this text:

> My smmr hols wr CWOT. B4, we usd 2 go 2 NY 2C my bro, his GF & thr 3 :-@ kds FTF. ILNY, its gr8. Bt my Ps wr so {:-/ BC o 9/11 tht they dcdd 2 stay in SCO & spnd 2wks up N. Up N, WUCIWUG – 0. I ws vvv brd in MON. 0 bt baas & ^^^^^. AAR8, my Ps wr :-) – they sd ICBW, & tht they wr ha-p 4 the pc&qt... IDTS!! I wntd 2 go hm ASAP, 2C my M8s again. 2day, I cam bk 2 skool. I feel v O:-) BC I hv dn all my hm wrk. Now its BAU ...[1]

It's on topic. It's a narrative of sorts. It's reasonably coherent. It conveys its message forcefully, if a little unsubtly. But can you read it? If you can't, you're far from alone. Many people who aren't 'digital natives'[2] – who don't belong to the 'net generation'[3] – struggle with it. The teacher, too, was stumped, comparing the text to hieroglyphics.

In more standard English, the opening might read: 'My summer holidays were a complete waste of time. Before, we used to go to New York to see my brother, his girlfriend and their three screaming kids face-to-face. I love New York; it's great'.[4] But clearly, whatever other conventions this text adheres to, it's not standard English. It's an example of what's commonly known as 'textspeak', or even 'txtspk'. Reported initially in Britain's *Sunday Herald*, the story caused a minor sensation in the UK press before spreading rapidly around the Anglophone world, being picked up by news outlets from CNN to *The Sydney Morning Herald*. In addition to making its way through traditional media channels on every continent, it also began to circulate virally on the web. Even today, a Google search for the first sentence of the essay produces hundreds of hits, with commentary available in German or Hebrew, Chinese or Vietnamese.

There's certainly a problem here – but what kind of problem is it? On one level, it's a technological issue. The keypads of mobile phones don't allow you to conveniently compose long sentences. Kids who text or SMS each other (to use two verbs now emerging from their infancy) are often in a hurry. What's more, the cost of sending a text may depend on its length. The use of shortened forms and pictographic representations – which do bear superficial similarities to Egyptian hieroglyphics, as the teacher observed – can save time and money. It's no wonder, then, that this kind of shorthand has developed to fit the medium, though it's also spread into emails and onto social networking sites where, since keypad and cost issues don't apply in the same way, it presumably fulfils a variety of other needs. Speed, as we'll see, is just one of these.

On a second level, the issue is pedagogical. The teacher was horrified, stating: 'I could not quite believe what I was seeing'. A representative of the Scottish Parent Teacher Council recommended to the *Sunday Herald* that: 'There must be rigorous efforts from all quarters of the education system to stamp out the use of texting as a form of written language so far as English study is concerned'.[5] A publisher cited by the BBC spoke about a 'degree of crisis' in the written English of university students.[6] Certainly there are linguistic and pedagogical concerns. However, the fundamental problem with this text is actually one of appropriacy for its *con*-text. In the midst of the ensuing 'uproar about falling literacy standards', Hamish Norbrook, writing in *The Guardian Weekly*, wondered whether texting might in fact present opportunities for English teachers to engage their students in writing tasks to help them recognise different linguistic registers.[7] Reminding us of Shakespeare's own 'famously inconsistent' spelling, the BBC reflected on whether

txtspk could 'mean the liberation of our use of language'.[8] Writing in *The Sunday Times* some time later, Jeremy Clarkson noted that there are many historical precedents for changing the way we transcribe our language.[9] The expression of such contradictory opinions within the debate over txtspk shows the need for educators to explore the underlying issues in more detail. At the same time it's emblematic of the polarisation of conservative and liberal opinion around new forms of literacy, a polarisation which, if bridges are not built, threatens to halt all conversation on the subject.

But in the outcry over falling standards, pedagogical discussions began to shift to a third level: for this is also a social issue, as clearly demonstrated by the amount of media attention it received. In the popular imagination, language standards have long been linked to social and moral standards, of which they are seen as both symbol and guarantor. Since at least the days of Jonathan Swift, grammar has been treated as a buffer against social change, one that needs to be (re-)erected in the wake of any period of liberalisation. Whatever the limitations of the complaints tradition, there are important social issues to be addressed here. It's hard to imagine that naivety regarding context was the sole reason the student handed in such a text. Language, of course, is intimately bound up with identity. Was this a genuinely exploratory performance on the part of a relative newcomer in a linguistically unstable world? Or was it a linguistic rebellion of the kind teenagers have long engaged in – in this case, a digital native student intentionally throwing down the gauntlet to a 'digital immigrant' teacher? Or both?

To give Swift and his descendants their due: there's no doubt that language does codify power relations and, whatever the underlying cause, submitting an essay in txtspk suggests a flattening of the traditional hierarchies which formerly required careful, respectful interaction with authority figures like teachers. Later media discussions of txtspk show that the Scottish essay was just the tip of a looming iceberg. In early 2008, for example, the TV talkshow *Insight* cited examples from the Australian context, including a message received by a recruiter from a job candidate which read: 'thanx 4 ur call re intaview, c u then', while a less grateful new employee wrote simply: 'job sux – not coming back'.[10]

And so the social level, which pertains to individual and group relations within a given society, leads onto a fourth, sociopolitical level, where we have to ask deeper questions about social structures which we've long taken for granted. Some observers argue that far from being flattened, these structures are as entrenched as ever. From this point of view, txtspk essays or messages to recruiters reveal, more than anything else, the socioeconomic

status of their writers, who may lack the educational or social sophistication to codeswitch appropriately. In other words, the so-called 'digital divide' is as much a literacy issue as an economic one. The new markers of class are not the presence or absence of technology, but facility and subtlety in its use.

And yet ubiquity of technology, too, is becoming a class marker. Ironically, an ability to switch off, to take technology-free holidays, is increasingly likely to signal high socioeconomic status and to be associated in the long term with healthier bodies and, especially, healthier minds. Stress-related illnesses are on the rise. Internet addiction clinics are starting to open around the world. As with any nutritional regime, an unbalanced digital diet will eventually have biological consequences. Such issues are part of a fifth, ecological level, which encompasses the health of the mind and the body as well as that of the biosphere to which we all belong. Maybe not every encounter with *baas & ^^^^^* (sheep and mountains) should be mediated by technology!

The worldwide attention sparked by a schoolgirl in the west of Scotland in 2003 is thus symbolic of our time and the confusion we face over the direction of technological development and its implications for education. It's clear that we can examine the issues through a variety of lenses, each of which brings certain aspects into sharp focus while blurring others. Through a *technological lens*, we note the importance of mobile phone technology and its accompanying freedoms and restrictions. Through a *pedagogical lens*, we observe disagreements over literacy and how it should be taught. Through a *social lens*, we recognise processes of identity building, which may include bucking against established standards. Through a *sociopolitical lens*, we discover fundamental questions about social stratification and whether it's being undermined or, paradoxically, reinforced. Through an *ecological lens*, we're confronted with the limitations of our biology.

To develop a more sophisticated understanding of the intersections of technology and education, it's essential that we take the time to look through all of these lenses.

Five lenses

The term 'digital technologies' encompasses a range of information and communication technologies (ICTs), with particular emphasis on the internet and the computers or mobile devices used to access it. These technologies are among the most widely discussed subjects of our times: talked about in living rooms, conference rooms and boardrooms; in magazine features, talkback radio programs and TV chatshows; and,

self-referentially, on homepages, blogs and wikis. They have a particular salience for education, in which, year on year, they're coming to play an ever larger role. It's hard to avoid the conclusion that technology and education have a tightly intertwined future. Unsurprisingly, this is a subject of interest to teachers and academics in all parts of the education system, but it's also of immediate relevance to students, of some concern to parents, and of considerable significance to politicians, journalists, social commentators and the general public who, understandably, feel they have a major stake in the future of education.

Predictably, lots of discussions of educational technology are focused through a *technological lens*, which emphasises the technology's capabilities, limitations and ongoing evolution – as web 1.0 is trumped by web 2.0, homepages migrate to blogs, email cedes to instant messaging, and terms like 'downloads' and 'mashups' become part of everyday language. Love it or hate it, technological development is proceeding apace. Treading water is not an option. The technological wave will carry us with it. But neither fear of the wave, nor awe at its size and power, will get us very far. Instead, we need to find ways to harness its energy so that, as we ride it, we can attempt to give our journey at least some direction of our own choosing.

First, though, we have to understand that 'technology' is about a lot more than technology. This realisation, to which many educators have come in recent years, was succinctly captured in a statement made at a 2007 technology conference in Chennai, just down the road from Bangalore, the burgeoning IT centre of India. It's essential, argued Gary Motteram and Sophie Ioannou-Georgiou in their plenary, that we remember the three Ps of e-learning: pedagogy, pedagogy and pedagogy![11] That the point needed to be made so forcefully shows it hasn't always been as obvious as it now seems; and what's more, that it may still not be obvious to everyone.

Looking at digital technologies through a *pedagogical lens*, rather than just a technological lens, allows the conversation to expand beyond the capabilities of the hardware and software. In discussions of the pedagogical approaches best suited to e-learning, it's often argued that the newer web 2.0 technology is an ideal vehicle for the social constructivist approaches that have shaped Western educational thought over the last few decades. Yet this sits uncomfortably with politically driven back-to-basics movements which, promising to leave no child behind, have recently swept much of the English-speaking world. Lines of conflict have opened up between education departments and governments, between teachers and parents, between universities and

the media. Nor do educators speak with one voice: differing opinions reflect differences in fields of expertise, disciplinary allegiance and political persuasion.

In this context, we need to ask what changing pedagogy and tools will mean for recognised authority and established truth, as information and knowledge lose their traditional gatekeepers, literacy multiplies into multiliteracies, and languages spawn new registers. What are the consequences of collaborative, interactive educational approaches superseding individualist, transmission-oriented approaches? How should educators accommodate the emerging model of collective intelligence, of which we hear whisperings across the web? Is there any way to reconcile the views of the academics who eagerly, if sometimes uncritically, anticipate the benefits of 'the greatest unplanned collaboration in human history'[12] with the concerns of those who insist that 'Internet learning has, so far, been a tragedy for education'?[13]

But technological and pedagogical lenses, even used in complementary fashion, won't satisfy the inquiring gaze of the media. It's all very well for technologists to talk about advances in speed and flexibility. It's all very well for teachers, disagreements notwithstanding, to extol the constructivist virtues of online tools. The media, however, channel the social anxieties of the wider community. It's true that some media conduits like *Wired* frequently carry celebratory reports of the new technologies. Others, such as *The Guardian* or *The Economist*, take a more neutral or nuanced approach. But it's hard not to notice that our newsstands, airwaves and, ironically, more than a few websites are brimming over with an angst that sometimes verges on panic, mostly centred on a perceived need to protect the younger generation.

Of course, it's crucial that the media apply a *social lens* to the phenomenon of digital technologies, introducing into national and international conversation the most pressing issues, negative as well as positive. This has to include some consideration of the dangers for young people of lives increasingly lived online: predation, cyberbullying and compromised privacy, to name a few. All are important matters. All, unfortunately, are also red rags to the injured bull of public hysteria. It's worth remembering, for example, that there have been more articles published about MySpace predators than there have been predators reported.[14] The greatest danger, however, is not that hysteria is uninformed or even unproductive, but that it smothers more thoughtful approaches, making balanced discussion extremely difficult.

Yet thoughtful, balanced discussion is very much needed, not only on the negatives for young people, but on other possible negatives

– and the possible positives – and the unknowns. Fortunately, thanks to more reflective commentators, other important social questions are being articulated. What are our online options for maintaining old social ties, making new ones, or avoiding either or both? How should we behave when, amid tricky context collisions,[15] we find ourselves simultaneously networked with our current partner, our ex-partners, our family, our friends, our colleagues…and perhaps a future employer to boot? What does it mean to be submerged in a 24/7 data stream and to multitask endlessly, operating in a state of continuous partial attention?[16]

And what exactly *is* this net generation emerging before our eyes? It will be, in some ways at least, quite unlike preceding generations. It will have new ways of establishing and affirming identity, which may strike older generations as anything from self-assured to self-indulgent. It will have new ways of expressing its views as it peppers the digital landscape with user-generated content and remixes. It will have new ways of socialising and bonding, perhaps uniting a transient teenage passion for kicking against authority with a long-term preference for hooking into non-hierarchical networks. It will have new attitudes to security and privacy, which may yet turn out to involve empowerment and delusion in equal measure. And at the root of it all, it will have very different attitudes to technology. As one student told Marc Prensky: 'You look at technology as a tool. We look at technology as a foundation – it's totally integrated into what we do'.[17]

On the other hand, we'd be unwise to expect that any new generation will differ completely from its predecessors. In the face of complex and mounting challenges, where the negatives and positives are frequently intertwined, we can stand on the sidelines and watch or, worse still, we can drive the net generation's use of digital technologies underground by banning their use in schools and public libraries. The alternative is to listen to and learn from what the net generation has to say, and at the same time do our best to offer some careful guidance and some measured warnings. In other words, we – educators, parents, carers, counsellors, researchers, politicians or journalists – can invest something of ourselves in a partnership with the young people who will in time become fully fledged citizens of our own societies. When, as adults, they look back, they may not have much comprehension of how or why we were willing to let the rampaging bull of public hysteria shape social and educational agendas for so long.

Discussions of the social aspects of digital technologies inevitably begin, at their fringes, to touch on political and structural issues. If we refocus through a *sociopolitical lens*, we see that some of the shadowy

concerns which have hovered insistently at the edges of our vision as we've peered through technological, pedagogical and social lenses are suddenly thrown into sharp relief. We find ourselves facing far-reaching and at times quite disturbing questions about how our societies are structured; how our societies relate to other societies; and just how stable our internal social structures and external social relations are.

In some Western countries, the internet has been gaining traction as an interactive channel for political candidates, local and state governments, and even federal governments. The net played a significant role in galvanising the youth vote in the Australian general election of 2007 and the US general election of 2008. In 2008, the Australia 2020 summit was perceived by some as the beginning of a move towards 'technologically enabled talk back government' in Australia.[18] In the UK, the Shadow Chancellor has spoken of using the web to open-source policy, in an effort to draw ideas from the public.[19]

At the same time, the net and mobile technologies have opened up new options for those whose voices aren't heard in regular political forums, or for whom no regular political forums exist. 'Smart mobs', to use Howard Rheingold's term, organise themselves organically, without any hierarchical or centralised control, to create large-scale protests which sometimes precipitate dramatic political changes.[20] Manila, 2001. Madrid, 2004. More recently, during the Beijing Olympic Torch Relay of 2008, the internet ran white-hot. Opposing interest groups sprang up on Facebook. Pro-Tibetan protests flowed from the streets of Paris and San Francisco onto the virtual islands of Second Life and back again. Pro-Chinese demonstrations spilled out of cyberspace chatrooms and onto the streets of Canberra and Seoul.

OK, it may all be a little rough and ready, but so far it sounds like a blueprint for a robust, technologically enabled network society where everyone's voice is heard. However, there's a flip side. Vigilante groups can spring up online, as in the wake of the Australian bushfires in early 2009. Chinese 'human flesh search engines' are known to scour the country for perceived transgressors of social norms. Islamic fundamentalists issue death threats to Western video hosting services like LiveLeak. And then there are the bombs that shake the world. London, 2005. Mumbai, 2008. Nowadays nation states, the traditional building blocks of the world order, share the stage with vigilantes and terrorists, all of whom, thanks to technology, can act without state sanction.

But we also need to ask some uncomfortable questions about state policies and practices. Amid the cacophonous babble of cyberspace, who is silent? Who falls on the wrong side of the digital divide, within the West and beyond it, as neocolonial relations play themselves out online and

offline? Who doesn't get to shop in the multicultural marketplace beckoning at the end of history? And which views can't or won't be expressed as governments across the political spectrum isolate and gag the voices they fear – while tracking the rest, just in case?

The twentieth century also left us with a legacy of global issues which exist beyond political and ideological polarities. And so we come, finally, to the need to observe technology through an *ecological lens*. What are attention-hungry technologies doing to our minds and bodies? What are energy-hungry devices and their e-waste doing to the larger ecosystem of which we're part? It's a race against time. In the face of clashing cultures, divisive markets and suspicious governments, is the collective global awareness facilitated by the internet developing quickly enough to offset the mounting problems of neglected bodies, overloaded minds and, above all, a poisoned world?

From blogs to bombs

It's long been understood that the area of digital technologies in education covers education *through* digital technologies. However, it must also, crucially, encompass education *about* digital technologies and their effects, positive and negative, known and unknown, predictable and unpredictable. The results of a lack of understanding of our technologies are already becoming all too apparent.

Digital technologies, as we've seen, lend themselves to viewing through at least five lenses: the technological, the pedagogical, the social, the sociopolitical and the ecological. As with any set of lenses, there's considerable overlap in what the various lenses enable us to see, but there are also differences in what comes into clearest focus and what's relegated to a blurrier presence. So, even allowing for overlap, a minimum of five lenses seems necessary to capture the focal points of the main conversations we've been having, and need to have, about new technologies in education: the technological discussions typically favoured by IT professionals and some educators; the pedagogical discussions favoured by many academics and teachers; the social discussions favoured by the media and politicians; the sociopolitical discussions favoured by cultural and political theorists; and the ecological discussions which are beginning to take place among scientists and medical researchers, and are just starting to reach public consciousness.

The broad issues that come into focus through each of the lenses are informed by a range of more specific topics that crystallise at different resolutions. The model in Figure 1.1 attempts to capture some of the key issues and topics, arranged across five levels. Like all models, it involves a trade-off between detail and depth on the one hand, and clarity of

presentation on the other. Inevitably, it entails some simplification, but its main aim is not to simplify our conversations. On the contrary, the aim is to lead us away from simplification by reminding us of the many issues which have an impact on, or are impacted by, the use of digital technologies in education. The terms employed are largely drawn from common usage, with some referring to developments and others to trends or problems, some to theories and others to fields of study or debate. Some are widely accepted and others are controversial. Some are relatively neutral and others carry positive or negative overtones. Closely related issues often cluster together, with issues at one level feeding into and articulating with issues at other levels. While some phenomena are shown on lens boundaries, most can be viewed through multiple lenses, with each lens highlighting particular aspects.

The model also functions as an overview of the key issues addressed in this book although, because of close connections between issues in different areas, they won't always, or only, be discussed within the most obviously relevant chapters. Nor is the list of topics exhaustive, though it includes many of the most important ones for educators. Those which will feature more prominently in our discussion are shown, in the style of a tag cloud, in larger and darker (bold) fonts. As with most tag clouds, this represents a personal perspective, a snapshot of new technologies in education taken from one point of view among the constellation of possible points of view, though it does draw extensively on the views of others working in the field. Of course, the model is a work in progress and, like digital technologies themselves, will be subject to constant revision – notwithstanding the requirements of print, which freezes it at a certain moment in time.

The model, then, is a reminder that the issues which have an impact on digital technologies in education – that is, education *through* and simultaneously *about* digital technologies – run from blogs to bombs, from technology to politics, and back again, while encompassing a host of other areas at the same time. It's a reminder that we need to develop a more holistic view of digital technologies in general, and as they apply to education in particular. That's the only way we can hope to grasp what new technologies may mean for the individual and communal stories which we can, and cannot, tell about ourselves.

Telling stories

In the past, an individual's life narrative was largely determined by his or her role within traditional institutions like the family and the church. But in modern liberal democracies, where external sources of identity are fewer and weaker, individuals are increasingly compelled – that is, empowered but

also obliged – to author their own life stories.[21] It's a process which has been underway for some time but was given a major boost in the social revolutions of the late 60s. Even if institutional power has become more subtle rather than disappearing, and even if consumerist pressure has expanded to fill some of the gaps, there's no doubt that all around us we see individuals choosing ways of life unthinkable in past eras. Naturally, we also tell collective stories: stories of the groups, communities, and nations to which we belong. Here, too, we see a profound change, although once again it's relative rather than absolute. A multitude of individuals now find themselves in a position to actively contribute to the communal stories with which their personal stories are interwoven, and simultaneously to reject those communal stories to which they can't or don't want to contribute.

Enter digital technologies, which further diminish limitations on individual agency by offering us a panoply of tools for constructing our personal stories as well as multiplying the channels we can use to connect with chosen others and compose communal stories. Indeed, it

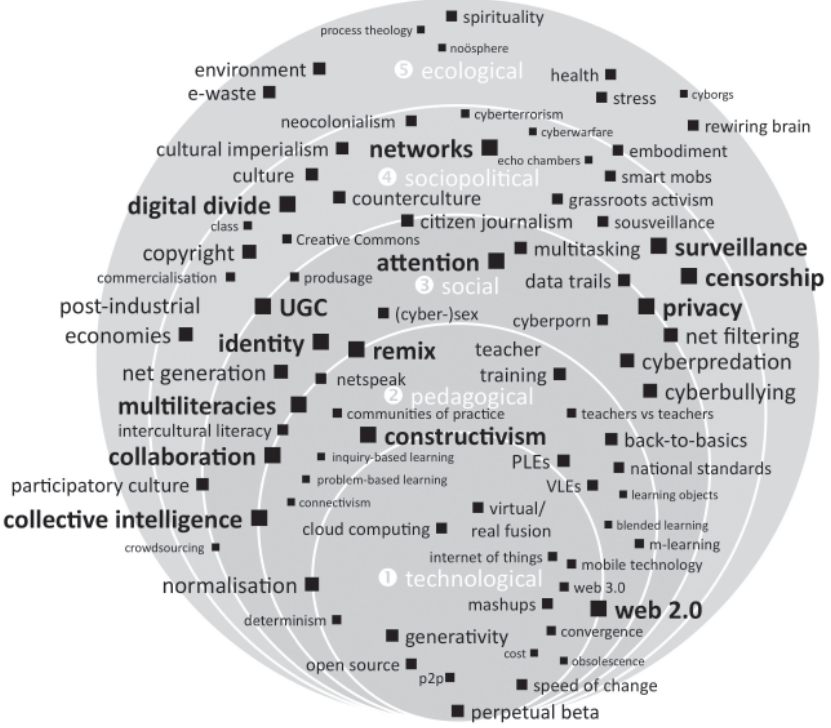

Figure 1.1. Five lenses on digital technologies in education.

should come as no surprise that contemporary digital technologies are the fruit of seeds planted in the rich soil of the revolutionary period at the end of the 60s. Today, individuals find themselves empowered to express themselves verbally on Blogger, visually on Flickr, and in video remixes on YouTube; to experiment with identity under cover of anonymity in ICQ ('I seek you') chatrooms or in Second Life; and to carve out social networks unrestricted by geography or tradition on Facebook or MySpace. Groups find themselves empowered to build collaborative wikis or Creative Commons repositories; to leverage networks for grassroots social initiatives; and to organise themselves into political smart mobs.

But the plot of this technological tale has lots of twists and turns, many of which, as we've seen, have little to do with technology itself, and we're still a long way from any kind of conclusion. We have to recognise that digital technologies don't just offer narrative freedom to artists mashing up media content, teens coming to terms with their sexuality, or anti-poverty campaigners; they offer the same freedom to vigilantes, child pornographers and terrorists. We also have to recognise that liberal democracies are bursting with political, social and moral conservatives – some in government, some in the media, some in educational institutions – who would like to turn the clock back on individual freedoms, particularly those inherited from the 60s. Sometimes, perhaps, they are right to defend traditions, standards and social cohesion. Sometimes, surely, they are wrong. But this much is absolutely clear: cyberterrorists and cyberpredators are endlessly invoked by those who seek to contain the explosion of online and offline freedoms, to limit the proliferation of new stories, and to bind individual and group narratives more closely to traditional societal narratives.

Education has always been political. At its best, it walks a tightrope between reproducing the status quo and providing open democratic spaces for challenging it. When teaching *through* digital technologies, educators have a responsibility to help students explore the power of these new tools to craft individual and communal stories, but also to help them perceive and compensate for their limitations and dangers. When teaching *about* digital technologies, educators have a responsibility to help students appraise the new tools through technological, pedagogical, social, sociopolitical and ecological lenses. Each lens will reveal different storytelling possibilities and different limitations. Taken together, these lenses can help both educators and students problematise the narrative freedoms offered by digital technologies, and simultaneously problematise the restrictions which some would like to impose on those freedoms. It's vital that today's students graduate with the creative skills to make

the most of digital technologies, as well as the critical skills to evaluate the freedom or lack of freedom to which they may lead.

Digital technologies are set to play a major role in the future of education. Education must also play a major role in the future of digital technologies. The decisions we make today about education, technology, and technology in education must be informed by a consideration of the long-term social, sociopolitical and ecological consequences: in short, what kinds of stories – individual, local, national and global – they'll enable us to write. It's up to us to make sure we shape our technologies as much as they shape us. And, given the pace of ongoing technological development, we have to start now.