Introduction

There’s an old Chinese curse: ‘May you live in interesting times.’ Well, we do. In particular, we live in a period when our communications environment is being transformed. And a big question is what this change might mean – both for society and for those of us who work professionally with data, information and knowledge and what one might loosely call the media business.

Most librarians would bridle at the notion that they are in the media business. But in a sense we’re all – academics and librarians alike – in it. I don’t mean that we are part of the circus of popular culture – which is what journalists mean by the term ‘media business’. I mean it in a more profound sense, for ‘media’ is the plural of ‘medium’, a word with an interesting etymology.

The conventional interpretation holds that a medium is a carrier of something. But in science the word has another, more interesting, connotation. To a biologist, for example, a medium is a mixture of nutrients needed for cell growth. And that’s a very interesting interpretation for my purposes.

In biology, media are used to grow tissue cultures – living organisms. The most famous example, I guess, is Alexander Fleming and the mould growing in his Petri dishes which eventually led to the discovery of penicillin.

What I want to do is to borrow that idea and use it as a metaphor for thinking about human society – to treat society as a living organism
which depends on a media environment for the nutrients it needs to survive and develop. Any change in the environment – in the media which support social and cultural life – will have corresponding effects on the organism. Some things will wither; others may grow; new, mutant organisms may appear. The key point of the metaphor is simple: change the environment, and you change the organism.

Which leads me to my central question: what is changing in our media environment, and what does that mean for us?

**Our media environment**

This way of thinking is not new. I picked it up originally from the late Neil Postman, a passionate humanist who taught at New York University for more than 40 years and was an unremitting sceptic about the impact of technology on society. In a series of witty and thought-provoking books he described how our societies are shaped by their prevailing modes of communication, and fretted about the consequences.

From my perspective, Postman’s most interesting book is *The Disappearance of Childhood*. In it, he argues that the concept of ‘childhood’ – as a special, protected phase in a person’s life – is an artefact of communications technology. It was, he claims, a by-product of the evolution of a print-based culture.

Before print, Postman maintained, adulthood began the moment a young person was deemed to be competent in the prevailing communications mode of the society. In the oral culture which pre-dated Gutenberg, a child therefore became, effectively, an adult around the age of seven. This, he maintains, is why you never see children *per se* in the paintings of Breughel – you merely see small adults; and it is why the Catholic church defined seven as the ‘age of reason’ – after which an individual could be held accountable for their sins.

But the invention of printing changed all that. Why? Because – Postman argues – in a print-based culture, it takes longer (and requires more education, some of it formal) to attain the kind of communicative competence needed to function as an adult. So the concept of ‘childhood’ was extended to 12 or thereabouts – and this remained the case from the 19th century to the middle of the 20th.

The title of Postman’s book – *The Disappearance of Childhood* – comes from his contention that the arrival of broadcast television represented
the first revolutionary transformation of our communications environment since Gutenberg. Just as print had transformed society – undermining the authority of the Catholic church and stimulating the Reformation, enabling the rise of modern science and the growth of a new intellectual class – Postman argued that the dominance of TV had a correspondingly dramatic impact.

In particular, it had effectively lowered the age of reason. In a society dominated by the idiocies of such a medium, it didn’t take long for a child to master the basics. Postman cited research which allegedly showed that American children were ‘competent’ TV viewers – in the sense that they understood genres and could follow narrative threads – by the age of three. This explained, he said, why, although there were remedial classes in reading in every American public school, he had never seen a remedial class in TV viewing! (It also explained, he contended, why adults were increasingly dressing like children, and vice versa.)

I’m not sure what to make of Postman’s view about education, but his general point – that changes in the communications environment bring about cultural change – is, I think, spot on. He made a convincing case for it in another book – *Amusing Ourselves to Death* – which is in part a devastating analysis of the impact that broadcast television had – and continues to have – on American politics. What he argued was that we live in a polity which has been shaped by a single communications medium. Most of us have grown up in such an environment. It seems as natural to us as the air we breathe. And yet it is changing under our noses.

**Media ecology**

In seeking a language in which to talk about change, I’ve borrowed another idea from Postman – the notion of *media ecology*, that is to say, the study of media as environments. As with ‘medium’, the term is appropriated from the sciences, 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 never static. The system may be in equilib-
riculum 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 has 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 books 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, e-mail 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.

This ecosystem is the media environment in which most of us grew up. But it’s in the process of radical change, mainly because broadcast TV is in apparently inexorable decline. Its audience is fragmenting. In particular, it’s being eaten from within: the worm in the bud in this case is narrowcast digital television – in which specialist content is aimed at specialized, subscription-based audiences and distributed via digital channels. The problem is that the business model that supports broadcast is based on its ability to attract and hold mass audiences. Once audiences become fragmented, the commercial logic changes.

Note that when I say that broadcast TV is declining, I am not saying that it will disappear. Broadcast will continue to exist, for the simple 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 focused 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.

**Life after television?**

What will replace it? Answer: the ubiquitous internet.

Note that I do not say the web. The biggest mistake people in the media business make is to think that the net and the web are synonymous. They’re not. Of course the web is enormous; but it’s just one kind of traffic that runs on the internet’s tracks and signalling (to use a railway metaphor). And already the web is being dwarfed by other kinds of traffic. According to data gathered by the Cambridge firm Cachelogic, peer-to-peer (P2P) data exceeds web traffic by a factor of between two and ten, depending on the time of day. And I’ve no doubt that in ten years’ time, P2P traffic will be outrun by some other ingenious networking application, as yet undiscovered.

What’s happening is that we’re moving from the era where the platform – the PC – was the computer to the point where the network is the computer. And that’s where the foreseeable future lies. We’re moving to what is sometimes called ‘cloud computing’ – where we get many of our ‘computing’ services (e-mail, messaging, document creation and management, multimedia asset storage, presentations, calendar services, etc.) from the internet ‘cloud’ rather than from our PCs.

The point of all this is that while we 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 – the point, in a way, of this chapter – is, what will that mean for us, and for them?

**From push to pull**

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’re 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 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 B. F. 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 – that occupied by 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.

The web is exactly the opposite of a push medium: 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.

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 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. It’s also become much harder for companies to keep secrets in a net-centric world. If one of your products has flaws, or if a service you provide is substandard, then the chances are that the news will appear somewhere on a blog or a posting to a newsgroup or e-mail list. My conjecture is that nobody who offers a public service will be immune from this aspect of a ubiquitous net.
Some years ago, I participated in a seminar at Addenbrooke’s hospital in Cambridge on the future of information technology and how it might affect the health service. One memory that sticks in my mind from the event is of a statement made by a medical researcher from the National Institute of Health. The biggest challenge general practitioners will face in 2010, he said, was ‘how to deal with the internet-informed patient’.

The emergence of a truly sovereign, informed consumer is thus one of the implications of an internet-centric world.

Another implication is that the asymmetry of the old, push-media world will be replaced by something much more balanced.

Remember that the underlying assumption of the old model was that audiences were passive and uncreative. What we’re now 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. Certainly, that’s the only explanation I can think of for what’s been happening on the net since the beginning of the 21st century.

**Blogging and the public sphere**

Take blogging – the practice of keeping an online diary. There are currently approaching 100 million bloggers across the globe. Many blogs are, as you might expect, mere dross – vanity publishing with no discernible literary or intellectual merit. But many thousands of them are updated regularly, and many contain writing and thinking of a very high order. In my own areas of professional interest, for example, blogs are often my most trusted sources, because I know many of the people who write them, and some are world 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 ecology. 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.

The result is a reversal in the decline of what Jürgen Habermas calls
'the public sphere’ – 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-energized 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 what John Seely Brown calls ‘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, I suggest, is that a new organism has arrived in our media ecosystem and existing organisms are having to accommodate themselves to the newcomer, and vice versa. Interesting, complex – and essentially symbiotic – relationships are emerging between the new medium of blogging and more conventional print journalism. My conjecture is that this is beneficial to both.

**Digital imagery**

Another remarkable explosion of creativity comes from digital photography. Since 2005 an enormous number of digital cameras has been sold – and of course many mobile phones now come with an onboard camera. So every day, millions of digital photographs are taken. Until the advent of services like PhotoBucket, Flickr.com and Kodak Gallery, an understandable response to this statement would have been ‘so what?’ But these services allow people to upload their pictures and display them on the web, each neatly resized and allocated its own unique URL.

Flickr is the service I use. It now stores over two billion photographs. For me, 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 photographs tagged with ‘Ireland’ and came up with 1,018,825 images! Of course I didn’t sift through them all, but I must have looked
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.

**Audio and video**

And then there’s YouTube. Think of it as Flickr for video clips, many of them home-made. It too is growing almost exponentially, in true internet fashion. And it has an astonishingly wide range of content – from stuff that is unbelievably crass, to examples of wit and talent that take one’s breath away.

YouTube deserves an essay to itself – but space precludes that. I just want to highlight two aspects of it that seem, to me, significant.

First, 9/11. In September 2007, as the anniversary loomed, I suddenly wanted to check what the video coverage of the day had been like. In the old, push-media ecosystem, there would have been no way I could have satisfied that need. Broadcasters were the ones who controlled that stuff and decided whether or not to make it available. But all I had to do was go to YouTube and perform a simple search. And there, sure enough, were recordings of all the CNN, ABC and Fox News coverage of the day, streamed across the net to my study in Cambridge. And they’re available 24/7, as current marketing speak puts it.

Then my RSS reader turned up an entry on a blog by a journalist whose work I admire – Jeff Jarvis. He had been at Ground Zero on the day – and survived. A few days later, he recorded his experiences and posted them in six MP3 files to his blog. So I followed the link and spent about half an hour listening in the dark to an eyewitness account of the horror he had lived through.

These two experiences – of being able to find the multimedia records I sought and pull them down onto my computer – capture something of the essence of the new media ecosystem.

The second significant aspect of YouTube is the way it illustrates the extent to which we are moving into a remix culture. Lots of the material on the site is created by users who take products originally generated
by old media like broadcast TV and then rework them in some satirical way.

What links all these things is a phrase that in our old media ecosystem would be regarded as an oxymoron – a contradiction in terms. The phrase is ‘user-generated content’. In the old push-media world, users weren’t seen as capable of generating anything. They were passive recipients of what we decided to create. And even if, by some miracle, they did succeed in creating something, well, there was no way they were going to get it published, because they would never get past the gatekeepers who controlled access to publishing media.

That world is coming to an end. The media which nurture and support our social and cultural lives are changing. And that means that our culture – and our economies – will change too. It also means that we will change in response to what has happened to our environment. Well, perhaps we – in the sense of my (baby-boomer) generation – will not change that much, because we haven’t experienced the full force of the changes that I’ve been describing. But our children and grandchildren will. And they’re the ones who will shape the future – and use its libraries. (Or not, as the case may be.) So we need to think about them.

Digital immigrants and digital natives

In October 2006, in a presentation to the New York Library Council, Lee Rainie – Founding Director of the Pew Internet and American Life Project – drew a useful distinction between adults and children. The former, he said, are ‘digital immigrants’ – i.e. recent and somewhat tentative arrivals in cyberspace – whereas children are digital natives, people who have lived there all their lives.

The first cohort of true digital natives has now graduated from university and entered the workplace. So let’s look back at the media and technology environment in which they grew up.

Today’s 23-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. The first SMS message was sent in 1992, when these children were seven. 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 16+ examinations. Wikipedia and the iPod appeared in 2001. Early social networking services appeared in 2002 when they were doing 18+ examinations. Skype launched in 2003, as they were heading for university, and YouTube launched in 2005, as they were preparing for graduation and the workplace.

These young people have been socially conditioned in a universe that apparently runs parallel to the one inhabited by most of us in the education business (and perhaps some even in the library business). They’ve been playing computer games of mind-blowing complexity for ever. They’re resourceful, knowledgeable and natural users of computer and communications technology. They’re true digital natives – accustomed to creating content of their own – and publishing it.

In his portrayal of this generation, Lee Rainie drew attention to what he described as six ‘new realities’ about the native inhabitants of our emerging media ecosystem:

1. Media and gadgets are ubiquitous parts of everyday life. This means that the media environment in which these young people have been socialized is immeasurably more complex than it was in the decade before they were born.
2. New devices allow them to enjoy media and carry on communication anywhere. Mobile phones are a key element in this.
3. The internet is at the centre of the revolution – and mobile devices increasingly provide a window onto the network.
4. Multi-tasking is a way of life, and digital natives live in a state of ‘continuous partial attention’.
5. Ordinary citizens have the chance to be publishers, movie-makers, song creators and story-tellers.
6. Everything will change even more in coming years!

**Implications for the future**

We need to beware of the dangers of technological determinism, that is
to say the belief that technology is the prime mover of social development. The relationship between a society and its technological infrastructure is a complicated and interactive one; technology pushes, certainly; but society pushes back. And much of the time, the factors that determine which technologies become mainstream have relatively little to do with the properties of the technology itself – which is why most new technologies fail, because consumers refuse to adopt them, or the legal or social obstacles facing them are too high to be surmounted at a given moment.

Second, there is the fatal temptation to extrapolate current trends – to delude ourselves that the New New Thing (to adapt Michael Lewis’s title) is what will determine the future. The truth is that, in historical terms, we have just embarked on the networking revolution and we have no idea of what it’s long-term impact will be. But from what we’ve seen so far, it’s clear that:

- The internet will become ubiquitous and a central component of our information ecosystem.
- The ecosystem will be immeasurably more complex than anything that has gone before in terms of numbers of publishers, density and range of interactions between audiences and publishers, and speed of change.
- The technologies which triumph are those which meet a major human need or satisfy a significant desire. The automobile was one such technology – which is why it has become such a pervasive force in our societies. The mobile phone is another such technology, because it represents a transition from a world in which telephones were tethered, like goats, to a wall, to a world where communication is always possible.
- Young people who grow up in the new ecosystem will have different competencies, coping strategies and expectations from those of earlier generations. Most of our traditional ‘information sector’ doesn’t currently meet those expectations. The future is likely to be particularly acute for institutions that have hitherto regarded themselves as intermediaries between clients and services. Like travel agents. And libraries.

These are inferences drawn from my observation of what’s happening. You may object, quite reasonably, that they are based on what are effectively
just straws in the wind. But the whole point of straws is that they indicate which way the wind is blowing. What I want to suggest is that it’s blowing in a direction that many of us, professionally conditioned as we were in an older ecosystem, may well find unsettling or downright uncomfortable. And the $64 trillion question for librarians is: how will they avoid the fate of travel agents?

**Bibliography**


