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LOVE THEM OR LOATHE THEM: NAVIGATING THE LITERACY LANDSCAPE IN DIGITAL TIMES

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Back in the 1990s, academics writing and talking about new media often included a reference to the science fiction writer William Gibson. I'm afraid I'm still stuck in that groove. It is Gibson's capacity to create new words and to invest old ones with new meaning to which I draw your attention. He has named some of the cultural touchstones of the techno-society in which we live. In *Neuromancer*, published in 1984, he coined the word *cyberspace* which he explained as a matrix of 'bright lattices of logic unfolding across the colorless void' (Gibson 1986, p. 11) - a 'consensual hallucination' (Gibson 1986, p. 12).

In his two most recent novels, *Pattern Recognition* and *Spook Country*, Gibson (2003, 2007) has moved away from science fiction territory and placed himself squarely in the present. *Spook Country* is populated by 'illegal facilitators', non-existent magazines, terrorists, pirates, junkies, mad art dealers and WMD. As always, the female characters are brilliantly drawn. This time it's Hollis Henry, an investigative journalist from a magazine called Node, which doesn't exist yet. In *Pattern Recognition*, it is Cayce Pollard, a cool hunter, whose clients want to know what will work commercially and pay her big money to find out.

When *Spook Country* was released last year, Andrew Leonard (2007) from *Rolling Stone* asked Gibson if he had lost interest in the future. Replied Gibson:

It has to do with the nature of the present. If one had gone to talk to a publisher in 1997 with a scenario for a science-fiction novel that was in effect the scenario for the year 2007, nobody would buy anything like it. It's too complex, with too many huge sci-fi tropes: global warming; the lethal, sexually transmitted immune-system disease; the United States, attacked by crazy terror-

ists, invading the wrong country. Any one of these would have been more than adequate for a science-fiction novel. But if you suggested doing them all and presenting them as an imaginary future, they'd not only show you the door, they'd probably call security.

When Leonard asked: What are the major challenges we face? Gibson replied: 'Let's go for global warming, peak oil and ubiquitous computing'.

Of Gibson's three challenges, 'ubiquitous computing' has the most salience for literacy education in digital times. In *Spook Country*, Gibson uses the term to capture the new ontology, but he didn't invent the term. 'Ubiquitous computing' is attributed to Mark Weiser who worked at Xerox in the late 1980s. Another possible source is the 1969 novel *Ubik* written by the great science fiction writer, Philip K. Dick, whose work Gibson has always admired. However, in *Spook Country* Gibson gives 'ubiquitous computing' new meaning and significance. Explains Gibson:

One of the things our grandchildren will find quaintest about us is that we distinguish the digital from the real, the virtual from the real. In the future, that will become literally impossible. The distinction between cyberspace and that which isn't cyberspace is going to be unimaginable. When I wrote *Neuromancer* in 1984, cyberspace already existed for some people, but they didn't spend all their time there. So cyberspace was there, and we were here. Now cyberspace is here for a lot of us, and *there* has become any state of relative nonconnectivity. *There* is where they don't have Wi-Fi.

In a world of superubiquitous computing, you're not gonna know when you're on and when you're off. You're always going to be on, in some sort of blended-

reality state. You only think about it when something goes wrong and it goes off. And then it's a drag.

We haven't yet reached a state of ubiquitous computing but again Gibson is onto something. It's an idea that we can store away, puzzle over and re-examine as the textual and communication landscape continues to change rapidly, dramatically and in unexpected ways.

In that *Rolling Stone* interview, Gibson also suggested that we are living in what the post-modern theorist Fredric Jameson calls the 'simultaneous apprehension of dread and ecstasy' or, as I've expressed it in the title of this article, a condition of both 'loving and loathing' new media. An extreme state of ambivalence, if you like.

Polarised positions about the use of new technologies for educational purposes are familiar to us all. At one extreme, there are the promoters of the latest whizz-bang technology, celebrations of online life and predictions of enhanced teaching and learning when the latest technology appears. At the other, there are nostalgic paeans to the book and book culture, diatribes against computers, video games and the internet, and expressions of moral panic over the dangers lurking for children in cyberspace.

Texts that assume such extreme positions have enormous cultural impact, shaping the ways in which we think about new technologies. As both consumers of culture and as teachers of literacy, we need to be able to recognise these texts, understand them and find effective ways to deal with them in our classrooms. Why? Because it is part of our professional responsibility in digital times. I'll return to this argument a little later, but first let's look at some examples of texts that either celebrate or demonise new technologies.

Texts that celebrate new technologies are very easy to find. The cover of *Time* magazine, that announced the person of the year in December 2006, is a classic example. On the cover, there was a desktop computer with a mirror in place of the screen. The caption read: 'You. Yes, you. You control the Information Age. Welcome to your world'. That Christmas issue honoured the individuals who are changing the nature of the information age - the creators and consumers of user-generated content who are transforming art and politics and commerce. Said Managing Editor, Richard Stengel (2006, p. 4), they are 'the engaged citizens of a new digital democracy'.

Twenty-seven pages of the magazine were dedicated to hyping up Web 2.0 - a term used more or less interchangeably these days with social media. Although networking and interacting online have been available since the Web was launched in the early nineties, advances in technology have meant that social software tools such as blogs, wikis and virtual conferencing now also allow users to upload photos, videos and music. As the extraordinary growth of Wikipedia, MySpace, FaceBook, YouTube and Twitter has demonstrated, social media are what matters today - at least until the next best technology comes along.

The introductory piece in *Time* asserted that Web 2.0 provides ordinary people with the opportunity 'to build a new kind of international understanding' (Grossman 2006, p. 25). It was followed by fifteen cameos of citizens of the new digital democracy, including Leila, the real Loneleygirl15, one of the most viewed YouTube users ever, who is a work of fiction created by two professional screenwriters and an actress from New Zealand. Next came a two-pager about the power of anyone with a digital camera 'to change history' (Poniewozik 2006, p. 44), beginning with the story of the bystander who videotaped the police beating of Rodney King.

A longer piece followed which celebrated the YouTube 'gurus', Chad Hurley and Steve Chen, 'a couple of regular guys' who built a company that 'changed the way we see ourselves' (Cloud 2006, pp. 46-47). Any semblance of critique was left to the last two pages: one piece questioned the celebration of self, intrinsic to the current generation, and the other bemoaned the 'vast increase in the sheer quantity and accessibility of pure crap, even when measured against the dregs of the newsstand and the cable spectrum' (Johnson 2006, p. 55).

Time's salute to the citizens of cyberspace for Person of the Year in 2006 was part of a tradition of writing about new technologies which is not exclusive to the print-media. First it was hypertext, then it was the Internet and the World Wide Web, now it is Web 2.0, with really cool people talking about Web 3.0. Enthusiasts endow new media with utopian promise and discuss them in a celebratory way. The hope is for social and cultural change propelled by the latest information and communication technologies.

Two writers of popular books on new media, Ted Nelson and Howard Rheingold, epitomise this genre. In *Dream Machines*, Ted Nelson (1978) imagined the World Wide Web before the technology to make it

possible was available. Naming his project after Coleridge's poem *Xanadu*, he envisaged a system which would enable the storage of the entire human heritage, making it more accessible than ever before. His explanation of the purpose of Xanadu was imbued with utopian fervour: 'Our objective at the Xanadu project has been not to fulfil the needs of industry, or to make things happen a little faster or more efficiently. Ours has been the only proper objective: to make a new world (Nelson 1992, pp. 56-57).

In *The Virtual Community*, Howard Rheingold (1995) depicted a community where people talk, argue, seek information, organise politically, fall in love and deceive others - in his eyes, as real and diverse as any physical community. In *Smart Mobs* (2002), Rheingold looked at the convergence of popular culture, cutting-edge technology and social activism as the real impact of mobile technologies such as phones and hand-held computers. Rheingold's books resonate with the distinctive tone of that special issue of *Time*.

The celebratory genre also features in the press. When journalists write about new media and education, they often concentrate on how the technologies are changing schools for the better. When Bill Gates' school of the future opened in September 2006, it was reported as the chance for Microsoft 'to prove that it can help fix the woes of public education' (Yao 2006). The school was described as 'a gleaming white modern facility looking out of place amid rows of ramshackle homes in a working-class West Philadelphia neighborhood'. It has a high-tech building, laptops, wireless access, digital lockers, interactive smart boards and a learning process modelled on Microsoft's management techniques. Students are 'learners', teachers are 'educators' and there is no library but an interactive learning centre where information is digital and multimedia specialists help students with their queries.

Examples of texts that demonise new technologies are just as easy to find. Technology detractors predict the death of the book which they see as synonymous with the death of civilisation. They describe their love of printed books, first memories of reading at an early age, subsequent addiction and ongoing romance, reinforced by the pleasures of ownership. New forms of writing such as texting are dismissed as a threat to the sanctity of the English language.

An early example of these kinds of texts was Sven Birkert's *Gutenberg Elegies* published in 1994. Birkert wrote in a rather elegant way of the threat to culture of hypertext. Another book, this time by an Australian

author, John Nieuwenhuizen, was published in 1997. In *Asleep at the wheel: Australia on the superhighway*, Nieuwenhuizen warned about the dangers of going down the route of the information superhighway. Do you remember Al Gore's first linguistic gift to the world, before *An inconvenient truth*? It was the information superhighway, a metaphor that has since been superseded by the notion of networks of computers. Will 'ubiquitous computing' be the next way of thinking about access to technology?

Writers of such texts associate the use of digital technologies with the triviality and crassness of popular culture and argue that new technologies such as computer games have no place in literacy education. The Internet is somewhere children and young people may spend time out of school hours, but this doesn't justify its use in formal education. The detractors also express deep concern about children's open access to undesirable resources and information via the Internet.

In an article in *The Age*, a daily newspaper in Victoria, Australia, owned by Fairfax Media Limited, Pamela Bone (2004) said: '[i]f reading declines so do we all'. Writing in response to another commentator's suggestion that 'in today's culture, finely honed literacy skills are simply not as important as they once were ... for making your way in the world', Bone argued that only books provide the resources for exploring the meaning of life. Serious reading demands 'time and patience' and 'solitude' which is 'against the spirit of this hyperactive age'. Bone associated depth with books and superficiality with new media - her fear was an illiterate generation raised on text messaging, Internet surfing and video games.

However, not all celebrations of the book and book culture are as benign as the examples offered so far. The lingering cultural preference for the book and print technology is a key dimension of conservative criticism directed at English teaching and curricula in Australia. A question on the 2005 year 12 Advanced English exam in New South Wales, Australia, offered students 'a choice of "texts" to analyse, including the ATSIIC [Aboriginal and Torres Strait Islander Commission] site, drawing criticism that its inclusion was an insult to the classics' (Lane 2005). A state curriculum that recognised the importance of teaching students how to critically evaluate new media spaces was vehemently attacked.

The next day 'Sticking to the book' was the header for the *Australian's* editorial (2005). The editorial attacked the students who had denounced critics of year 12 English courses and their teachers as reported

in the *Sydney Morning Herald*. The editorial argued that although critical analysis should be a core component of any English course: 'Books - not blogs, not digital ephemera, but books' should be set for study.

Deeply connected to texts that see new technologies as producing only negative cultural consequences is a strong sense of anxiety. Such fears are not new. Since the early days of television, there has been concern about the effects of TV on children, education, literacy and culture, and recommendations made for the control of its content and for strict supervision. Each successive technology has been seen to have a negative influence on children - by sanctioning inappropriate values and by representing frightening and violent experiences.

It comes as no surprise that there have been similar anxieties about children's access to the Internet, cyberspace and computer games, regarded widely as inherently dangerous unless controlled. The role of governments and schools to regulate the new technologies in the interests of vulnerable children is at the centre of public concern.

So when academic Victoria Carrington (2005) was interviewed on radio about the 13-year-old Scottish schoolgirl who submitted an essay written in text using her mobile phone the journalist's questions took a particular direction:

My smmr hols wr CWOT. B4, we used 2go2 NY 2C my bro, his GF & thr 3 :- kids FTF. ILNY, it's a gr8 plc'.

Translation:

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 a great place.

The journalist asked Carrington about textings' distinct style as compared with correct spelling and grammar, and then proceeded to link texting to youth, declining standards, poor academic achievement and social breakdown. When Carrington analysed a number of press articles discussing texting, she found that young people and standards were most often represented as needing protection from an addiction that could jeopardise their success in exams and their educational futures.

Take another example: When two sixteen-year-old high school students were found dead in the

Dandenong Ranges, east of Melbourne, the press connected their suicide to MySpace. With an image of the two girls and their last message, 'RIP Jessica & Mel' [not the girls' real names], posted on their website, the inference was that the Internet is a dangerous place for young people (eg Cubby & Dubecki 2007). By inserting the word 'MySpace', journalists made the story look exciting. However, all the evidence suggested that the girls didn't commit suicide because they wrote about depression on the Internet. They wrote about depression on the Internet because MySpace was a place for self-expression and communication as it is for many other young people.

A degree of caution and critical perspective on digital technologies is timely and appropriate. Without doubt, technologies such as the Internet and texting enable certain undesirable social behaviours and give some people the anonymity they need to entrap the susceptible. However, children can be preyed upon in whichever places they choose for recreation and teachers can be the victims of bullying, whether on a website or in an anonymous letter to the principal. History suggests that a sense of anxiety and moral panic is unwarranted as old technologies have also been used to connect children to inappropriate adult content and aggressive advertising. Risks can be exaggerated for the sake of a story but producing a moral panic doesn't inform or lead to sensible public debate or policy.

As I suggested earlier, in digital times where texts that assume extreme positions on new technologies represent a dominant feature of the cultural landscape, we have an additional set of responsibilities. We need to ensure that our students acquire the critical capabilities to make sense of the contemporary literacy landscape so that they can participate effectively in post-school life and work as informed, active citizens. Providing carefully structured opportunities for students to develop critical literacy skills and a strong sense of informed scepticism are more important than ever.

To be able to do this job well, it is useful to consider some of the knowledge researchers have assembled in the area of literacy and technology studies. First, the different ways of thinking about technology that have had a significant impact on how technology is represented. Second, there is much to be learned from examining the findings of research in the field of literacy and technology studies. Third, it is salutary to see how literacy teachers have responded to the call to integrate new media into their curriculum and pedagogy. I've expressed these important areas of

knowledge as three questions: What are the dominant ways in which researchers think about technology? What does the research tell us about how the use of digital technologies affects students' literacy practices and their learning? How have literacy teachers, but also teachers more generally, responded to the use of computer technologies in education?

First - What are the dominant ways in which researchers think about technology? Different ways of thinking about new technologies shape the kinds of questions researchers ask about their effects and how they are deployed in schools and classrooms. One particular approach dominates the public discourse and some scholarly journals: technological and social determinism. Both forms of determinism have their weaknesses as they ascribe too much power either to the technology or to the people who use it.

The main idea behind technological determinism is that qualities in the technology are responsible for changes that inevitably affect social relationships. The language of technological determinism is typified by sentences in which technology is made the subject of an active predicate: 'computers enhance students' learning', 'the Web democratizes the availability of information', 'Web 2.0 has changed the way we perceive the world'. In each case, a complex event is made to seem the outcome of a technological innovation.

Social determinism is the inverse. As exemplified in the *Time* story, it argues that those who use the technology have agency, and control over how it is used. In the words of the Managing Editor of *Time* (Stengel 2006, p. 4): 'We chose to put a mirror on the cover because it literally reflects the idea that you, not we, are transforming the information age'. People, not technology, are portrayed as responsible for the phenomenon of digital democracy.

Of the many social theories of technology available, domestication offers a particularly generative way to think about technology in literacy education. Domestication is a compromise between technological and social determinism. The theory was developed to examine the adoption of technologies in the home, but can be expanded to think about the use of new technologies in literacy education (Silverstone & Hirsch 1994).

Domestication theory is essentially a pragmatic approach. It accepts the idea that technologies have effects on people and that people shape their uses. Domestication theory looks at both the interactions between individuals and technologies and the

contexts within which the technologies are being defined and used. It also recognises that their adoption and use are dynamic and changing. Take the example of the Scandinavian university students who worked out how to send text messages with a mobile phone, a device designed to communicate via voice. Traces of domestication theory are evident in recent accounts of research that have explored the complex relationships between literacy, learning and technology.

Now to the second question - What does the research tell us about how the use of digital technologies affects students' literacy practices and their learning? All sorts of research-based claims have been made about how digital technologies affect literacy learning and practices. The findings of studies that have investigated the technologies' impact on learning range from clear improvement to no improvement, while some have even said that they make things worse. Sometimes statistics are used to indicate if there have been any significant differences in achievement between reading and writing with new technologies and reading and writing with traditional tools. Sometimes detailed descriptions of the settings and of changes in how the students make meaning and communicate their ideas are provided. What are people to make of this array of evidence?

It is useful to consider which theory of technology underpinned the research as it shaped the questions the researchers asked, the investigations they initiated and the conclusions they produced. When technological determinism has informed the research, the guiding question has often asked about the impact of technology on students' literacy performance. When social determinism has informed the study, then the focus has been on the teachers and students in classroom contexts and how they have used the technologies for particular purposes. When domestication theory has underpinned the research, the relationships between teachers, students and the technologies have all been examined as part of complex networks of interaction and learning.

The first studies used mainly experimental methods - the dominant approach in science and medicine. They investigated whether the use of computers improved literacy outcomes and the findings were equivocal. Almost three decades later, there is still no commanding body of evidence demonstrating that students' sustained use of the Internet, word processing and other popular applications has any impact on academic

achievement. My PhD study was in this tradition. Its title was: The impact of word processors on students' writing. The central question was: Does the use of word processors improve the quality of student's writing?

By the mid-80s, researchers were taking account of the settings in which the computers were used, producing detailed descriptions of classroom teaching and learning. There was a growing recognition that computers in classrooms were unlikely to negate the influence of social class on students' achievement. By the mid-90s, the Internet and the Web had become sites for research. Informed by the understanding of literacy as a set of social practices, investigations focused on new literacy practices, identity, gender, class and access. My book, written with Colin Lankshear and Bill Green (Lankshear, Snyder & Green 2000), *Teachers and Technoliteracy* reports the findings of a major Australian study that produced case studies of teachers trying to integrate computers into their classroom practices. There were also studies that emphasised the need to teach students how to critically assess the reliability and value of the information they find on the Web by understanding its source as well as its textual and non-textual features such as images, links and interactivity. Nick Burbules' (eg 2000 with Callister) work has been very important in this area.

Large-scale surveys have examined the complex relationships between the media, childhood, the family and the home. Sonia Livingstone's (eg 2002) work is notable. The surveys have found that young people live media-filled lives with access to an unprecedented amount of media in their homes. However, age, gender, race and class influence the amount of time young people spend using the media. Those with the poorest grades spend the most time playing video games. Television and listening to music remain important in their lives, but the Internet now commands the most time. Although children and young people continue to read books, they spend less time than past generations. Some young people are concerned about their growing dependence on machines, the isolating nature of the Internet, and how technology threatens their privacy and ability to relate to others.

Since the late nineties, researchers have been identifying new text types, language practices and social formations as young people use mobile phones, text messaging, the Internet, instant messaging, online games, blogs, search engines, websites, email, digital video, music, imaging and more. Their digital literacy practices include word processing, hypertextual

linking, participating in online discussion, using presentation software, creating webpages and assembling digital portfolios. Colin Lankshear and Michele Knobel's (2003) *New Literacies* is an excellent example of this research emphasis. Research examining the complex connections between school literacies and out-of-school literacies has provided insight for teachers about the experience and knowledge students bring to formal studies in school.

Along similar lines, researchers have investigated the relationship between computer games and literacy learning. The work of Jim Gee (2003) and Henry Jenkins (2006) stands out. Studies have demonstrated that games require complex literacies and teach a degree of multimodal, visual and linguistic sophistication, usually neglected in the literacy classroom. Research has also suggested the value such popular texts offer for consolidating and extending students' understanding of reading practices. For example, Catherine Beavis (2002) has argued that working with computer games in literacy classrooms provides students with additional means of expression and communication to those dependent on print skills.

Gender-based studies have revealed that computer games are one aspect of technology use where differences along gender lines are breaking down. Although most girls still do not choose technology subjects at school or in post-school study and continue to be under-represented in the IT industry, they are participating more in the culture of computer games. The assumption that the world of computer games is a male domain which emphasises violence and sexual fantasy for boys no longer holds. The stereotypical masculine narratives of certain games are unappealing to girls, but there are now other options for them.

So what are the implications of the research findings for literacy teachers? Researchers have emphasised the importance of understanding the children and young people who populate classrooms: what they do in their out-of-school lives, what captures their interest and what does not. Young people bring advanced technology-related skills to classrooms which could be used productively for language and literacy learning. But we also need to remember that there is great diversity in the ways in which families and young people engage with new technologies. Mark Warschauer's (2003) work on social inclusion and the digital divide can be quite chilling. Simply having access at home or at school does not guarantee students opportunities for literacy learning.

Writing about the possibilities for creative changes to classrooms and schools when new technologies are used, researchers have argued that a knowledge of the history of the new literacy practices is a prerequisite. Other researchers have questioned the assumption that the more schools spend on technology, the better the outcomes.

Suggestions from the research literature for how to re-think, redefine and redesign language and literacy in the classroom to meet the needs of students in the twenty-first century include a common component: above all else, a literacy classroom for the future must involve the effective integration of print literacy and digital literacy. It should not be a choice between the world of the page and the world of the screen - education needs to give attention to both. Achievement of this important goal requires a broader concept of literacy. But despite growing recognition of this need in the research literature, change to teachers' classroom practices has been slow.

Which brings me to my third question: How have literacy teachers, but also teachers more generally, responded to the use of computer technologies in education? In the main, literacy teachers have seen technology as antithetical to their concerns. Although this attitude is not shared by all, there has been a general mistrust of machines. So when desktop computers entered education systems in the late 1970s, touted as the new technology that would inevitably improve education, literacy teachers were reticent about exploring their potential use in the classroom. This restrained response continued through the 1980s, when computers were promoted as marvellous writing machines, tutors and drill masters. I've traced these patterns in *Hypertext* (Snyder 1996) and *Page to Screen* (Snyder 1997).

It persisted into the 1990s, when the Internet and the Web were hailed as making possible an approach to education in which students would be able to learn anything, anywhere, anytime. And it progressed into the 2000s, where the excitement has centred on the communication possibilities of Web 2.0. Interest has slowly expanded and increasing numbers of literacy teachers, particularly the younger ones, are now using digital technologies in their classrooms, but that initial reticence remains.

Much thought has been given in the research literature to how literacy teachers and educators might make effective use of the new technologies in their classrooms. However, the most commonly used

applications in literacy and English classrooms are word processing for writing and the Internet to search for information, which is not to discount the value of both. By and large, literacy teachers at all levels of schooling have used the new technologies to continue what they have always done. Students use laptop computers as they would use paper notebooks. Teachers may post assignments on the Web, communicate with students by email and respond to their writing electronically, but the traditional approach of initiating a curriculum activity, setting homework and evaluating the students' work has been sustained.

Although teachers in some other disciplines have been more enthusiastic than literacy teachers about the promise of computers, there has not been a technological revolution in education. Despite the huge investment of governments in wiring schools, reducing the ratio of students to computers and ensuring that curriculum documents take account of new technologies at all levels of education, teaching and learning in both Australian and Brazilian schools have not been transformed. By technologising education, governments have aimed to make schools more efficient and productive, more connected to real life and to prepare young people for post-school employment. Without any real evidence to indicate that these goals have been achieved, governments must now be asking whether the investment in computers and other technologies has been worth the cost (Cuban 2001).

Seymour Papert's (1993) parable of the time travellers from the nineteenth century has resonance here. When the time travellers visit a twenty-first century operating theatre in a hospital, they recognise little that is going on, but when they visit a classroom in a school, most things are familiar. The exponential growth of science and technology in recent years has meant that some areas of human activity such as telecommunications, entertainment, transportation and medicine have changed dramatically, but education has not. Schools as institutions and the teachers who work within them seem to be resistant to technology-based change.

Yet no-one who attended a school in the 1950s and then visited one in 2008 could fail to notice that important changes in technology-mediated curriculum and classroom practices have taken place. The point is not that schools and teachers cannot change, but that classroom and teaching practices persist due to historical legacies and contextual factors. Incremental

changes to education in response to new technologies have taken place but fundamental changes have been rare.

As Larry Cuban (2001) points out, despite the extravagant claims of the promoters, the provision of technology is insufficient to transform education let alone equip students with the skills and agency they need to operate effectively in the post-school world of leisure, work and citizenship. Real change requires far more than simply giving schools more technological resources. The whole ecology of schooling would need to be rethought if transformation was the objective: changes in how schools are organised and funded, in how teachers are prepared and valued, and in how hardware and software are designed to meet the needs of teachers and students rather than the world of business. Without such major changes, only relatively minor shifts in classroom practice are likely to take place (Cuban 2001).

Opportunities and Challenges

I have focused here on the sensationalised responses to new technologies that have been the culturally dominant texts for decades. There are two main strands - breathless accounts of the latest gadgetry and what's coming next, and moral arguments for retaining education's traditional allegiance to print culture. However, polarising and simplifying the issues in this way ignores the challenges we face trying to find strategies to deal with both the print and digital literacy needs of our students. Some of us have found ways to exploit the opportunities for rich learning that the new media offer and to help students become critical and capable users. However, most of us have been slow to adjust and when we do use the technologies, it's often to achieve print-based purposes in print-oriented ways.

There are very real systemic reasons to explain this phenomenon that go beyond our historical reticence with new technologies. Literacy classrooms are constrained by the static model of schools as institutions that prevents careful inquiry into the new literacies and the expansive use of new media. We have little time to reflect on what we do, no matter what the proposed curriculum direction. So when we try to work with digital media in our classrooms, there is not much opportunity to build creative partnerships with colleagues and to experiment with new literacies. Imaginative uses are often limited to the technology champions who, research shows, eventually experience burn-out.

There is a gulf between the world of the literacy classroom and the world of our students who are immersed in media, the Internet and video games. Problems with the infrastructure of the schools we work in also exacerbate the difficulties: the Internet may be working one day, down the next, and the computers are often not powerful enough for the use of advanced tools. Further, schools may have constricting rules about email and Internet access which frustrate both teachers and students. These factors alone are enough to discourage all of us from trying to integrate new technologies into our classrooms practices even though we may be dedicated and experienced users in our private lives.

Yet as teachers we are still charged with the responsibility to find innovative ways to incorporate the new literacies into classroom practice. The skills and knowledge of print literacy are essential, but not enough to support young people as they live their lives in the networked information society. When literacy is seen as a repertoire of linguistic and intellectual abilities which learners need to function at the highest levels in a multi-media world, notions of literacy as a set of basic skills prescribed for a print-based world, seem more and more limited.

The responsibility of literacy educators is to provide young people with carefully planned opportunities to learn how to become critical navigators of the literacy landscape in digital times. We can help our students make sense of the digital literacy landscape so that they are not seduced by what they find. The aim is to imbue them with a strong sense of informed scepticism.

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