

Edu 1.1 meets Web 3.0

A keynote address*

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Thank you for inviting me. I have to confess, though, that I am unsure about what the role of a keynote address is. My hunch is that it is to add a touch of class to what might otherwise be rather sordid proceedings. If this is indeed the case, then I'm afraid you made a big mistake in asking me.

A more charitable view is to say that a keynote address is akin to a sermon – defined as “a talk given in church on a spiritual or moral theme”. Well, this isn't a church, I'm not very spiritual and my morals are questionable, but I do have a sermon, so perhaps what I'm about to say will fit the bill. And in embarking on it I promise to bear in mind the advice of the American comedian George Burns, who once said that “The secret of a good sermon is to have a good beginning and a good ending -- and having the two as close together as possible”.

The email invitation which brought me here requested me to address a broad and unfocussed question: what are the technological developments which are likely to affect universities in the next few years, especially those which will (or could) have an impact on assessment, learning and teaching?

Answers on the back of a stamped, addressed £5 note. Do not write on both side of the paper at once.

Now, as it happens, there is an established method of approaching this question, much used by keynote speakers up and down the land. It consists of describing in glowing, optimistic and uncritical detail a constellation of weird and wonderful network technologies and phenomena – things with which their audiences (especially if they university teachers and administrators) are as yet largely unfamiliar.

This then has two predictable effects. The first is to induce acute inferiority complexes in the audience. The second is to leave everyone with an uneasy feeling that their students probably know all about these exotic developments. A cruel

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variant on this approach is to ask members of the audience for evidence of their technological street-cred. Hands up who has a blog. Who has NOT downloaded music illicitly via a peer-to-peer service? Hands up anyone who knows what BitTorrent is. And so on.

You will be relieved to know that I do not engage in these cruel and unnatural punishments.

This is partly because I am a liberal and am kind to animals. But it is mainly because I believe that focussing exclusively on technology is the wrong way to go about thinking about this stuff. It's an example of *technological determinism* – the view that the effects of any new technology on society are determined in a fixed way by the *inherent* capabilities and functions of the technology itself. It's the view that technology is the main driver in social and economic development – the belief that technology pushes and society just goes along.

Technological determinism has been the curse of educational technology for as long as I can remember – and if anything it's getting worse. And it explains why, when we ask what contribution ICT has made to teaching and learning over the last 40 years we are reduced to an embarrassed silence.

Actually, that's not entirely true. A former OU colleague of mine, Tim O'Shea, now Principal of Edinburgh University, is an expert on educational uses of IT, and has never, *ever* been reduced to silence. In fact, Tim doesn't *do* silence. And he famously used to annoy conferences like this by saying that the only piece of educational technology known *for sure* to work was the school bus.

The problem with technological determinism is that it's very seductive. This is partly because it taps into a powerful general narrative in our societies.² New technologies attract enthusiasts, who are generally drawn from the ranks of those likely to benefit from them. Most of the conversations we have about exciting new technologies therefore focus on the benefits and transformations to be expected from them. The voices of those with reservations about the new stuff tend to be muted, either because they feel themselves disqualified by ignorance, or because their interests are obviously threatened by the new developments. So our discourse is skewed in a particular, technophilic direction.

² For an elegant articulation of this theme, see Neil Postman's book *Technopoly: the surrender of culture to technology*, Vintage, 1993.

In the case of educational technology, technological determinism leads to what one might call the *electric wok syndrome*. Nobody in his or her right mind needs an electric wok. But it possible to make such things – and they are indeed manufactured and sold. In the world of educational technology electric wok syndrome manifests itself as a particular, distinctive mindset. This mindset says: “technology is the answer; now what was the problem again?”

Here’s what happens. An interesting new piece of computer technology appears on the market. Almost instantly some bright spark in the educational world says “Gee, this is cool. There must be an educational application for it.” So a new ‘educational’ application of ICT is developed and proudly launched. Whether it meets any real educational need, of course, is another question – and one that is rarely asked.

The history of educational technology is littered with electric woks. Previous examples have included programmed instruction systems, computer-based training, LOGO, Encarta, the Laserdisc, interactive CD-ROMs, simulation games, and so on.

And new candidates for the role of electric wok appear all the time. Here are some popular ones:

- The \$100 laptop³
- Podcasting
- Second Life
- Facebook
- Wikis

A more considered list of developments currently causing educators to salivate would look like this:

- Tools for maintaining intermittent, casual connectivity (Twitter, Facebook status updates and so on)
- Simple tools and facilities for multimedia authoring, remixing and publishing
- Wiki-like tools for distributed collaborative work
- DIY Animation tools (Flash, Silverlight...)

Now I know that each of these developments has its legions of earnest, clever, well-intentioned and serious advocates. And it is indeed possible that some of them will

³ See <http://laptop.org/>

turn out to have real, tangible and measurable educational benefits. But my prediction is that they will mostly go the way of their predecessors if we just think about them in isolation. What we need to do is to think harder about the wider social and institutional context in which information technologies are deployed. And the reason for this is simple: it is that technological determinism just isn't an accurate description of what happens with technology. As Robin Williams and David Edge put it in their famous essay "The Social Shaping of Technology"⁴,

"technology does not develop according to an inner technical logic but is instead a social product, patterned by the conditions of its creation and use. Every stage in the generation and implementation of new technologies involves a set of choices between different technical options. Alongside narrowly 'technical' considerations, a range of 'social' factors affect which options are selected - thus influencing the content of technologies, and their social implications."

Let me give a simple example of how technologies are socially shaped: SMS. In a way, this is a story against myself. I was an early adopter of mobile phones because it had always seemed to me that telephones ought to be mobile, rather than being tethered to the wall like goats. So when mobiles appeared I was an early adopter. I bought my first phone in 1988. It was made by Nokia and was the size of a house-brick. It made me the subject of endless ridicule because mobile phones were then thought to be the playthings of *poseurs*.

The phone offered a facility for sending short text messages – up to 160 characters in length. It was called SMS. I regarded this feature with disdainful astonishment. Remember that I had been using email from home since 1975⁵, so to me SMS seemed like a kind of brain-damaged email. It never occurred to me to use it.

It turned out that I wasn't alone. If you look at the data for SMS traffic in the UK for the early years, it's like looking at the mountains of Belgium. The graph ambles along near the X-axis, rising ever so gently. But then there comes a moment when the graph rotates and goes up like a rocket. SMS has gone through a tipping point of some kind.

What happened? Simply this. For the early history of mobile phones, users had to be adults because the phones were available only on monthly contracts and in order

⁴ Robin Williams and David Edge, "The Social Shaping of Technology", *Research Policy* Vol. 25, (1996) pp. 856-899.

⁵ John Naughton, *A Brief History of the Future: the origins of the Internet*, Phoenix, 1999, page 143.

to get a contract you had to have a bank account. And adults had relatively little use for SMS. But then the networks ran out of people to screw on contracts and they looked around for another business plan. And they hit on the idea of pre-pay phones. Which meant that, for the first time, teenagers could have mobile phones. And boy, did *they* know what SMS was for. The rest, as they say, is history.

The point is obvious and simple: we shape technology as much as it shapes us. The relationship between technology and society is a two-way interactive one. So let's make a resolution to give up on technological determinism. Sure, there are all kinds of interesting technological developments out there. But whether they have any lasting impact on our educational institutions depends on factors other than technology.

What kind of factors? I've singled out two in particular. They are *media ecology* and *demographics*. Let's look at them in turn.

It may seem odd to use the term 'ecology' in this context. But we're living through a massive, seismic shift in our media environment and one of our problems is that we lack a language that is appropriate to what is happening. Traditionally, we have drawn linguistic and analytical tools from economics, and as a consequence seek to interpret what is going on through the prism of that discipline. But economics – at least the economics on which we have relied to date – is the study of the allocation of *scarce* resources, whereas an important feature of our emerging media environment is *abundance*, not scarcity. Much of the cultural production which characterises the new environment is driven largely by non-economic motives and takes place entirely outside market processes. So a discourse rooted in market-based economic analysis seems unequal to the task of understanding what is going on in our media environment just now.⁶

In seeking a language in which to talk about change, I've borrowed an idea from the cultural critic, Neil Postman – the notion of media ecology, that is to say, the study of media as environments. The term is borrowed from science, where an ecosystem is defined as *a dynamic system in which living organisms interact with one another and with their environment*. These interactions can be very complex and take many forms. Organisms prey on one another; compete for food and other nutrients; have parasitic or symbiotic relationships; wax and wane; prosper and decline. And an ecosystem is

⁶ See Yochai Benkler, *The Wealth of Networks: how social production transforms markets and freedom*, Yale, 2006.

never static. The system may be in equilibrium at any given moment, but the balance is precarious. The slightest perturbation may disturb it, resulting in a new set of interactions and movement to another – temporary – point of equilibrium.

This seems to me a more insightful way of viewing our communications environment than the conventional ‘market’ metaphor more commonly used in public discussion, because it comes closer to capturing the complexity of what actually goes on in real life.

Just to illustrate the point, consider what happened when new technologies have appeared in the past. When television arrived, it was widely predicted that it would wipe out radio, and perhaps also movies and newspapers. Yet nothing like that happened. When the CD-ROM appeared on the scene, people predicted the demise of the printed book. When the Web arrived, people predicted that it would wipe out newsprint. And so on.

These ‘wipe-out’ scenarios are a product of a mindset that sees the world mainly in terms of markets and market share. Yet the reality is that while new communications technologies may not wipe out earlier ones, they certainly change the ecosystem. The CD-ROM did not eliminate the printed book, for example, but it altered forever the prospects for printed works of reference. Novels and other types of book, on the other hand, continued to thrive.

The ‘organisms’ in our media ecosystem include broadcast and narrowcast television, movies, radio, print and the Internet (which itself encompasses the Web, email and peer-to-peer networking of various kinds). For most of our lives, the dominant organism in this system – the one that grabbed most of the resources, revenue and attention – was *broadcast TV*⁷.

This ecosystem is the media environment in which most of us grew up. But it’s in the process of radical change.

Broadcast TV is in serious – apparently inexorable -- decline. It’s haemorrhaging viewers – or at least the viewers who are the most commercially lucrative. And its audience is fragmenting. In particular, it’s been eaten from within: the worm in the bud in this case is narrowcast digital television -- in which specialist content is aimed at specialised, subscription-based audiences and distributed via digital channels. But the business model that supports broadcast is based on its ability to attract and hold

⁷ Broadcast, remember, means few-to-many.

mass audiences. Once audiences become fragmented, the commercial logic changes. And, finally, new technologies like Personal Video Recorders (PVRs) – essentially recorders which use hard drives rather than tape and are much easier to program – are enabling viewers to determine their own viewing schedules and – more significantly – to avoid advertisements.

Note that when I say that broadcast TV is declining, I am not saying that it will disappear. That's what the computer scientist John Seely Brown⁸ calls 'endism' and it's not the way ecologists think. Broadcast will continue to exist, for the simple and very good reason that some things are best covered using a few-to-many technology. Only a broadcast model can deal with something like a World Cup final or a major terrorist attack, for example – when the attention of the world is focussed on a single event or a single place. But broadcast will lose its *dominant* position in the ecosystem, and that is the change that I think will have really profound consequences for us all.

What will replace it? Simple: the ubiquitous Internet.

Already the signs of the Net's encroaching centrality are everywhere. We see it in, for example: the remarkable penetration of broadband access in developed countries; the rise of Web services; the rapid growth of e-commerce; the streaming of audio – and, increasingly, video -- across the Net; the interest of Rupert Murdoch and other broadcasters in acquiring broadband and other Internet companies; declining newspaper sales and the growth of online news; the expanding use of the Web as a publication medium by public authorities; the spread of public WiFi; and in the stupendous growth of internet telephony – spurred by the realisation that, sooner rather than later, all voice telephony will be done over the Net.

The point of all this is that while my (baby boomer) generation grew up and came to maturity in a media ecosystem dominated by broadcast TV, our children and grandchildren will live in an environment dominated by the Net. And the interesting question is what will that mean for us, and for them?

In thinking about the future, the two most useful words are 'push' and 'pull' because they capture the essence of where we've been and where we seem to be headed.

Broadcast TV is a 'push' medium: a relatively select band of producers (broadcasters) decide what content is to be created, create it and then push it down

⁸ John Seely Brown and Andrew Duguid, *The Social Life of Information*, Harvard Business School Press, 2000.

analogue or digital channels at audiences which are assumed to consist of essentially passive recipients.

The couch potato was, par excellence, a creature of this world. He did, of course, have some freedom of action. He could choose to switch off the TV; but if he decided to leave it on, then essentially his freedom of action was confined to choosing from a menu of options decided for him by others, and to ‘consuming’ their content at times decided by them. He was, in other words, a human surrogate for one of BF Skinner’s pigeons – free to peck at whatever coloured lever took his fancy, but not free at all in comparison with his fellow-pigeon perched outside on the roof.

The other essential feature of the world of push media was its fundamental asymmetry. All the creative energy was assumed to be located at one end (the producer/broadcaster). The viewer or listener was assumed to be incapable of, or uninterested in, creating content; and even if it turned out that s/he was capable of creative activity, there was no way in which anything s/he produced could have been published.

Looking back, the most astonishing thing about the broadcast-dominated world was how successful it was for so long in keeping billions of people in thrall. Networks could pull in audiences in the tens of millions for successful and popular broadcasts – and pitch their advertising rates accordingly. Small wonder that one owner of a UK ITV franchise famously described commercial television (in public) as “a licence to print money”.

But in fact the dominance of the push model was an artefact of the state of technology. Analogue transmission systems severely limited the number of channels that could be broadcast through the ether⁹, so consumer choice was restricted by the laws of analogue electronics. The advent of digital technology changed all that and began to hollow-out the broadcast model from within.

The Web – is the opposite of this: it’s a pull medium. Nothing comes to you unless you choose it and click on it to ‘pull’ it down onto your computer. You’re in charge. In the words of Elizabeth Murdoch, the Web is a “sit up” medium, in contrast to TV, which is a “sit back” medium.

So the first implication of the switch from push to pull is a growth in consumer sovereignty. We saw this early on in e-commerce, because it became easy to compare

⁹ Because analogue transmissions on adjacent frequencies could interfere with one another.

online prices and locate the most competitive suppliers from the comfort of your own armchair. The US automobile industry has discovered, for example, that a majority of prospective customers turn up at dealerships armed not only with information about particular models, but also with detailed data on the prices that dealers elsewhere in the country are charging for those models.

But the Internet doesn't just enable people to become more fickle and choosy consumers. It also makes them much better informed – or at least provides them with formidable resources with which to become more knowledgeable.

The Net is also making it much harder for companies to keep secrets. If one of your products has flaws, or if a service you provide is sub-standard, then the chances are that the news will appear somewhere on a Blog or a posting to a newgroup or email list. And when it does, conventional PR news management techniques are ineffective.

The emergence of a truly sovereign, informed consumer is thus one of the implications of an Internet-centric world. This is significant, of course, but it was predictable, given the nature of the technology. And in the end it may turn out to be the least interesting part of the story.

My conjecture is that the most significant consequence of an Internet-centric world lies not in the arena of consumption, but in that of *production*. In blunt terms, the asymmetry of the old, push-media-dominated ecosystem looks like being replaced by something much more balanced. The implicit assumption of the broadcast model was that audiences are passive and uncreative. In recent years, what we're discovering is that that passivity and apparent lack of creativity may have been more due to the absence of tools and publication opportunities than to intrinsic defects in human nature.

Take Blogging – the practice of keeping an online diary. At the time of writing Technorati, a Blog-tracking service, is claiming to be monitoring over 70 million. Many of them are, no doubt, vanity publishing with no little literary or intellectual merit. But hundreds of thousands of Blogs are updated every day or so, and many of them contain writing and thinking of a very high order. In my own areas of professional interest, for example, Blogs are often my most trusted online sources, because I know many of the people who write them, and some of them are leading experts in their fields.

What is significant about the Blogging phenomenon is its demonstration that the traffic in ideas and cultural products isn't a one-way street – as it was in the old push-media ecosystem. People have always been thoughtful and articulate and well-informed, but up to now relatively few of them ever made it past the gatekeepers who controlled access to publication media. Blogging software and the Internet gave them the platform they needed – and they have grasped the opportunity in very large numbers.

The result is a dramatic reversal in the decline of what Jurgen Habermas calls 'the public sphere'¹⁰ – an arena which facilitates the public use of reason in rational-critical debate and which had been steadily narrowing as the power and reach of mass media increased. In recent years, the political implications of this re-energised public sphere have begun to emerge, notably in the debates among Democrats in the US about how to challenge Republican political ascendancy and the Bush presidency.

The explosive growth in blogging has prompted a predictable outburst of 'endism' – as in questions about whether the phenomenon marks the end of journalism. Yet, when one looks at it from an ecological perspective what one sees is the evolution of an interesting parasitic/symbiotic relationship between blogging and conventional journalism. Several case studies – for example the Harvard study of the Trent Lott case , and the 60 Minutes saga (which led to the premature retirement of TV news anchorman Dan Rather) – have delineated the contours of this relationship. What has happened, in essence, is that a new organism has arrived in the media ecosystem and existing organisms are having to accommodate themselves to the newcomer. And vice versa.

Another remarkable explosion of creativity comes from digital photography. In the last few years sales of digital cameras have grown phenomenally – and many mobile phones now come with an onboard camera. So every day, millions of digital photographs are taken. Until the advent of Flickr.com, an understandable response to this statement would have been "so what?" But Flickr allows people to upload their pictures and display them on the Web, each neatly resized and allocated its own unique URL.

¹⁰Jurgen habermas, *The Structural Transformation of the Public Sphere: an inquiry into a category of bourgeois society*, MIT Press (reprint edition), 1991.

I don't know how many photographs Flickr holds, but it must already run into hundreds of millions. The most interesting aspect of it is that users are encouraged to attach tags to their pictures, and these tags can be used as the basis for searches of the entire database. When writing this I searched for images tagged with the word 'Ireland'. The database returned 951,114 photographs. (A few months earlier, the same search had yielded only 85,000 images.) Of course, I didn't sift through them all, but I did look at a few hundred. They were mostly holiday snaps, but here and there were some memorable pictures. What struck me most, though, was what they represented. Ten years ago, those holiday snaps would have wound up in a shoebox and would certainly never have been seen in a public forum. But now they can be – and are being – published, shared with others, made available to the world. And this is something new.

In fact, strictly speaking, it's something that ought not to be possible – at least in terms of the old media ecosystem. The blogging avalanche and Flickr's visual cornucopia are just two examples of user-generated content, which to an old-style broadcaster would be an oxymoron -- a contradiction in terms. In the previous paradigm, broadcasters created the content and users (audiences) merely consumed it. In the emerging system, broadcasters and conventional media outlets will doubtless continue to create content, but so will a great many others. If present trends continue, there will come a point where more content is being produced annually by users than by the entire output of what the UK Treasury calls the 'creative industries'. And when that crossover point is reached, we will have moved into entirely uncharted territory.

So one huge change in our environment is under way. Here's another.

A cohort of remarkable young people is now entering the worlds of work and higher education. There's a growing chasm between the experiences and expectations of these kids and those of the university staff who are supposedly going to educate them. This is, sadly, largely a matter of age. The fact is that most people over the age of 30 are what the Pew Internet and American Life Project¹¹ calls "digital immigrants" – that is to say, recent (and nervous) arrivals in Cyberspace.

¹¹ <http://www.pewinternet.org/>

In contrast, the kids now arriving at, and graduating from, university are full-blown digital natives. To appreciate where they're at, let's look at a timeline of their lives to date.

Today's 22-year-olds were born in 1985. The Internet was two years old in January that year, and Nintendo launched 'Super Mario Brothers', the first blockbuster game. When they were going to primary school in 1990, Tim Berners-Lee was busy inventing the World Wide Web. Amazon and eBay launched in 1995. Hotmail was launched in 1996, when they were heading towards secondary school.

Around that time, pay-as-you-go mobile phone tariffs arrived, enabling teenagers to have phones, and the first instant messaging services appeared. Google launched in 1998, just as they were becoming teenagers. Napster and Blogger.com launched in 1999 when they were doing GCSEs. Wikipedia and the iPod appeared in 2001. Early social networking services appeared in 2002 when they were doing A-levels. Skype launched in 2003, as they were heading for university, and YouTube launched in 2005, as they were heading toward graduation.

These kids have been socially conditioned in a universe that apparently runs parallel to the one inhabited by most folks in the education business. They've been playing computer games of mind-blowing complexity *forever*. They're resourceful, knowledgeable and natural users of computer and communications technology. They're Digital Natives - accustomed to creating content of their own - and publishing it. (Remember the motto of YouTube: 'Broadcast yourself!')

They buy music from the iTunes store - but continue to download tracks illicitly as well. They use BitTorrent to get US episodes of *Lost*. They think 'Google' is a synonym for 'research' and regard it as quite normal to maintain and read blogs, use Skype to talk to their mates and upload photos to Flickr. Some even write or edit entries on Wikipedia. And they know how to use iMovie or Adobe Premiere to edit videos and upload them to YouTube. They have curious ideas about 'friendship' (in the MySpace/Facebook sense), maintain profiles in multiple social networking sites and think nothing of rating their teachers (or bosses) on websites that cater for that kind of thing. They also seem to be casual about protecting personal data and privacy. Some of them are going to get nasty shocks when they discover that putative employers have been reading their past adventures as detailed on MySpace, Facebook

or Flickr. And – last but not least – they have what one might describe as a relaxed attitude towards intellectual property rights.

I’ve said that this generation inhabits a parallel universe to the one that we – their parents and educators – inhabit, but that’s not quite accurate. The truth is that we also inhabit the same universe; the difference is that we may not have noticed how it’s changed.

And the implications of all this for universities?

Universities are strange institutions. In the old days, they were asylums run by the inmates. Nowadays, they are asylums run by managers. They are not entirely immune to change, but they embrace it reluctantly and sporadically. And, in general, they don’t really know what to do about technology – so they do as little as they can get away with. There’s a lovely observation by the hypertext guru, George Landow, which makes this point nicely. Writing in 1992 he said:

“It took only twenty-five years for the overhead projector to make it from the bowling alley to the classroom. I’m optimistic about academic computing; I’ve begun to see computers in bowling alleys.¹²

In 1995, the Columbia scholar Eli Noam published his celebrated paper on “Electronics and the dim future of the University”¹³ and university presidents and vice-chancellors have been nervously surveying the technological environment ever since. The basic question Noam posed was this: *what will universities do when students no longer have to come to them just for information or knowledge?* His answer was that they will have to think harder about the rationale for bringing students together in the same physical location.

Things have moved on a lot since 1995 – which, after all, was the year Netscape launched on the stock market and the first Internet bubble began – so I’ve been pondering what kinds of questions a latter-day Noam might be asking. Here are a few to be going on with.

¹² Landow, George P. 1992. *Hypertext: The Convergence of Contemporary Critical Theory and Technology*. Baltimore, MD: Johns Hopkins University Press.

¹³ *Science*, Vol. 270, pp 247-249, October 13, 1995. Available online at: <http://www.asis.org/annual-96/noam.html>

Arbiters of quality?

First of all, do the changes now under way in our media ecosystem enhance or undermine the role of universities as arbiters of quality. We're moving from a world in which relatively small numbers of gatekeepers decided what could be published and in what form, to a world in which anyone can become a global publisher, and in which 'amateurs' can collaboratively produce what is increasingly regarded as an authoritative source of knowledge – Wikipedia. What is the role of universities in such a world?

The sovereign student

The customer is always right in the commercial world, even when he's wrong. As universities struggle to turn themselves into customer-service organisations dealing with people who are accustomed to ordering stuff online and having it delivered the next day, they're being sucked down that road. The trouble is that in education the customer often isn't right because he or she is inevitably clueless or ignorant.

Where's the 'value added'?

Next, what's the 'value added' by a conventional university experience? This is something that's been vividly highlighted by the MIT Open Courseware initiative. The fact that a major university published so much of its teaching material on the Web brought home to people that there is more to an MIT education than access to class materials. (This seems obvious, I know, but it wasn't obvious at the height of the last Internet bubble. Remember Fathom.com?)

So what exactly do MIT (or LeedsMet) students get by being at MIT or Leeds? The answer is that they belong to *communities* – of students, teachers, scholars and researchers, and what they get from membership of those communities is a key component of their education. So the social, community aspect of higher education is vitally important. Yet that is precisely the aspect of university life that seems under most threat as universities strive to turn themselves into cost-effective degree mills.

Intellectual property

Our intellectual property system is broken, in the sense that it not fit for purpose in a digital age. It needs to be adapted to encourage rather than stifle creativity in modern circumstances. For an indication of how this could be done, see the Adelphi Charter on Creativity, Innovation and Intellectual Property conceived by a working group of the Royal Society of Arts of which I was a member¹⁴. Unfortunately, there's little evidence yet that our legislators have any appetite for a fundamental rethink of IP law. Given the attitudes of our new generations of students and the imperatives and possibilities of digital technology, universities are going to be caught in the middle of what might turn out to be a very bloody battlefield. I see little evidence at present that administrators have a rounded appreciation of the problem.

Pedagogy

The fundamental pedagogical model of universities hasn't changed all that much in centuries. In the past, students put up with it because (a) it was rather like what they'd been put through in school, and (b) there didn't seem to be much alternative. A big question now is whether the new generation of digital natives will be so tolerant. Already we're seeing lecturers pressing to have WiFi banned from lecture-rooms because they're fed up addressing rows of impassive, laptop-toting students who are Facebooking, blogging, googling, browsing, emailing and instant-messaging as they talk. The thought that perhaps the students are behaving like this because they're bored by the lecturer doesn't seem to be deemed worthy of consideration.

Allied to that is the more positive question of whether university teachers will adapt their teaching methods to harness the online sociability of students and the collaborative possibilities of networking technologies. Will it happen? Don't hold your breath.

And in conclusion...

I could go on but you will get the point. The new computing and networking technologies are interesting but they're not the main story. Technological determinism should be consigned to the dustbin of intellectual history. The future will

¹⁴ <http://www.adelphicharter.org/>

be determined not by the technologies themselves, but by how people – and institutions – shape them.

It's obvious really – and besides I expect you knew it all anyway. But if you have been, thank you for listening.