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Pedagogical Practice after the Information Age

Erica McWilliam
Queensland University of Technology
Australia

Shane Dawson
Queensland University of Technology
Australia

Abstract

This paper sets out some new ways of thinking and doing pedagogy in the twenty-first century. It indicates how 'content' and 'learning' are being transformed in the new millennium, and considers some quite precise ways in which schools and universities might be able to make practical pedagogical moves to 'catch' the wave of change and ride it, rather than cling to the wreckage of traditional content and processes – even 'progressive' ones. The paper begins by considering the changing shape of 'content' i.e., of what counts as worth learning. It then proceeds to explore new forms of social engagement and how they can inform a fresh understanding of how learners might engage optimally with 'content'. Finally it explores what sort of educational research might inform pedagogical change in the short to medium term. All this is set within the context of the urgency and the impetus to pedagogical change and mounting evidence of the entrenchment and obstinacy of our mainstream educational practices.

Keywords: information age, pedagogy, curriculum, digitalisation, education

Introduction

Much has been made, in recent times, of the extent to which we have seen one 'Age' of knowledge production end and another begin. Whether the advent of a new millennium provided the impetus, or whether it came from so much evidence of new patterns of social engagement emerging in a new generation, there is no doubt about the flurry of literature in recent years declaring the end of one sort of 'knowledge society' and the beginning of a new era. This new era – called variously

the Conceptual Age (Pink, 2005), the Dream Society (Jensen, 1999) or the Economy of Icons (Sternberg, 1999) – is one in which knowledge, learners and learning are profoundly different, and it is a difference for which our educational institutions have been – and still are thoroughly unprepared.

In what follows we indicate how 'content' and 'learning' are being transformed by the current surge of readily accessible information and communication technologies, and move on from these deliberations to explore practical pedagogical moves schools and universities can make to catch the wave of change and ride it, rather than cling to the wreckage of traditional instructive content and process. We begin by considering the changing shape of 'content' i.e., of what counts as 'worth' learning. We then go on to explore new forms of social engagement and what new affordances they bring to a fresh understanding of how learners might engage optimally with 'content'. Finally we provide an indication of the sort of educational research that might inform pedagogical change in the short to medium term. We do all this in the context of the urgency that now attaches to pedagogical change and the entrenchment of our mainstream educational practices i.e., their capacity to stand as anachronistic sentinels defying external logic and yet anxious about the educational experience they offer to the 'Net' generation.

Disrupting 'content'

As a number of commentators have pointed out (e.g. Dator, 2005; Lessig, 2005), formal education remains deeply wedded to the written word. Indeed, Jim Dator goes further to argue that "seldom has a technology been the subject of more worship than the word is in literate cultures" (Dator, 2005, p.202). The written word connotes more than the skills of knowledge access. As the capital 'w' Word, it is imbued with moral purpose and as such achieves a status above and beyond a useful medium, skill or capacity.

If sacred texts are the purest examples of the call to the literal Word, secular texts like encyclopaedias have also achieved for the Word a revered status through which it has maintained a long and strong grasp on mainstream educational 'content'. While we certainly have seen tinkering at the edges of disciplinary 'content', what counts as worth knowing in schools and universities has remained been very much wedded to the 'bookish' word – the word of the scientist, of the writer, or the historian and so on. Thus any parity of esteem of the sort that Lawrence Lessig (2005) argues should be afforded 'word', 'sound' and 'image' in digital times is still far from the value system that attaches to 'content'. 'Sound' and 'image' are very much garnish to the 'word' roast, unless located in the visual or performing arts. There they remain fringe-dwellers on the edge of formal learning rather than part of its core business.

The resilience of the word-as-content is aptly illustrated by the longevity of the Encyclopaedia Britannica. Despite all we know about the short shelf-life of knowledge and the speed with which scientific 'facts' become 'errors', The Encyclopaedia still proudly claims itself as "an encyclopaedia created by experts, [and still] sought after by many [as] ... *the* gateway to knowledge and understanding" (Encyclopaedia Britannica Australia, 2007, emphasis added). As "the oldest continuously published reference source in the English language", and "the most authoritative encyclopedia"

in the world today, its presence is purported to signal value beyond a mere information repository. "Walk into a home or an office with the 2007 Encyclopaedia Britannica on the shelf", its promotional material declares, "and you immediately know you're in a place where learning and discovery are respected ...[and where]...[k]nowledge and information are cherished and enjoyed" (Encyclopaedia Britannica Australia, accessed 15 August 2007, emphasis added). In other words, not just an encyclopaedia but a way of life!

For 'baby boomer' school children of the post-war years, Encyclopaedia Britannica certainly had special significance, echoes of which linger in the marketing material quoted above. As a technology through which the legitimate form of content is, and is seen to be - the 'authorised' word, the encyclopaedia may be considered a metaphor for the Information Age itself – information-as-knowledge that is crystalline and crystal clear, contained and containable, trustworthy and indisputable, readily available to all those who can read and write.

A key point here, in terms of formal education, is the word 'authorised'. This is what turns content into school curriculum and curriculum into a systemic syllabus. It is what frames the disciplines and the faculties of universities. The 'authorised word' locates the knower and the learner in very different spaces, vertically differentiated and clearly defined. It de-limits whose reading and writing is to be respected and revered. It is focused on a past in which reputations have been made rather than a future where reputations are yet to be forged. Thus the 'authorised word' is very much the medium for framing what Marc Prensky (2001) calls "Legacy content" – that is, content that "includes reading, writing, arithmetic, logical thinking, [and]...understanding the writings and ideas of the past" (p.4). It has little to do with "Future content" (Prensky, 2001) i.e., digital and technological knowledge like "software, hardware, robotics, nanotechnology, genomics ...[and also]...*the ethics, politics, sociology, languages and other things that go with them*" (p.4, emphasis in original).

Our interest is in imagining new forms of knowledge production and dissemination when the 'authorised word' ("Legacy content") that dominates in schools and universities is by-passed, as it increasingly is, by a Net generation that actively engages in co-creating 'Future' content – in editing, assembling and dis-assembling it. What pedagogical possibilities might arise when the command-and-control economy of knowledge creation and distribution finds its stranglehold on author/ity being weakened by the productive power of horizontal networks of individuals with a penchant for cutting and pasting ideas, patterns of words, sounds and images in millions of households and garages? In other words, how might formal learning environments become responsive to learners who are not at the end of a vertical supply and demand chain – not passive couch potato consumers but an active 'prod-*users*' (Lessig, 2005) of ideas and products, some of which may have wider commercial and/or scientific value?

To date there has been no radical re-working of the systems and the pedagogical practices that characterise mainstream education. This is so despite urgings about the need not simply for *more* education but *better* education for a changed world economy. This plea comes not only from social commentators such as Ken Robinson but also bodies like The National Center on Education and the Economy in the USA (www.skillscommission.org) and the European University Association (www.eua.be).

At the same time, moral panics proliferate about the perceived loss of foundational skills in the net generation - fears that SMS-ing will be detrimental to young people's capacity to spell, fear that kids know their McDonalds but not their mathematics, fear that kids won't get a job because they don't understand what that quaint 19th century term 'next-of-kin' means, fear that kids will lose the capacity to remember facts because they are so fast at finding them. One way of explaining all this panic is to understand the role that the 'authorised word' has in the *moral training* of young people. It is as if there is something fundamentally worthy about 'command and control' processes of instruction and allied testing, that young people will be 'better people' if they can recite the names of Prime Ministers and Presidents in alphabetical order, or if they can write a six hundred word essay in copybook prose, as though some combination of Sir Francis Bacon and a Quiz Show Champion would constitute the ideal global citizen/knowledge worker for our times.

Meanwhile, those who 'prod-*use*' wikipedia (www.wikiepdia.org) as their preferred information source – and this number is increasing exponentially - do so with little regard for the trappings of academic authority or the moral panics that continue to attach to reliance on anything sourced through the Internet. While the pre-publication scrutiny of content on the Internet as a whole cannot compete with the reputation and resources that continue to attach to the 'authorised' word, when it comes to expertise and editing, more interactive and shared knowledge resources allow for greater numbers of the public to contribute to the information sources. For instance, in answer to those who disparage the quality of information to be accessed online at sites such as wikipedia, its advocates point to the speed and accuracy with which hundreds of regular prod-*users* can provide and update useful information, and can edit out 'bogus' or misleading information. This stands in sharp contrast to the lugubrious editing processes that need to be cranked up when Encyclopaedia Britannica needs an error corrected. Moreover, wikipedia's openness in terms of process also stands in contrast to the defensiveness of traditional editors when challenged on a particular point of 'fact'.

'Liquid modern' learning

However we might want to hold onto the myth of scientific certainty, "liquid modernity" (Bauman, 2000) does not allow author/ity to be monopolised by a handful of academic or scientific 'experts' – in other words, information wants to be free. Everyone can be publisher and editor – a producer and user of content knowledge. We are seeing not only the multiplying of sources of knowledge from 'outside' traditional knowledge domains, but also more openness to that knowledge from within social and scientific organisations, more combinations of in-house knowledge with external ideas, more co-production of knowledge and greater preparedness to jettison knowledge that does not tell in its applications. In this context, having 'the last word' is rendered at best suspect and at worst just plain silly.

New knowledge is being created at speed. According to Kevin Byron (2007), the full product cycle, from innovation to diffusion to stasis, was, in the 1970s, about 30 to 50 years in duration. By 2006, that cycle has now reduced in duration to about 5-10 years. The time taken to communicate with 50 million people has shifted from 30 yrs

(Radio), to 13 yrs (Television) to 4 years (World Wide Web). Richard Florida, author of *The Rise of the Creative Class* (2002), argues that almost one third of the workforce are 'creatives', because they turn symbolic knowledge into economic and social assets. In so doing, their competitive edge depends on the speed with which they can make cultural products that are both novel and appropriate. The creative industries in which these workers will be predominant (many of which do not yet exist) are predicted by Daniel Pink, author of *A Whole New Mind* (2005), to be worth 6.1 trillion dollars in 15 years time. So speed matters, and those who can access and edit at speed have a greater potential to create and maintain valuable networks than those who cannot. For 21st century young people, the future is correctible (Inayatullah, 2007), available to be constantly re-invented, and all this can happen fast.

Along with the imperative for faster operational systems we are seeing a move away from content knowledge created by large scale commercial and research and development organisations. The move is to what is predominantly household driven innovation. The 'digital' shift from *authority* to *voice* is a shift that is evident in the communities of interest that provide the stories, identities and resources for building new communities – communities for co-creative communication, communities of interest (e.g., eduspaces, BC campus), communities around user-generated content (e.g., flickr, My Space), user-defined collections (e.g., Amazon, del.icio.us) and community interpretation (e.g., YouTube).

Meanwhile, formal education keeps promising to help young people reach their full potential while continuing with standardised curriculum, pedagogy and assessment models that have little to do with their futures, or indeed the future of learning. This is not to argue that theories of teaching and learning have not changed at all in recent decades. It is, however, to claim that schools are still organised through standard operational procedures that were produced in the Industrial Age and Information Ages of the 19th and 20th centuries. They were not designed for content co-creation, new learners or the new forms of engagements that digitally savvy young people call living. Unlike the Information Age, in which the core business was the routine accessing of information to solve routine problems, the new Age invests in, and springs from, unique cultural forms and modes of consumption that digital tools and communications are making possible.

Whether or not we agree that all this amounts to the first real generation gap since rock and roll (Robinson, 2007), it certainly makes unique demands of educators, just as it makes unique demands of the systems, strategies and sustainability of organisations. Put simply, educators are ill-equipped to respond, but the urgency of a more relevant response from schools and universities is increasing at an exponential rate.

New times, old pedagogies

The vast majority of schools today continue to use structures and artefacts pertinent to the Industrial and Information Ages (Phillip, 2007). In organisational terms, schooling is a top-down hierarchy of command and control, with designated timetables, fragmented and specialised disciplines and classrooms designed to house thirty or so students, frequently at desks in rows facing black/whiteboards. Moreover, despite the tinkering with curriculum that we have seen in more recent times, teachers

continue to work as singular 'content authorities'. Ask children to provide a picture of their experience of school, and the picture they are most likely to paint is 'blah blah blah' from the teacher at the front. Whether or not the blackboard has been replaced by a whiteboard, a 'transmission' culture of traditional curriculum remains dominant. While technologically-mediated tools have recently been conspicuously employed, the logic of their usage is predicated on pre-existing transmission based models of pedagogy, i.e., Tools designed for new modes of social engagement serve fewer broader purposes than the transmission of "Legacy" content or the location of sites of information (Thompson, 2007; Williams, Coles, Wilson, Richardson, & Tuson, 2000). Thus laptops, wireless access, data projectors and interactive whiteboards now generally 'stand in for' pens and paper, blackboard diagrams and print-based worksheets, despite the efforts of academic staff developers and a few maverick educators (Burnett & Dawson, 2005).

The command and control model of schooling clearly limits the sort of curriculum, pedagogy and assessment that is able to be enacted in a school. It is not a matter of 'blaming' school-based educators for this state of affairs but it is important to understand the 'double vision' that educational policy requires of its teachers. At a time when Child Protection legislation is central to any government policy related to children, teachers now have an expanded duty of care in which risk of any kind is to be minimised (McWilliam, 2003; McWilliam & Jones, 2005) at the same time that they are expected to provide an open, creative environment which encourages risk-taking. Schools must be on guard against the unfamiliar at the same time that they are supposed to welcome it. So the sort of risk-taking that is made possible through opening up schools remains in tension at all times with claims about 'safety first'. The fact that the push and pull of risk is a pendulum that swings back and forth in social life is a condition that we all now live with in a 'risk society' (Beck, 1992; Giddens, 2002), rather than a problem to be solved.

However, this does not assist schools to make a case that they are relevant to the cultural and social norms of the 21st century. Florida expressed his negative view of schools in his visit to Australia a few years ago[1]. A student of economic growth and social renewal in the USA, Florida was responding to questions from an audience of Queensland academics, politicians, bureaucrats and students. He had just finished a presentation about the importance of place in organising the sort of work that is done by 'the creative class'. According to Florida's empirical study of American economic trends, growth requires open systems that value social and cultural difference (tolerance), technology and talent (Florida, 2002, p.249). Schools, by contrast, continue to operate as closed systems with traditional notions of accountability and performance expertise. While admitting that his research has been in economics, not education, Florida contended that schools are disconnected from the fizz and edge of the creative workplace and likely to remain so.

Perhaps, then, it could be argued that the call to 'open up' to "Futures content" (Prensky, 2001) and its associated risk-taking and experimentation should just be ignored by those who really understand the nature of schooling and its limitations. To adopt such a position is very risky indeed, if Florida is correct in his assertion that 'openness' to an external and uncertain world is a fundamental disposition of those

who would be part of "the creative class" (Florida, 2002). Closed systems which operate out of traditional notions of accountability and performance expertise are unlikely to lead to success either in wealth creation or in social betterment.

There is no doubting the frustrations of many would-be school reformers who have bemoaned what they perceive to be strong resistance from teachers and administrators when trying to 'open up' schools to enable new experiences. In an article in *Campus Review*, 'A new vision of learning environments' (Johnston, 2004), the frustration of one would-be reformer, Melbourne University doctoral student Andrew Bunting, is palpable:

> *At the moment we have stand-alone school buildings and whilst they're nestled out there in the community they're all behind cyclone fences. People aren't welcome because of things like stranger danger.* (p.12)

Bunting is convinced, however, that "contact and control can all be handled with today's communication technology and the increasing sophistication of on-line course delivery makes distance learning even more possible" (p.12). While the panopticon possibilities of new technologies need hardly be reiterated, it is less clear what precisely this would mean in terms of taking full responsibility for enacting the expanded duty of care that is now *de rigeur* for all teachers of young people. The idea that more or different technology in/for schools can of itself solve this dilemma is naïve at best, given the moral panics that have been generated around children's access to the internet, and the expense (and potential for abuse) of mobile phones. Put simply, despite the fact that technology comes "with the friendliest of epithets" (Strathern, 1997, p.317), each wave of techno-innovation brings with it a new set of risks that must be managed on behalf of the school community, and this in turn requires teachers and administrators to engage in yet another set of risk mitigation tasks. In short, the push to learning innovation and the pull to child protection through risk minimisation are contradictory imperatives that together shape the way that schools are organised and changed in the twenty-first century, for better *and* worse.

Beyond the problematic issue of 'risky' learning, we also have a pedagogical gap between how technological tools and resources are currently utilised and what research is telling us about optimal learning environments. Put simply, research tells us that optimal learning environments are not based on efficient 'couch potato' consumption of transmitted information but on social interactions within communities of interest. There is indeed a plethora of literature about the implementation and development of pedagogical practices across the education sector that focuses squarely on the importance of social interactions for optimising student learning. For instance, Vygotsky (1978), Bandura (1977) and more recently, Lave and Wenger (1991) and Seimens (2005) have developed learning theories emphasising the importance of socialisation in order to aid learning. Northedge (2003) likewise has argued that the embracing of social constructivist principles among educators has forced a shift in teaching practices from didactic teacher ('sage on the stage') to facilitator ('guide on the side'). What is critical here is the notion that learning is fundamentally a social activity and that pedagogy therefore, is about optimising the value of social engagement.

The shift from a transmission model of education to a social or community-centred approach is reflected in the move from absolute and verified knowledge as represented by Encyclopaedia Britannica (EB), to community understandings as exemplified by wikipedia. In essence the transition from 'sage on the stage' to 'guide on the side' has mirrored the transfer of information source from the authoritarian EB to the informal and communal online environment such as wikipedia. While Northedge (2003) argues the importance of 'balancing' these pedagogical approaches, we would go further, arguing for pedagogical work that is appropriate to the role of "*meddler in the middle*" (McWilliam, 2005, p.5). In this role teachers are not commanders, nor are they fully 'in control', just as the student is not a passive participant in the learning process but an active creator and sharer of 'curriculum' and the evaluation of learning outcomes. 'Meddling' teachers actively co-create learning resources with students, leading and following just as the students have opportunities to lead and follow.

Back to nature?

The concept of 'lead-and-follow' as a shared responsibility has been elaborated upon by us elsewhere (McWilliam & Dawson, 2008). Students as leaders and followers in dynamic learning environments can be seen enacting the 'flocking' behaviour of birds, with individuals contributing collectively yet independently of fellow peers, in order to maximise efficiencies for achieving shared learning goals. As in 'swarming' behaviour (Miller, 2007), command-and-control leadership is not the dynamic through which complex problems are solved and tasks allocated.

'Swarming' or 'flocking' or 'teeming' behaviour involves much more than this. Computer simulations of 'boids' (bird objects) (Thompson, 2006) are informative about the behavioural principles that allow flocks or swarms to perform with more capacity (e.g., flying higher and faster) than the capacity of any one flock member. The deceptively simple rules involved - *separation* (the capacity to steer to avoid crowding others), *alignment* (the capacity to steer towards the average heading of the local flockmates) and *cohesion* (the capacity to steer to move towards the average position of local flockmates), ensure that each boid is aligned with and responsive to those flockmates in their immediate vicinity, as well as appropriately separate from other flockmates. The pedagogical implications of this are that team-based student 'self-management' needs to function in way that does not interfere with others. At the same time, this is not a space of individual 'freedom' – there are 'good inhibitors' to behaviour that ensure any 'randomness' is always systematic, scanning for and reporting anything 'interesting'. All this purposive activity has the effect of reducing vulnerability to individual member failure, while at the same time generating "swarm intelligence" i.e. "amazing scheduling and routing capabilities" (Thompson, 2006) that are well beyond any individual capacity.

The internet has made it possible to harness such 'swarm intelligence' more powerfully than any technology. Yet while there has been much interest and investment in ICTs for learning, we have made scant headway in understanding what sorts of collaborations are now possible, and whether and how they might be systematically fostered in formal education. So what might pedagogy look like that is informed by 'bio-behaviour'?

While we acknowledge that human behaviour is much more complex than that of 'boids', we nevertheless see value in applying the principles of bio-behaviour to 21st century pedagogy. Some work has already commenced to apply these ideas to human teams at work within organisations (Thompson, 2006), but they are yet to be applied to educational environments. It may be that the very large numbers of users on the internet militate against a self-managing 'local neighbourhood' forming and being sustained through its capacity to share, connect and co-invent. However, the numbers of students we teach in a particular discipline or 'class' should not be an inhibitor.

Recent research has begun to probe the social formations that university students co-create in their on-line learning (Dawson, 2007; Haythornthwaite, 2001 & 2002). The sociogram of a sample class's interactions on-line in Figure 1 is a useful illustration of the emergence of what appear to be 'local neighbourhoods' – relatively stable groups of four, five or six individuals with strong peer-to-peer relationships. By contrast, it also shows that many individuals are disconnected or only tenuously connected to their peers.

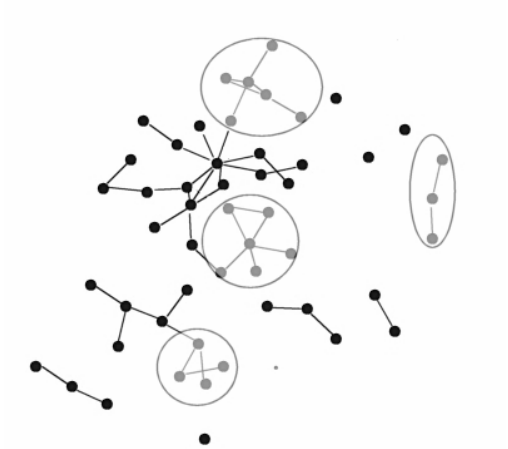

Figure 1: Sociogram of student discussion forum communication interactions[2]

The sociogram illustrates not only the localised neighbourhoods but also the key individuals *linking* potentially disparate student neighbourhoods into a networked community. These individuals act as 'border crossers' relaying, editing and assisting in the information flow throughout the entire network. Clearly the border crossers are taking on some of the typical roles of teachers, and their assistance is pivotal to the overall 'swarm intelligence' of the group as a whole. The sociogram also highlights those individuals with greater or fewer direct contacts in the network. From an educators' perspective this provides an opportunity to rapidly identify potential 'flockmates' that are disconnected and disengaged with the network.

There is much that we need to know about the presence of absence of 'local (student) neighbourhoods' in terms of the conditions of their formation, their temporal and spatial dimensions and how these factors impact on individual learning performance. In exploring these matters in future research, we may be able to provide the pedagogi-

cal support and direction through which more of our students can be active self-managers of their learning in active, purposive 'local neighbourhoods'. That is, we may be able to imagine – and then create - an environment in which 'group work' – currently the bane of many students' lives - is supplanted by rich dynamic processes of peer-to-peer learning as flockmates for whom the local neighbourhood' works as a practical and sustainable source of - and support for – learning.

For the Net generation, the sharing of resources, content and information is already a core and central component of life (Oblinger & Oblinger, 2005). Novice online gamers seldom refer to instructional manuals for acquiring the rules, norms and vocabulary required to be an active and legitimate community member (Willett, 2007). They learn through discussions and online experiences with more skilled members, all of whom share, as flockmates, their passion for 'flying higher' in the game. This peer-to-peer dynamic carries through to all aspects of the net generation's daily lives including their educational experiences.

In place of the skepticism baby boomer educators bring to the usefulness of online technologies for learning (including worries about student plagiarism and lack of attention to print-based 'basics'), the net generation is much more sanguine about fellow members re-creating and re-purposing prior learning resources. The sharing and co-production of learning resources within the virtual world has been possible because of the development of broad and effective social networks (Thompson, 2007). By developing friendly relationships in online blogging software such as My Space and Facebook, users have the opportunity to identify the specific skills and characteristics that are required for participation within a dynamic team or 'local neighbourhood'.

Friends or flockmates are recruited through processes of self-promotion and exposure where individuals unabashedly display their daily lives, skills, interests and attributes in ways that may seem both narcissistic and dangerous to baby boomers. Yet this display does a particular kind of work in that it makes it possible to locate shared passions and thus who potential flockmates might be, as well as how they can be accessed. Educators who capitalise on these generational characteristics of sharing, searching, rapidly evaluating, self-promotion and synergising with peers, are more likely to be enacting teaching and learning practices that imitate the forms of sharing and community that flourish in the virtual world.

Pockets of innovations may now be found dotting the formal learning landscape, yet most schools and universities continue to defy the trend away from singular top-down authority to the democratising imperative of 'giving voice'. Moreover, they remain domains in which the value of information accessed via the online environment is problematic in terms of its legitimacy as 'pure' disciplinary knowledge.

Conclusion

Much has been written in recent times about the importance of 'communities' to learning (see for example: Bielaczyc & Collins, 1999; Lave, 1993; Lave & Wenger, 1991; Levine Laufgraben & Shapiro, 2004; Palloff & Pratt, 1999; Rovai, 2002). We would argue that the bulk of this literature remains vague about the precise work of setting up a robust 'peer-to-peer' environment. It has become a conceptual cul-de-sac rather than a pathway to better practice. So rather than continue to pile up the case for

more or better 'communities of practice', we are seeking to explore further the value of bio-behaviour – and language that attends it – in order to capture more precisely the dynamics of optimal learning as a social activity.

There is much that is exciting and still relatively unexplored and unknown about the social world in which our young people are increasingly spending their time and energies. As reported by Stephen Lunn (2007), the engagement of young people with new media has reached unprecedented levels and continues to show exponential growth. Australia MySpace, for example, has reached the level of 3.8 million profiles, while Facebook has grown 270% in the past three months to about 150,000 profiles at the time of writing. It is not just that these sites are "worth billions" (Lunn, 2007), but that they are spaces where young people are practising the forms of navigation, networking and communication skills necessary to the 'creative worker' identity. Schools and universities whose curriculum, pedagogy and assessment remain 'outside' will be increasingly irrelevant to the modes of learning and social engagement that young people choose and to the future of their work. It is not that teachers should never instruct, or that facts should never be memorized. The point is that memorization of facts by couch-potato consumers of information passed from a top-down 'authority' is a much less valuable exercise than it was a few decades ago. There are more 'high flying' activities to be getting on with.

Correspondence

Erica McWilliam
Faculty of Education
Queensland University of Technology
Kelvin Grove, Qld Australia 4059
Email: e.mcwilliam@qut.edu.au

Shane Dawson
Faculty of Education
Queensland University of Technology
Kelvin Grove, Qld Australia 4059
Email: sp.dawson@qut.edu.au

Notes

1. Florida, R. (2004). The Rise of the Creative Class, sponsored by the Hornery Institute, The Roundhouse Theatre, Kelvin Grove Urban Village, Brisbane, 22 March.
2. The data informing the sociogram (Figure 1) emerged from a study investigating the relationship between student sense of community and online communication interactions (Dawson, 2007).

References

Bandura, Albert. (1977). *Social learning theory.* New York: General Learning.

Bauman, Zygmunt. (2000). *Liquid modernity*. Cambridge: Polity.

Beck, Ulrich. (1992). *Risk society: Towards a new modernity.* London: Sage.

Bielaczyc, Katerine, & Allan Collins. (1999). Learning communities in classrooms: A reconceptualization of educational practice. In Charles Reigeluth (Ed.), *Instructional-design theories and models, Volume II: A new paradigm of instructional theory* (pp. 269-292). Mahwah, NJ: Lawrence Erlbaum Associates.

Burnett, Bruce, & Shane Dawson. (2005, 29 September). *Aligned and resistant communities: Exploring new conduits for online engagement.* Paper presented at the OLT 2005: Beyond delivery, Brisbane, Australia.

Byron, Kevin. (2007, January 8-10). *Defining boundaries for creativity.* Paper presented at the Creativity or conformity? Building cultures of creativity in higher education, Cardiff.

Dator, Jim. (2005). Universities without "quality" and quality without "universities". *On the Horizon, 13*(4), 199-215.

Dawson, Shane. (2007). *Juxtaposing community with learning: The relationship between learner contributions and sense of community in online environments*. Unpublished PhD, Brisbane: Queensland University of Technology.

Encylopaedia Britannica Australia (2007). *Encyclopaedia Britannica.* Retrieved August 15, 2007, from http://www.britannica.com.au/

Florida, Richard. (2002). *The rise of the creative class.* New York: Basic Books.

Giddens, Anthony. (2002). *Runaway world: How globalisation is reshaping our lives.* London: Profile Books.

Haythornthwaite, Caroline. (2001). Exploring multiplexity: Social network structures in a computer-supported distance learning class. *The information society, 17*(3), 211-226.

Haythornthwaite, Caroline. (2002). Building social networks via computer networks: Creating and sustaining distributed learning communities. In K. Ann Renninger & Wesley Shumar (Eds.), *Building virtual communities: Learning and change in cyber-space* (pp. 159-190). New York: Cambridge University Press.

Inayatullah, Sohail. (2007). A post Howard-Costello scenario. *Journal of Futures Studies, 11*(3), 93-96. Retrieved August 5, 2007, from http://www.jfs.tku.edu.tw/2011-2003/ES2002.pdf.

Jensen, Rolf. (1999). *The dream society: How the coming shift from information to imagination will transform your business.* New York: McGraw-Hill.

Johnston, Megan. (2004). A new vision of learning environments. *Campus Review, 7*(4).

Lave, Jean. (1993). Situating learning in communities of practice. In Lauren B. Resnick, John M. Levine, & Stephanie D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 17-36). Washington, DC: American Psychological Association.

Lave, Jean, & Etienne Wenger. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge: Cambridge University Press.

Lessig, Lawrence. (2005, 18-19 January). *The vision for creative commons: What are we and where are we headed?* Paper presented at the Keynote address presented at the 'Open Content Licensing (OCL): Cultivating the Creative Commons', QUT, Brisbane.

Levine Laufgraben, Jodi, & Nancy Shapiro. (2004). *Sustaining and improving learning*

communities. San Francisco: Jossey-Bass.

Lunn, Stephen. (2007, July 27). Face to face in cyberspace. *The Australian.* Retrieved July 27, 2007, from http://www.theaustralian.news.com.au/story/2000,,22140064-22128737,22140000.html?from=public_rss

McWilliam, Erica. (2003). The vulnerable child as a pedagogical subject. *Journal of Curriculum Theorizing, 19* (2), 35-44.

McWilliam, Erica. (2005). Unlearning pedagogy. *Journal of Learning Design, 1*(1), 1-11.

McWilliam, Erica, & Shane Dawson. (2008). Teaching for creativity: Towards sustainable and replicable pedagogical practice. *Higher Education.* Retrieved March 4, 2008, from http://www.springerlink.com/content/g518p92082x3l221/

McWilliam, Erica, & Alison Jones. (2005). An unprotected species? On teachers as risky subjects. *British Journal of Educational Research, 31*(1), 109-120.

Miller, Peter. (2007). Swarm Theory. Retrieved August 22, 2007, from http://www7.nationalgeographic. com/ngm/0707/feature5/

Northedge, Andrew. (2003). Enabling participation in academic discourse. *Teaching in Higher Education, 8*(2), 169-180.

Oblinger, Diana, & James Oblinger. (2005). Is it age or IT: First steps toward understanding the net generation. In Diana Oblinger & James Oblinger (Eds.), *Educating the net generation.* Boulder, CO: Educause.

Palloff, Rena, & Keith Pratt. (1999). *Building learning communities in cyberspace.* San Francisco: Jossey-Bass.

Phillip, Donald. (2007). The knowledge building paradigm: A model of learning for net generation students. *Innovate, 3*(5), Retrieved July 28, 2007, from http://www.innovateonline.info/index.php?view=article&id=368

Pink, Daniel H. (2005). *A whole new mind.* New York: Penguin.

Prensky, Marc. (2001). Digital natives, digital immigrants. *On the Horizon, 9*(5), 1-6.

Robinson, Ken. (2007, March 29-30). *The other climate crisis: Digital culture, demography and education (Keynote address).* Paper presented at the Digital Literacy and Creative Innovation in a Knowledge Economy Research Symposium, Queensland State Library, Brisbane, Australia.

Rovai, Alfred P. (2002). *Building sense of community at a distance.* Retrieved January 25, 2005, from http://www.irrodl.org/content/v3.1/rovai.html

Siemens, George. (2005). A learning theory for the digital age. *Instructional Technology and Distance Education, 2*(1), 3-10.

Sternberg, Ernest. (1999). *The economy of icons : How business manufactures meaning.* Westport: Greenwood.

Strathern, Marilyn. (1997). 'Improving ratings': Audit in the British university system. *European Review, 5*(3), 305–321.

Thompson, John. (2007). Is education ready for web 2.0 students? *Innovate, 3*(4). Retrieved July 28, 2007, from http://www.innovateonline.info/index.php?view=article&id=2393

Thompson, Ken. (2006). *Enhance team performance by consistent individual behaviour.* Retrieved April 27, 2007, from http://www.bioteams.com/2006/03/22/enhance_team_performance.html

Vygotsky, Lev S. (and edited by Michael Cole, Vera John-Steiner, Sylvia Scribner, & Ellen Souberman). (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Willett, Rebekah. (2007). Technology, pedagogy and digital production: A case study of children learning new media skills. *Learning, Media and Technology, 32*(2), 167-181.

Williams, Dorothy, Louisa Coles, Kay Wilson, Amanda Richardson, & Jennifer Tuson. (2000). Teachers and ICT: Current use and future needs. *British Journal of Educational Technology, 31*(4), 307-320.