

E-Primer Series

No. 5: Extending e-possibilities

Mark Nichols

E-learning specialist

Laidlaw College, Auckland, New Zealand

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Updates available from <http://e-ako.blogspot.com> Author can be contacted at mnichols@laidlaw.ac.nz



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5.0 Extending e-possibilities

As I mentioned in E-Primer 1.3.2, any contemporary look at e-learning must consider those applications that have the potential to transform teaching and learning beyond the class-centric confines of the Virtual Learning Environment (VLE). Although e-portfolios and blogs are increasingly included with VLE systems, they tend to be associated with a user's own profile rather than any particular class area – which is why such tools have the potential to move e-learning beyond artificial class boundaries, and into the more public domain of the internet. Wikis, which can also be publicly available, emphasise a shared outcome rather than the particular input of any individual, and they therefore have clear potential for collaborative activity beyond semesterised timeframes. Virtual worlds such as Second Life invite learners into new educational experiences. Social networking sites such as Ning communities, MySpace, Facebook, YouTube, and Flickr encourage people to distribute ideas, perspectives, and artifacts, and to form new online connections. New applications such as Twitter challenge traditional models of what it means to be 'connected' and in touch with others. Web 2.0 is upon us. Collaboration, sharing, openness, authenticity, and inclusiveness are the core values: *produsage*, *long tail*, *wisdom of the crowd*, *mashup* and *folksonomy* are among the terms created to help describe the novel contributions and challenges Web 2.0 brings to consumerism, business, collaboration and publishing, media development, and epistemology.

This has been the most difficult E-Primer to prepare. Firstly, it is difficult to find empirical research on the use of Web 2.0 applications in education. As perhaps we should expect, the more relaxed and informal connections that Web 2.0 inspires has led to discussion about Web 2.0 in education that is largely relaxed and informal! I recently asked one internationally-renowned expert in distance education about the availability of Web 2.0 research in his specific area of interest. His response: there is one report; however, "the data was very much of the 'students liked it so it must have had an effect' variety". Fortunately there have been recent (2008) publications of various dedicated journal issues featuring primary studies, and I have drawn on these wherever possible.

In reviewing the literature I was struck by the frequency of the phrases 'fun', 'were impressed by the technology', 'has the potential to' and 'more enjoyable'. While this in itself is no cause for alarm, the warnings of Postman (2006:14) are pertinent: "in every tool we create, an idea is embedded that goes beyond the function of the thing itself". The objective of higher education is not primarily *fun*; it is cognitive transformation – and this always involves hard work. Higher education exists to broaden minds, to make people into deeper thinkers. If making learning 'fun' can help to do this, then it is a worthy pursuit; but fun on its own is far from a good criterion for applying technology to education. I am not aware of any hard evidence to suggest that there is actually a link between 'fun' and better learning. Likewise, *potential* is only useful if it can be effectively harnessed.

Secondly, there is substantial rhetoric on whether Web 2.0 gives us the opportunity to overthrow the chains of formal education and emancipate learners into a world of

collaborative exploration. If Web 2.0 connects people and ideas, the argument goes, why do we need formal institutes of learning? Associated with these questions is the matter of the *Net Generation* of learners, also termed the *Millennials* or the *Digital Natives*. What are their expectations of education? Are traditional practices of formal education are no longer appropriate? It is profitable to engage with such questions, which stretch beyond the technicalities of Web 2.0 tools into fundamental ideas of what it means to educate. If we adopt tools outside institutional VLEs, we must pay attention to the role of higher education itself.

Finally, there is the question of which specific tools to consider for this E-Primer. Blogs and wikis are clearly examples of Web 2.0; e-portfolios and m-learning are not widely considered elements of Web 2.0, yet are still relevant for extending e-learning practice beyond the VLE. Podcasts, digital video, simulations, mashups, open educational resources (OERs) and social networking sites are not specifically addressed here. Rather than discuss all possibilities, I have elected to focus on some that have current appeal and a mature literature – e-portfolios, blogs, wikis, multiple user virtual environments (MUVes) and m-learning – in an attempt to frame the kinds of issues and potential these might hold for higher education. I am not trying to be comprehensive in my coverage of additional possibilities, and nor is my focus in this E-Primer exclusively on Web 2.0.

So the great challenges to preparing this E-Primer have been the multiplicity of voices and opinions, perspectives, and agendas in areas of e-learning that are theoretically largely untitled yet are abuzz with practical activity and promise. This E-Primer intentionally seeks to place Web 2.0 firmly within the context of formal education and empirical research. My starting point is, unapologetically, formal education. Web 2.0 and the connectivity it encourages have certainly transformed what it means to share information, and have brought about new means of collaboration; other new tools promise exciting new ways of teaching and learning. But it is important not to overstate the potential of Web 2.0 or additional technologies for formal education.

5.1 Web 2.0 and the Net Generation

While this E-Primer is not solely concerned with Web 2.0, the various tools discussed (blogs, wikis, e-portfolios, Second Life, and m-learning) are placed in a particular framework based on an initial analysis of Web 2.0. Web 2.0 is popularly labelled the 'read/write' or 'social' Web,¹ because it is a participative and collaborative expression of the internet. Tools such as blogs, wikis, social bookmarking sites, and file sharing services such as YouTube and Flickr make it easy for internet users to express themselves and connect to other people's ideas. Twitter makes it possible for users to share 'bite-sized' summaries – of what they are doing, or what they are thinking – to anyone interested in real time. An emerging literature is considering the potential of Web 2.0 on education and its effect on emerging generations.

1 For a clearer contrast of the terms 'Web 1.0' and 'Web 2.0', see "'Web 2.0' or 'Web 1.0'? A tale of two Tims" in Anderson (2008:5–7).

5.1.1 The phenomenon of Web 2.0

Web 2.0 is characterised by creativity, collaboration, communication, openness, microcontent, sharing, and user-centredness (Alexander, 2006; Solomon & Schrum, 2007). Its various services include blogs, wikis, tagging and social bookmarking, multimedia sharing, audio blogging and podcasting, and RSS alongside other forms of social networking (Anderson, 2007).

The enabler of Web 2.0 is Rich Site Summary, or Really Simple Syndication (RSS). RSS technology enables internet users to subscribe to a blog, wiki, podcast series or user's account, so they are alerted when something changes. A new blog post, for example, will be 'pushed' to subscribers of the blog, saving subscribers the need to constantly check the blog for new content. Using RSS, users can subscribe to those bloggers, wiki entries, podcast series, and users whose work most inspires them.

That the internet, particularly through Web 2.0 services, is changing society is undeniable. Social networking tools are almost ubiquitous; even so-called 'Web 1.0' has influenced daily life.

As stated by Rainie and Horrigan (2005:np):

A decade after browsers came into popular use, the Internet has reached into – and, in some cases, reshaped – just about every important realm of modern life. It has changed the way we inform ourselves, amuse ourselves, care for ourselves, educate ourselves, work, shop, bank, pray and stay in touch.

Work by the Pew Internet and American Life Project reveals the staggering degree of online activity in the United States, where it is becoming characteristic of everyday activity. However, it is important not to overstate the influence of particular Web 2.0 tools. For example, Solomon and Schrum (2007:14) state that "[t]he United States has become a nation of bloggers" just one sentence before they cite their evidence: 40 per cent of the 147 million United States internet-using population says that they read blogs, whereas only 8 per cent write them. With an overall population of about 300 million, the so-called 'nation of bloggers' has significantly more people who do not read blogs (80 per cent) than do. Indeed, blogging attracts a relatively small subset of online users (Lenhart & Fox, 2006; Lenhart & Madden, 2005; PewInternet.org, 2005; see also Anderson, 2007). Further, only about 20 per cent of the United States population uses Facebook (New Zealand has about an 18 per cent penetration).

While the adoption of Web 2.0 tools can be overstated, their influence on users is not insignificant. The internet is viewed as an authoritative source of information for big decisions and major life episodes (Horrigan & Rainie, 2006), and such influence comes from both static webpages and online networks.

Bruns (2008) suggests that Web 2.0 fundamentally alters value chains, whereby collaborative effort that was once possible only through formal or commercial management is now possible through the informal means of online networking. The differences between producers and users are no longer clear-cut; Bruns coined the term *produsers* to describe those who both produce and use information and services

through online networks. *Wikipedia* and open-source software are cited by Bruns as evidence of this shift.

5.1.2 Web 2.0 and education

Bruns (2008) argues that, just as Web 2.0 produsage has transformed journalism (newspapers versus blogs), software development (commercial versus open source) and information services (*Wikipedia* versus *Encyclopaedia Britannica*), so it must transform education (see also Richardson, 2006). Bruns suggests that traditional education relies on “the artificial scarcity imposed by traditional production and accreditation processes” (2008:344) and a sender (teacher) to receiver (student) relationship. The scarcity of information is challenged by the resources available over the internet; the sender-receiver relationship is challenged by the collaborative produsage that characterises Web 2.0.

This position is similar to that of Daanen and Facer (2007:19), who question what formal education can contribute in a Web 2.0 world:

The ability to record and retrieve all experiences requires a debate on the purpose and function of education: what is its goal when all information – from facts, to skills advice – is constantly accessible?

Ito et al (2008:2), who studied the online behaviour of American teens,² add that:

New media allow for a degree of freedom and autonomy for youth that is less apparent in a classroom setting. Youth respect one another’s authority online, and they are often more motivated to learn from peers than from adults. Their efforts are also largely self-directed, and the outcome emerges from exploration, in contrast to classroom learning that is oriented toward set, predefined goals.

Given these shifts in context, what should we do? Bruns proposes that teachers should become ‘guides on the side’ and establish themselves as leading members in a community of producers, “facilitating and guiding learner engagement in the wider knowledge space” (2008:349). Ito et al’s (2008) call for peer-based learning echoes this sentiment, and they also helpfully suggest including a broader network of people in education. Many education bloggers (*edubloggers*) advocate Web 2.0 as the means by which traditional education might be ended in favour of a lifelong and personalised learning age, either unmediated by formality or characterised by student-directed and fully collaborative learning (see, for example, Bryant, 2007; Downes, 2005; Owen et al, 2006; many edubloggers also favour such an approach). Such a system might be based on a learner’s own blog, e-portfolio, or personalised learning environment (Downes, 2005, 2007; LaCour, 2005).

Barnes and Tynan (2008:189) also argue that change is required at the tertiary level:

The latest generation of undergraduates already live in a Web 2.0 world... To attract and retain these students, universities will need to rethink their operations. New social technologies mean that universities have the chance to create a new generation of student-centred learning environments, to realize the idea of a University 2.0.

² Ito et al’s (2008) study focuses on youth, not a specific education sector.

Savin-Baden (2008) argues that Web 2.0 – in the form of open or social software and MUVes such as Second Life – should cause a reevaluation of higher education: “For students who spend six hours a day on social networking and just over three hours a day on email, surfing the net and instant messaging ... it is clear universities need to rethink learning in immersive worlds” (2008:159).

Ally (2009:1) presents the utopian vision for m-learning:

Learners will not have to wait for a certain time to learn or go to a certain place to learn. With mobile learning, learners will be empowered since they can learn whenever and wherever they want. Also, learners do not need to learn what is prescribed for them.

Consider, too, Warlick’s (2007:12–13) account of how the new generation learns:

During his junior year, my son started making videos with a digital video camera ... he was not merely taking video with his camera and then editing sequence. He was mixing in audio from the Internet, CDs and DVDs, video clips collected from his friends, still images he had taken and downloaded from the net, and even staged video from online video games, where players followed direction and acted out scenes on a virtual stage from their homes across the globe. I did not teach him how to do this ... his high school teachers ... did not teach him how to do this. He taught himself, with the help of his social network of people, with whom he IMs, text messages, shares MySpace pages, plays in the metaverse of video games, and through venues I am sure I do not even understand yet. He knows how to use this new read/write web to learn what he needs to know, in order to do what he needs to do, now! It’s how this generation learns. It’s how they use information.

The perspective that formal education has been superseded by Web 2.0 is easy to come by. However, all such views make assumptions about the nature of education itself – and many of these assumptions are highly questionable. Many critics of traditional education systems who advocate a Web 2.0-based approach to teaching and learning tend to have a rather one-eyed perspective of what happens in higher education settings. Frequently, the argument given is that information is freely accessible through the internet, and so it is now much easier for people to share ideas and collaborate than ever before. The old model of didactic presentation of abstract information, followed by testing, is out; authentic tasks and collaboration, preferably collaboration that creates something that can be shared, are in. Teachers should no longer spout forth as fountains of knowledge, and should instead busy themselves with empowering students to learn things for themselves. Unfortunately such arguments tend to ignore the broken middle, which is where polarised positions tend to co-exist in dynamic tension (see Tubbs, 2005). Didactic teaching and students learning for themselves are commonly presented as opposites, whereas the two are actually complementary. Further, education’s purpose is not to provide students with access to information. Instead, education is properly concerned with information becoming knowledge and understanding in the minds of students, to enable the transformation of the student so they are empowered to see the world through a broader lens (Mezirow 1990, 2000).

Web 2.0-based critiques of education tend to assume the following:³

1. Teachers claim a monopoly on authoritative information.
2. In tertiary formal education contexts, students are not free to think for themselves or to consult sources not authorised by the teacher.
3. The enthusiasm and self-direction that students apply to learning about things that implicitly interest them are readily transferable to broader curricula.
4. The ability to find information online and to interact with peers is evidence of mature research skills.
5. Collaborative work testifies to the contribution and understanding of each participant.
6. Students can competently navigate information sources and perspectives within a particular discipline (even one that is new to them).
7. Resources and perspectives suggested by a qualified member of faculty are somehow (and usually) inferior to those a student might find through their peer network.
8. Information that is not 'just in time' is of the rather less-useful 'just in case' variety.

Each of these assumptions is highly questionable, even dangerous. The 'just in time' versus 'just in case' perspective is particularly insidious. The issue is better framed as differentiating between that information which is more *immediately* useful, and what is more *conceptually* useful. Consider Plato's cave, Marx's critique of capitalism, studying the history of Western Europe, or analysing the themes from *One Flew Over the Cuckoo's Nest*. Some learning that may seem to be 'just in case' actually contributes to the development of a far deeper cognitive framework in the mind of the student. Education is concerned with such cognitive development. Memorisation, regurgitation of facts, and a search for 'the answers' will very seldom earn an undergraduate degree. Instead, graduates have learned to appraise, compare, contrast, critique, evaluate, and come to their own informed conclusions with reference to others' ideas.⁴ In Laurillard's (2002:12) words, "learning is not just about acquiring high-level knowledge. The way students handle that knowledge is what really concerns academics". The outcome of formal education is not necessarily in-head information, but rather new ways of being able to use information as a tool. Formal higher education is more properly considered *transformative* (Mezirow, 1990, 2000), than *informative*. One of the key rationales of formal higher education is to expose people to ideas and perspectives that result in them seeing the world differently, and to encourage them to consider ideas that they may never encounter through everyday experience. As a colleague at my own College

3 In some ways this issue is best summarised by Stuart McMillen (2005) <http://www.recombinantrecords.net/docs/2009-05-Amusing-Ourselves-to-Death.html>. McMillen well illustrates the concerns of Postman (cited earlier). Web 2.0 advocates assume a 'Big Brother' style education system, whereas I suggest that education is currently facing a Huxleyan context.

4 In the same way, postgraduates are expected to become comfortable navigating complex and conflicting points of view, and to determine and defend their own position within these points of view.

recently remarked, we can only think with the ideas that are available to us. Education exposes students to new ideas, whether their value for immediate application is appreciated or not.

Bradwell (2009:9) remarks that:

Universities are stores of expertise and knowledge capital. Students need their learning and development affiliated with and accredited by particular institutions, and they need exposure to new thinking and people. Universities provide hubs for research and support, exposure and promotion for researchers.

These roles, it seems, are taken for granted by critics of formal education. Universities also offer valuable filtering and sorting services for the plethora of information (in varying quality) now available.⁵

Gilbert (2005) argues that education must move on from preparing learners for the industrial age toward preparing them for a knowledge society. Such a shift involves requiring learners to focus on creating new knowledge rather than reproducing existing knowledge, and emphasises collaborative rather than individual learning tasks. Rather than being a 'thing', Gilbert maintains, knowledge should be considered "a form of *energy*, something dynamic or fluid, something that *does* things, or makes things happen" (Bolstad & Gilbert 2006: 30, emphasis original). In the paradigm shift proposed by Gilbert (2005), the content- and assessment-driven approach used in formal education should be replaced with one based on knowledge production. Such an approach is more consistent with the demands of a knowledge society, where people "need to be able to learn in groups as well as on their own, and they need to know how to create new knowledge" (Bolstad and Gilbert, 2006:30). In other words, education should provide students with the skills they require to learn for life and to create new knowledge for the situations that demand it. While this perspective might be considered unanimous among edubloggers and critics of the incumbent education system, what Bolstad & Gilbert (2006:30–31) add next is of paramount importance:

... this does *not* mean that the 'old' knowledge that is the basis of the present curriculum is no longer important. It is still important, and students still need to learn it, but in the post-industrial age the *reasons* for learning it are now different. Instead of learning it for its own sake, or so that it can be preserved and passed on, students need to understand 'old' knowledge so that they can use it to develop *new* knowledge. If they are to do this, they need to understand it at the 'big picture', 'systems' level, not at the level of detailed facts... Traditionally, this kind of understanding was developed only in those who went to higher education ...

Bolstad and Gilbert point out that familiarity with 'old' knowledge provides a vital foundation for development of 'new' knowledge and that, from their perspective of formal secondary education, higher education *is already configured* to provide learners with the 'big picture' and 'systems level' perspectives that prepare them for the development of new knowledge. From this perspective, Web 2.0 and other extended

5 Bradwell's (2009) work proposes the 'edgeless university', which uses technology to further its reach and openness, embraces the 'guide on the side' role for faculty, and uses social networking tools for promotion and support.

technologies might be considered conduits for what higher education *is already concerned with*, rather than a reason for over-hauling the system. Formal education does not view its knowledge as an end, but as a means.

It is timely to note the important difference between considering Web 2.0 *as a substitute for* formal education and Web 2.0 *in the context of* formal education. In this E-Primer, the former position is absolutely rejected. Formal education has an important role to play, mainly because it is concerned with a particular type of knowledge that is not immediately valued in everyday settings.

Laurillard (2002) makes the following observations:

- There are differences between everyday knowledge and academic knowledge.
- Everyday knowledge is based on experience ('knowledge of the world'); academic knowledge is based on our experience of experience ('knowledge of descriptions of the world').
- Everyday knowledge tends to be highly situational; however, academic knowledge is more objective and transferable, and can be generalised.
- Everyday knowledge can be gained through everyday experience, whereas academic knowledge must be mediated by experts with academic knowledge.

Once we have distinguished between everyday and academic knowledge, the importance of formal education's unique contribution to learning becomes clear. Formal education is deliberately different from everyday learning, because it is concerned with different forms of information and knowledge. There is no need for formal education to mimic social developments, adopt popular tools, or comply with individual preferences. The tail should not wag the dog. Higher education is not as concerned with means as it is with ends. Transforming student thinking through academic knowledge *is* the end. Web 2.0 and other technologies are means, useful only if they enable academic knowledge to hit its mark. Authentic and collaborative learning should also be understood as means and not ends. Sometimes didactic teaching is the best way to share academic knowledge.

So, while Web 2.0 will not fundamentally alter formal education, Mason and Rennie (2008:2) note that:

[i]gnoring social and technological trends is not the way forward for educators anymore than is chasing after every new movement because it is new ... [we should develop] an open mind to the possibility that using some form of social software could be beneficial in most courses, given imaginative course design.

The application of Web 2.0 in the context of formal education gives direction to this E-Primer. Nick Allen (in Miller, 2007:5) remarked that, unless Web 2.0 tools can "help students learn more, provide access to larger numbers of students, improve learning outcomes, or help faculty teach... institutions should not be distracted by them". This is a good summary. As we will see, Web 2.0 and other extending tools may well have a role to play in higher education, but rather than being one of changing paradigms, it is one of *extension*. The reason for my apparent conservatism here rests not just in the

nature of higher formal education, but also in the over-blown estimations of the Net Generation that often accompany the bold promises of 'learning 2.0'.

5.1.3 The Net Generation

The term *Net Generation* (or *Net Gen*) is one of many used to describe the generation currently engaged in schooling, and those who have recently passed from school directly into higher education. Net Genners are also commonly referred to as *Millennial learners*, *Generation Y* and the *Digital Generation* (Reeves & Oh, 2007). Prensky (2001) also suggested the terms *digital native* and *digital immigrant* as shorthand to differentiate between those who are brought up with digital technologies, and those for whom using digital technologies has come less naturally. Prensky's differentiation has been cited many times in e-learning literature over the last decade. Those citing Prensky's work usually do so with an urgent call for education to cater to the natives who, Prensky suggested, would find traditional schooling a poor contrast to their more active, participative, and creative online world. Digital natives are apparently multitaskers and random-access users with a preference for multimedia, instant gratification, and games rather than serious work. Bennett, Maton, and Kervin (2008) describe this sort of revolutionary call as an "academic form of 'moral panic'", which is still characteristic of some recent work (such as Hart, 2008).

Citing Oblinger and Oblinger (2005) and several other studies, Mason and Rennie (2008) describe Millennial or Net Gen learners as multitaskers who enjoy collaboration and networked activities, are strong visual learners, prefer experiential activities, and are techno-savvy. However, Mason and Rennie (2008:8) add that other studies suggest that these learners have short attention spans, poor reflection skills, and poor evaluative skills. They connect with local friends rather than broad social networks, and have "a cavalier attitude to quality of sources". Reeves and Oh (2007:302) point out that generational studies frequently suffer from poor non-representative sampling, self-reporting rather than objective observation, and unsubstantiated stereotyping; they conclude that "[t]he gross generalizations based on weak survey research and the speculations of profit-oriented consultants should be treated with extreme caution in a research and development context". Bolstad and Gilbert (2006:15) point out that many extrapolations in studies of the Net Generation are based on analysis of early adopters, and tend to homogenise young people, "implying that they all think and act in particular ways". The underlying assumption is that the early adopters will eventually represent the entire population. Even some large-scale projects, such as the Joint Information Systems Committee (JISC) LXP project (Conole, de Laat, Dillon, & Darby, 2006), have questionable sampling (drawing from the results of online surveys). Bennett et al (2008) note that many generational studies are cited uncritically by other commentators. Naturally, this results in a form of authority through citation, and so unfounded common sense or findings based on poor sampling soon become widely accepted.

Where more objective research does exist about generational characteristics it tends to conclude that:

- digital literacy or 'native-ness' is determined not by age, but socio-economic background
- there is no uniform sense of 'frustration with formal education' being expressed by young students
- particular generations are characterised more by heterogeneous complexities than homogenous generalities.

Expert opinion (Centre for Information Behaviour & the Evaluation of Research [CIBER], 2008) casts doubt on many claims made about the Net Generation, though some (such as competence with technology) are endorsed. A report from Becta (2008:8) found that though many young people from their survey were using Web 2.0 tools, there was "little evidence of young people engaging with the apparently creative scope of Web 2.0 or using these technologies in markedly original ways" (see also Sefton-Green & Buckingham, 1998, in Bolstad & Gilbert, 2006). The Pew Internet project has found that the Net Gen is more likely to use the internet for social interaction and entertainment; older internet users are more likely to use it for research (Jones, 2009).

Other studies cited by Bauerlein (2008) point to a generation that:

- uses online tools for social engagement with one another (that is, communicating within limited horizons)
- is impoverished for wider, cultural experience
- is not pursuing broad-based knowledge
- is simply not interested in reading.

Other reports warn that the Net Gen has an alarmingly pragmatic approach to searching for information. Online search results are accepted uncritically, and Net Genners tend to get frustrated when they cannot find answers easily (Bennett et al, 2008; CIBER, 2008). The Net Gen student body uses Google and *Wikipedia* as information sources extensively, and makes little distinction between the rank of search findings and their relevance to the actual subject at hand (Pan et al, 2007). Other commentators point out the potential dangers to the Net Gen of relying on online search engines for easy answers. Jeanneney (2007), for example, notes that finding facts online is easy; addressing conceptual issues is far more difficult. A search for a 'fact' will reveal the answer quickly; a search for a concept or perspective is much more difficult with a search engine. These days it is easy to find a keyword across a mountain of books and blogs, but the results do not automatically provide the context. Context is particularly important when considering the arguments presented in books. Because arguments are often very nuanced, books are designed to be read "sequentially and cumulatively" (Gorman, in Jeanneney 2007:68). Picking a keyword or citation out of context can be very misleading.

There is no doubt that the Net Gen has access to technology, and knows how to use it. Oliver and Goerke (2007) report that 88 per cent of Australian undergraduate students in their survey use instant messaging (IM), 30 per cent use blogs, and 22 per cent use podcasts. Ninety-six per cent have internet access outside the university, 96 per cent own a mobile phone, and 70 per cent have an MP3 player. Perhaps surprisingly, though, Net Gen is not the population segment most likely to use Web 2.0 tools. Healy (2009) observes that users of Web 2.0 services such as Twitter and LinkedIn are mostly aged 35 or older. Further, Facebook's recent growth is taking place in the 35 to 54 year-old demographic. Healy (2009:np) concludes: "the numbers show that mainstream Gen Y is not latching on to the newest social media tools, and for a group of people who are supposed to be the trend setters, this is a strange phenomenon".

Research findings also suggest that any perceived urgency for Web 2.0-based education is not driven by the students themselves. In a quantitatively significant study in the United States, Salaway, Caruso, and Nelson (2007) found that tertiary students prefer a 'moderate' amount of IT use in their courses and would actually prefer to have social networking tools *left out* of their education experience. A JISC report (JISC, 2007:29) that investigated a sample of ICT-adept students aged between 15 and 18, reported that: "The traditional methods of teacher/pupil learning seem neither hierarchical nor outmoded to them. They see personal, face to face interaction as the backbone of their learning".

The report concluded as follows (JISC, 2007:31):

Respondents found it hard to imagine using social networking sites for coursework or study, and had reservations about this when presented with the scenario ... Young people are not constantly looking for new technology to incorporate into their everyday life. They appreciate and endorse it when they can see a palpable social or academic benefit.

In their study of engineering and social work undergraduate students, Margaryan and Littlejohn (2008) found that so-called 'digital natives' tend to use a limited range of online technologies and make limited use of social networking sites. These findings are similar to those of Kennedy and Krause (2008), who surveyed almost 2000 University of Melbourne students. In their final report, Kennedy et al (2009) find no support for the existence of digital natives, digital immigrants, nor homogenous Net Gens. While ownership of digital devices is very high and internet access is almost ubiquitous across contemporary university students, user profiles are extremely variable.

Margaryan and Littlejohn (2008: 22) found that undergraduate students are not as familiar with online tools as is commonly believed, and that:

students' attitudes to learning appear to be influenced by the approaches adopted by their lecturers. Far from demanding lecturers change their practice, students appear to conform to fairly traditional pedagogies ... In fact students' expectations were that they would be 'taught' in traditional ways.

In New Zealand, a recent curriculum review held by the Ministry of Education (nd:np) found similar preferences from students consulted as part of the process. Interviewees

from intermediate and secondary schools (years 7 to 13) responded to questions about how they viewed success, what helped them to learn, and teachers.

Many perceived the advancement of technology as negative, especially in terms of making people “lazier”. One student commented: “With technology, it seems as if things are automatically done for you ... you won’t go the extra mile to do things for yourself”... Other perceived disadvantages of the increased use of technology were that people would become less literate, less able to communicate at a personal level, and socially isolated or disjointed.

Further evidence from Sheehy and Bucknall (2008) from focus groups establishes that school-age students do not perceive technology as having the potential to transform education in any meaningful way. However, literature does establish that Web 2.0 plays a part in the formal education of a growing number of learners. Conole et al (2006:5) found that students are using their peer networks and multiple information resources (including the web and hard-copy books) in formal education when it is convenient for them, “appropriating technologies to meet their own personal, individual needs”. These findings are in accord with the JISC (2007), Becta (2008), and Salaway et al (2007) reports cited above.

Conole et al (2006:6) note that:

They [students] are generally sophisticated users, using technologies in a variety of different ways to support different aspects of their learning. They are critically aware of the pros and cons of the use of different technologies and ‘vote with their feet’ – i.e. they don’t use technologies just for the sake of it – there needs to be a purpose and clear personal benefit. They have an expectation of being able to access up to date and relevant information and resources and see this as vital. They don’t see the technology as anything special; but see it as just another tool to support their learning.

Students may well be working differently as a result of Web 2.0 (see also Owen et al, 2006), but there is, in the reports cited, no *imperative* to integrate social networking or other Web 2.0 functionality with formal education.

Bradwell (2009:55) remarks that, despite their ability to navigate a connected world:

The skills that students lack when they arrive at university are much the same as those students have always needed to develop: the capacity to filter and analyse sources and to assess the validity and authority of material. The normalising of social networking in everyday life has not translated into better skills in a learning context. Very familiar problems have become more noticeable.

Students may well use Web 2.0 *anyway* as a part of their own engagement with formal education, which is entirely laudable. It seems that the flexibility that technology can add to education is much more important to students than any particular pedagogical shift (Kennedy & Krause, 2008). Margaryan and Littlejohn (2008:1) note that “although the calls for radical transformations in educational approaches may be legitimate it would be misleading to ground the arguments for such change solely in students’ shifting expectations and patterns of learning and technology use”.

5.2 The Conversational Framework

So far I have not presented the potential for Web 2.0 in formal education in glowing terms. Web 2.0 is not a means to a more enlightened education system, it is not as ubiquitous as it is often portrayed, and Net Gen students are not counting on its use in higher education. Yet the potential Web 2.0 brings for formal higher education (more collaborative, expressive, and personalised) is worth pursuing on its own merits. The Conversational Framework proposed by Laurillard (2002) provides a useful context for applying Web 2.0 to e-learning.

It is unfortunate that technology is often taken as the starting point for innovation in education. In referring to the potential for mobile devices in education, Laurillard (2007:153) remarks:

The process begins, inevitably, as a technology solution devised for other requirements, in search of a problem it can solve in education. The history of technology in education has repeated this process so many times, with less than optimal effects for education, that educators need a means by which education holds the reins of the investigation, stating our requirements, and using these to evaluate each new technology, on our terms.

And so Laurillard (2002, 2007, 2008, 2009) proposes the Conversational Framework, which portrays education as the alignment of conceptual understanding between teacher and learner. Based on what we know about effective teaching and learning, the Conversational Framework provides the means for comparing different approaches to teaching and learning and applying technology to education. The approach assumes directive teaching, discourse between teacher and student, and discourse among students to compare and evaluate ideas. Didactic teaching, application, practice, reflection, and assessment are elements of teacher/student interaction; and discussion with peers provides a further dimension to the formal education experience.

In Laurillard's (2002:86) words, education:

- must operate as an iterative dialogue;
- which must be discursive, adaptive, interactive and reflective;
- and which must operate at the level of descriptions of the topic;
- and at the level of actions within related tasks.

The Conversational Framework has the teacher's own conception as the start- and end-points, as Fig. 1 shows.

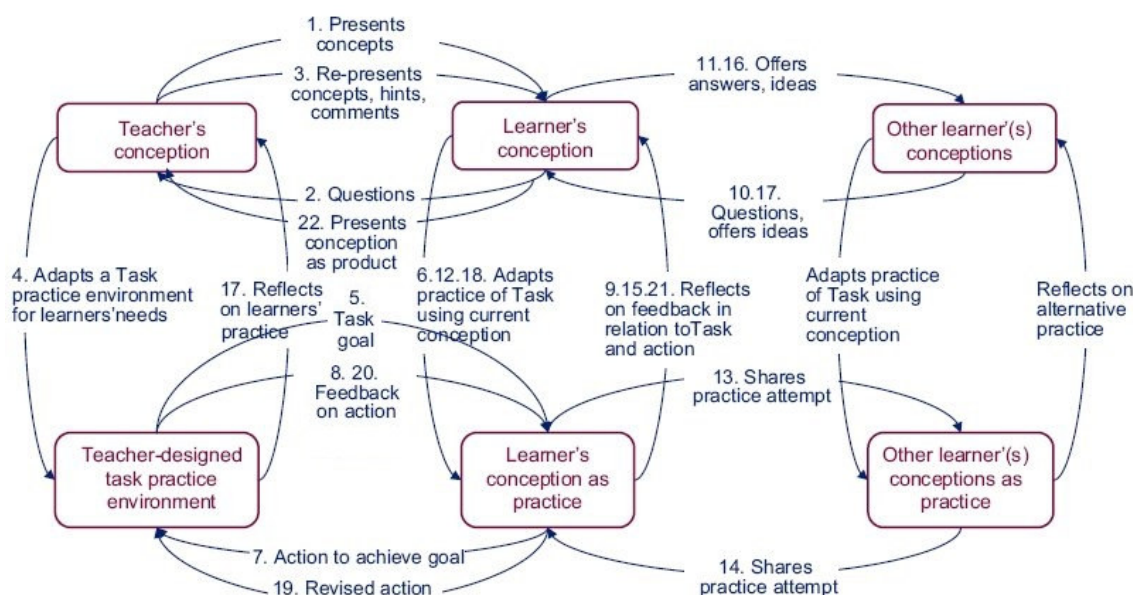


Figure 1 – The Conversational Framework (Laurillard, 2009).

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The numbers in Fig. 1 relate to the order in which successive activities might take place but, despite appearances, the Framework recognises that teaching and learning activity is more relational than linear. For any particular approach to teaching and learning, he Conversational Framework (2009:19) questions the extent to which the approach motivates students to:

- access explanations and presentations of the theory, ideas, or concepts (1, 6)
- ask questions about their understanding of the theory etc. by providing opportunities for answers from the teacher (2, 3) or their peers (10, 11)
- offer their own ideas and conceptual understanding through comments from the teacher or their peers
- use their theoretical understanding to achieve a clear task goal, by adapting their actions in the light of their understanding (5, 6, 7), or in response to comments (10, 11) or feedback (8)
- repeat practice by providing feedback on actions that enables them to improve performance (5, 6, 7, 8)

- repeat practice by enabling them to share their trial actions with peers for comparison and comment (13, 14, 15, 16, 17)
- reflect on the experience of the goal-action-feedback cycle by offering repeated practice at achieving the task goal (5, 6, 7, 8, 9, 12, 19, 20, 21)
- discuss and debate their ideas with other learners (10, 11)
- reflect on their experience by articulating or producing their ideas, reports, designs, performances etc. to present to their peers (13, 14, 15, 16)
- reflect on their experience by articulating or producing their ideas, reports, designs, performances etc. to present to their teachers (21, 22).

The Framework is therefore “a technology-neutral way of stating the user requirements on any teaching method” (Laurillard, 2009:12), and demonstrates “the iterative cycles required for robust learning work together” according to educational theory (Laurillard, 2009:13). Diagramming a particular approach with the Conversational Framework demonstrates the strengths and weaknesses of that approach as a means of education. The goal of such learning is that the student “achiev[es] some proportion of the teacher’s conception” about the subject under discussion (Laurillard, 2009:16). Feedback and dialogue are fundamental components of this conceptual alignment.

The Conversational Framework helps to identify two potential problems when we introduce Web 2.0 tools to formal education contexts. Firstly, the Framework identifies the importance of the teacher in education. What are the implications of Web 2.0 for the teacher’s role? Secondly, the Framework already identifies the importance of the learner’s conception interacting with other learners’ conceptions. To what extent might the individual’s conception be drowned out by those of other learners?

The role of the teacher is the fundamental issue when considering Web 2.0 and its potential effect on education. The difference, though, is really one of formal versus informal learning.⁶ In a formal education context, the position of the teacher does not change – Fig. 1 applies. However, in an informal learning context, the character of ‘teacher’ is removed and ‘the world of experience’ replaces the teacher-generated environment (Fig. 2). Laurillard (2007:169) remarks that: “In the absence of the teacher, the learner defines their own task goal, and other learners and the world of experience act as arbiters of the learner’s actions and productions”.

6 Formal education is not somehow ‘superior’ to informal learning. But it is *different*, in that it seeks to develop a conceptual framework in the learner that is not always possible in everyday contexts. Formal education and informal education are complementary – they are not opposites, but they are distinctive.



Figure 2 – The Conversational Framework in support of the informal learning process (based on Laurillard, 2007⁷).

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A key decision when considering Web 2.0 tools for education is which of Laurillard's Frameworks (Fig. 1 or Fig. 2) to apply. Does Web 2.0 learning require a teacher or not? Critical to the purposes of this E-Primer is the point that applying Web 2.0 tools to education should not alienate the teacher, or minimise their role. If we remove the teacher from the scene as a result of applying a particular Web 2.0 intervention, we remove a substantial element of the Conversational Framework, and we are no longer dealing with formal education. The 'world of experience' in Fig. 2 is also a setting for the creation of everyday knowledge, rather than the academic knowledge formal education is actually concerned with (see 5.1.2).

A further issue when applying Web 2.0 tools in formal education relates to the potential emphasis on group rather than individual performance. While it is possible that Web 2.0 tools such as blogs and wikis in public internet spaces have the potential for engagement with those outside the classroom (which is seldom actually achieved; see later), my discussion here is concerned with how Web 2.0 emphasises group, rather than individual, performance. To do this, I will consider the contribution of Plaisted and

⁷ This diagram is based on that provided in Laurillard (2007), with reference to the Conversational Framework and commentary provided in Laurillard (2009).

Irvine (2006) in their adaptation of the Conversational Framework for collaborative learning (Fig. 3).

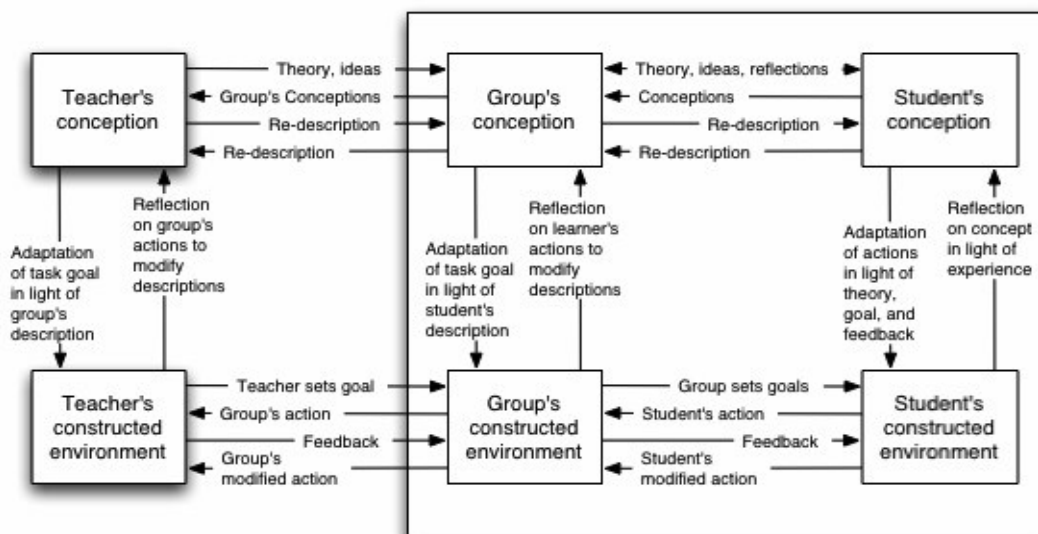


Figure 3 – An adaptation of the Conversational Framework for collaborative learning⁸ (Plaisted & Irvine, 2006:681)

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The key differences between Fig.1 (Laurillard's Conversational Framework) and Fig.3 (Plaisted & Irvine's adaptation) are the location of the learner ("learner" in Laurillard; "student" in Plaisted and Irvine) and, more significantly, the location of the "group" (Plaisted & Irvine; see "other learners" in Laurillard). In Fig. 3 *there is no direct feedback loop for the individual with the teacher*. Instead, conceptualisation is negotiated through the group. For a teacher to provide meaningful feedback, the group must provide a fully representative conceptualisation of its members' varying perspectives. The contribution of the individual in a wiki or mashup is not readily apparent⁹ and so individual

8 The title "...for collaborative learning" used by Plaisted and Irvine here is at odds with Laurillard's (2009) use of the term 'collaborative'. The Conversational Framework originally developed by Laurillard (see Fig. 1 above) combines 'instructionism', 'social learning', 'constructivism' and 'collaborative learning' in its design. Laurillard (2009) has a stricter understanding of 'collaborative learning' than do Plaisted and Irvine (2006) in that Laurillard assumes a purely didactic teacher still contributes in a collaborative model. It may be best to assume that Plaisted and Irvine's (2006) adaptation combines the same pedagogical models as does Laurillard, rather than to term their own model a 'collaborative' one.

9 Wikis can be checked for the contributions of individuals. However, it is not clear whether others might have made the same point as an earlier contribution, and checking can be complex.

conceptualisations (with all of their subtleties) are more difficult for the teacher to effectively engage with. That the individual's contribution cannot be discerned from within the collaborative output is highly significant and problematic for the purposes of higher education. In Laurillard's Fig. 1, the teacher deals with each individual's conception directly and can therefore offer customised feedback to each individual. In Plaisted and Irvine's Fig. 3, the teacher is assumed to have no such direct link with individual students and must instead respond to the overall group's conception. The concern here is that the 'group conception' may not adequately reflect the subtleties of each individual's understanding, thereby reducing the teacher's overall influence. Rather than empowering students through collaborative learning, Plaisted and Irvine's adaptation has the net effect of reducing the amount of targeted feedback provided to individuals.

Laurillard's Fig. 1 and Fig. 2, and Plaisted and Irvine's Fig. 3 show three distinct ways in which we might apply Web 2.0 technologies to education. In all three, the learner is encouraged to articulate their conception. However, Fig. 1 places the learner at the centre, with the teacher providing a corrective conception in the form of direct teaching and feedback. Figure 2 removes the teacher entirely, placing the learning in a real world or authentic context that also removes it from the sphere of academic knowledge. Figure 3 places the collaborative group at the centre and each individual's conception at the periphery. The situation is somewhat similar to that outlined in E-Primer 4.1.1: we can apply Web 2.0 to formal education in a 'cooperative' (Fig. 1) or a 'collaborative' (Fig. 3) mode. As is clear from a comparison between Fig. 1 and Fig. 3, a collaborative approach is likely to increase the transactional (or psychological) distance between teacher and students, and influence the amount of feedback the teacher can give to each individual.

If 'academic knowledge' is the currency of higher education, I suggest that Laurillard's Fig. 1 provides the best basis for framing the use of Web 2.0 and other extending tools to higher education.

5.3 Extending tools

Web 2.0 technologies accentuate the potential for collaboration beyond turn-taking discussion posts and toward collaborative resource development (wikis, mashups) and extended platforms for reflection (blogs, e-portfolios) – all of which can be interconnected through RSS technology. But there is more to extending tools than those associated with Web 2.0. Only a few tools are discussed in this section. Introductions to a broader range of e-learning possibilities are provided by Mason and Rennie (2008); what follows here are five of the more popular extended possibilities for e-learning in education. My discussion begins with two Web 2.0 solutions (blogs and wikis), then proceeds to e-portfolios and MUVes (such as Second Life). Finally, I'll look at the concept of m-learning. I'll refer to peer-reviewed studies as much as possible.

In this E-Primer I'll discuss the technologies before offering any design principles for their use in higher education because, as will become apparent, the social or popular

use of these technologies make them a rather complex fit. The technologies addressed here represent opportunities external to traditional teaching and learning, and we need some understanding of how they work before considering how to apply them in formal education.

5.3.1 Blogs

The term *blog* (a contraction of *web log*) is both a noun and a verb. As a noun, it indicates “an interactive web page most often used to publish regular writings on a variety of issues and with a variety of goals” (Warlick 2007:9). Blogs are “the first widely adopted easy publishing tool of the Read/Write Web” (Richardson, 2006:2), and are an excellent example of how Web 2.0 provides a collaborative and interactive platform. Strictly speaking, a blog is not just one interactive page but a collection of pages that can be displayed by date, topic, or entry. A blog is like an online journal, arranged with the most recent entry at the top. Writing a blog “takes as much skill as sending an email” (Richardson, 2006:17). Blogs are typically fully public and invite comments from readers. They are post-centred, in that their interactivity is based on each discrete entry or post. Blogs can belong to individuals or organisations, and frequently link to other blogs that are of interest to the author(s). Images and embedded video can be added alongside text; tags (or keywords) can also be allocated to each post, making it possible for users to quickly access related posts within the same blog. While blogs were once the domain of private individuals, use by professional journalists, corporations and teams of writers is increasingly common.

While significant numbers of undergraduate young people blog, most of them do so socially and with a focus on day-to-day life. Their audiences tend to be small groups of readers who are usually known to the bloggers themselves (Nackerud & Scaletta, 2008); most bloggers also “read about the same number of blogs as they have readers” (Nackerud & Scaletta, 2008:73). Oravec (2003:226) notes that the genre of the blog differs from that of online discussion boards “because of the creative leeway students are afforded as individuals”. This is a critical distinction. It’s not easy to exploit the “semi-structured, creative ‘middle space’ that blogging provides” (Oravec 2003:228) when the focus is on academic learning rather than everyday reflections. The genre of free-wheeling and experimental writing in blogs (as soapboxes for opinion, accounts of experience, and unprocessed thoughts between friends) makes their transferability to formal education contexts somewhat fraught. There is a distinct difference between social blogging and the expectations of educational blogging; if blogs are to be used successfully in higher education they must be more than extensions of how students use them in social contexts. Nackerud and Scaletta (2008) cite research indicating that blog writing styles tend to be determined by the writers’ age and background, reinforcing the need for clear expectations and standards (see also Goldman, Cohen, & Sheahan, 2008; Witte, 2007). The genre of blogging is a broad one, and students will probably need specific orientation to what is expected of them in terms of social and interactive behaviour (Leslie & Murphy, 2008).

Postgraduate students are more likely to blog as the “middle ground between private diary and public community” (Nackerud & Scaletta, 2008:75); indeed, blogging during a PhD is seen as a valuable contribution to helping candidates focus on writing during their research¹⁰ (Ward & West, 2008). The principles suggested by Ward and West (2008:64) might apply just as well to any research project where a blog (or joint blog for both candidate and supervisor) is used to:

- record quick ideas, insights, reading notes, lists, useful web-links (and to hyperlink these together)
- store important documents (drafts, administrative materials...)
- record events soon after they happen (along with their emotional load) for reflection and possible later discussion with a supervisor
- ‘put ideas out there’ and receive comments, thus creating an informal international online community of practice for both product and process.

Weller, Pegler, and Mason (2005) suggest three different types of blog that might be used in higher education:

1. group blogs – whether the group consists of students, a class with its instructor, or some other form of community of practice
2. academic blogs – used by teachers as outlets for ideas and up-to-date commentary
3. student blogs – used as a journal or online portfolio, and as the basis for interaction with other students.

This list serves as a general taxonomy of how blogs might be applied in higher education contexts. It seems that the real potential of blogging in higher education terms lies in Richardson’s (2006:32) ‘real’ and ‘complex’ blogging typologies, which involve:

Links with analysis and synthesis that articulate a deeper understanding or relationship to the content being linked and written with potential audience response in mind (real blogging) ... Extended analysis and synthesis over a longer period of time that builds on previous posts, links, and comments (complex blogging).

In other words, blogging is best used in circumstances where students are dealing with online content and where their analysis of that content is likely to be interesting to a particular audience, and where a blog might form an ongoing point of focus for personal expression. Reflective and metacognitive writing on its own, in Richardson’s (2006:32) thinking, is complex writing but only “simple blogging”. The ability to link sets blogging apart.

As with e-portfolios (5.3.3 below), there are various implementation issues when applying blogs in formal education contexts. Firstly, it is likely that blogs become more reflective and more attuned to a wider audience *as their authors maintain them over a*

10 Such as my own PhD candidate blog, <http://chredits.blogspot.com>.

period of time. Part of the potential of blogs for formal learning rests in their ability to “support consistent, long-term individual monologues, and simultaneously allow commentary and evaluation by others” (Sharma & Xie, 2008:138). Attempting to achieve the benefits of reflective blog writing by formal assessment across a single semester is likely to result only in frustration for all concerned, because “the learning process is simply slower and more cumulative than that” (Nackerud & Scaletta, 2008:75). Secondly, there is the issue of ongoing maintenance of a blog created specifically for formal education purposes. Singer (2008) notes that blogs constructed for a class are frequently abandoned once that class is completed. So while it is possible for blogs to “serve as catalysts in stimulating critical thinking and inspiring students to be lifelong learners” (Oravec, 2003:232), there is little evidence that these longer term benefits will eventuate for students who are not blogging outside the classroom context. Thirdly, although blogs may be more popular with students than VLE discussion boards (Dickey, 2004),¹¹ Kerawalla et al (2008:38) note that a blog is less formal and that “blog posts could be more detailed because, unlike a forum, reading is considered to be less obligatory”. This point is an important one because more voluminous and less formal posts may not necessarily be useful for collaborative academic learning or even the expression of academic learning. It is one thing to make your ideas available, still another to have people read and engage with them. While blogging has advantages for self-expression, discussion boards have advantages for engagement. Sharma and Xie (2008:138) add that discussion forums are based on the concept of dialogue, whereas blogs are more individualised and have potential as a platform for “a dialogue with self”. It could be that blogs are more suited as tools for personal reflection than collaborative engagement, even though both Dickey (2004) and Sharma and Xie (2008) found that students perceived a reduced sense of loneliness through blogging alongside peers.¹²

Using blogs might be more appropriate in formal education circles when they are used by teachers rather than students. Maintaining a teacher’s reflective journal or maintaining a class blog can be a useful exercise (Nackerud & Scaletta, 2008). Departmental blogs might also be kept to keep readers up to date with news, and as a means of publicity. Class blogs might be configured so that the teacher and all students are able to create new entries, a particularly effective technique for engaging students further in class-related content. Students might also be directly encouraged to interact with bloggers who are experts in the field.

Nackerud and Scaletta (2008) suggest students might do this by:

- posting a comment that links back to their own student blog
- citing an expert’s blog post in a post of their own blog

11 Dickey’s (2004) study was concerned with distance education students. In the study, students did not use discussion boards, but they did use a class listserv and email.

12 In Dickey’s (2004) case, the reduction of loneliness could be attributed to the small groups students were placed in, and the requirement for weekly engagement with other group members’ blogs.

- assembling a 'blog roll' (a list of links) of expert blogs that relate to their study, and requesting reciprocal listing.

Participating interactively through blogs does not require a student to create their own, as anyone can usually comment on a public blog.

Studies into the use of blogging in formal education contexts reveal some valuable lessons. Singer (2008) explored the use of blogs as educational tools for journalism students at both undergraduate and graduate levels, and found student blogging behaviour to be significantly assessment-driven and strongly linked to the teacher's own blogging presence. Singer's (2008) students were on-campus, rather than distance students. There was evidence that only one-third of students were intrinsically motivated by the blogging exercise, although discourse through blog comments frequently indicated effective interaction with other's ideas. Further, of 2578 posts and comments made on student blogs throughout the 5 years of the study, only *one* of note was from a true outsider. In a similar study of first-year undergraduate student bloggers, Leslie and Murphy (2008) found that only 77 of the 266 blogs had received comments from other students; of these, only 47 showed evidence of affective and cohesive interaction. Only nine showed evidence of knowledge construction through interaction. The poor levels of interaction were probably due to a lack of teacher presence.

Goldman et al (2008) required students to use private group blogs for assessment in a postgraduate class, and found that students appreciated the way the blogs enabled them to learn from others' perspectives, although there was little evidence of group community having formed (contra Sharma & Xie, 2008). In Goldman et al's (2008) study, students would rather interact through blogs than speak in class. However, students did protest at the number of assignments (over an 8-week period), and at not having enough allocated time to adequately post and comment. Overall, students appreciated the opportunity to use blogs; however, there was no comparison between the blogging students and a control group to measure any differences in learning achievement.

So how can we use blogs in higher education? Singer (2008) suggests that blogging in formal education might benefit from limited involvement – yet ongoing encouragement – from the teacher, so students have more ownership of the learning process.

Encouragement might include reminding participants to regularly check one another's blogs, and drawing attention to posts of particular merit. In a study of postgraduate education students, Churchill (2009) demonstrates how a blog might be integrated with the course design. Developing appropriate learning tasks, regularly checking student posts and leaving comments, preparing weekly summaries of blog activity and drawing attention to these in class, and making blogs an element of assessment resulted in a positive response from students. That this success meant significant involvement from the teacher is also clear from Churchill's article. Dickey (2004) was also quick to provide feedback to student blog posts, and placed students in small groups (between two and six) for socialisation and weekly reflection. Researchers also recommend that peer interaction be a required component, otherwise feedback tends to be provided only by

the teacher (Nackerud & Scaletta, 2008). Grades must also be assigned, otherwise the blogs will simply not be used: “[s]ome formal incentive does seem beneficial en route to the desired social or blended learning goal” (Singer, 2008:21; see also Williams and Jacobs, 2004). Kerawalla et al (2008), reporting on the use of blogs in a masters-level distance course ($n=9$) for e-learning professionals, found that students are more likely to blog if they have an audience, encounter community, and receive useful and thoughtful comments. Being able to personalise a blog is also a motivating factor for students (Leslie & Murphy, 2008). Kerawalla et al (2008:38) suggest not making blogging activities too rigid, but that teachers “give the students an opportunity to explore blogging and to appropriate it to support their individual requirements”.

Addressing the tension between making blogs student-directed and assessment-directed is critical, particularly as assessment causes anxiety that can make reflection artificial, and not all students appreciate the same level of direction (Sharma & Xie, 2008). Lack of direction can be very problematic for students (Sharma & Xie, 2008), as can concerns about privacy for those required to blog in public spaces.

Many commentators have noted a lack of research into blog use in higher education. Goldman et al (2008:1662) remark that further research is particularly necessary in the areas of:

criteria for grading discussion, including criteria for grading participation, desirable and effective incentives for participation, finding the balance between the requirement to participate and the freedom to choose to participate, and balancing the need to preserve privacy of participating students and the desire to facilitate students’ interactivity.

This is an important list. The helpfulness of comments (particularly whether they provide a useful critique) is another matter worth further study (Leslie & Murphy, 2008), as is further research on how to encourage meaningful reflection through blogging in formal education (Sharma & Xie, 2008). Finally, research comparing the outcomes of a blogging group and a control group, assessing learning outcomes and not just perceptions, will fill a much-needed gap in establishing blogging’s true potential for formal learning contexts.

Tools

Free and hosted blogging tools include Blogger (<http://www.blogger.com>), LiveJournal (<http://www.livejournal.com/>), Edublogs (<http://www.edublogs.org/>) and Wordpress (<http://wordpress.org/>). Edublogs provides an additional campus service (for a fee), giving the options of institutional domain names for blogs, additional privacy settings, and account management options. Wordpress can also be installed on a separate server, enabling a user to host their blog under their own domain name. Movable Type (<http://www.movabletype.org/>) is an open-source platform for those who want to set up their own blogging service. Most VLE systems also have built-in blogging tools.

5.3.2 Wikis

A wiki is a means of online collaboration – it consists of a webpage (or series of linked pages) that can be viewed and revised by multiple users. Earlier versions of each page can be compared and restored at any time, so it is possible to trace the journey of a wiki's construction and reinstate earlier work. New pages can be created and linked to, and each saved contribution can be checked according to the time it was added and who added it. A wiki is a dynamic work in progress, relying on its contributors to keep it up to date and accurate. The versatility of wiki applications is such that the open learning sites for *Wikiversity* (http://en.wikiversity.org/wiki/Wikiversity:Main_Page) and *Wikieducator* (http://www.wikieducator.org/Main_Page) are based entirely on wiki technology. The most common example cited of wikis in use is *Wikipedia*, the online encyclopedia that can be edited by any internet user.

Richardson (2006:60) explains the empowerment that wikis provide to users:

So, you have some knowledge about your favourite hobby that isn't on Wikipedia? Add it. Read something you think isn't correct? Fix it. Don't like the way one of the entries is written? Erase it. Something big just happen in the news that is history making? Start a new entry. You have the power, because every time you access Wikipedia or most any other wiki for that matter, you do so as Editor in Chief.

But sharing editorial power brings its own challenges. In a highly publicised (and contested) comparison between *Wikipedia* and *Encyclopaedia Britannica*, *Nature* magazine reported that *Wikipedia* articles were frequently poorly constructed and confusing. Further (and more significantly), they assessed a selection of articles and found 123 mistakes in *Encyclopaedia Britannica* and 162 in *Wikipedia*. *Britannica* contested the findings and, based on its own critique ("Fatally Flawed", 2006) the disparity may well be greater. Supporters of *Wikipedia* are quick to note that the errors in the *Wikipedia* articles were rapidly corrected. However, Larry Sanger, co-founder of *Wikipedia*, became so concerned over the alienation of experts in the *Wikipedia* system that he started an alternative online encyclopaedia, *Citizendium* (<http://citizendium.org>). *Citizendium* aims to improve the reliability of information by using "gentle expert oversight" and contributors' real names (*Citizendium*, nd). Even so, on 17 June 2009, *Citizendium's* entries numbered 957, compared with 2,916,846 English articles available in *Wikipedia* on the same date. The example of *Wikipedia* establishes wikis as environments "in which information is seen to be fluid and flexible, and even more importantly, communally constructed and owned" (Mason & Rennie, 2008:66). However, it is important to differentiate between community ownership and a sense of community – Hemmi, Bayne, and Land (2009) found that students perceive a wiki to be a more formal and disciplined place for sharing ideas than a discussion group, but that it is also less of a community space.

Shared editing provides many opportunities for collaboration in higher education. A wiki can be used to pool the knowledge and perspectives of groups of students, not only forming a useful learning resource but also requiring them to apply the skills of critical reading, reflection, evaluation, and writing (Trentin, 2008). Students who know that they

are writing for one another are motivated to make accurate and relevant contributions (Wheeler, Yeomans, and Wheeler, 2008). Having groups of three or four prepare an article on a particular topic is a simple way of using wikis in higher education (Choy & Ng, 2007). Wikis can also be used as gathering points for online resources, brainstormed ideas, or a series of interlinked reference materials. Such resources might be maintained across different class cohorts. A wiki might be used as a dynamic information page across the duration of a course, combining class news with the latest articles or ideas relevant to the course. Editing rights to a wiki might or might not be restricted to the members of a class; indeed, class groups might have to evaluate and update entries in *Wikipedia* itself, perhaps referring to the history and discussion pages associated with each entry. Mason and Rennie (2008:68) suggest an exercise in which students are required to “think about how information is organised, especially in a large or complex area, and to consider how to present it in small, hyperlinked chunks”.

While wikis are ideal for online group collaboration, Wheeler et al (2008:990) caution that “it is inevitable that some students will contribute more content than others”. Further, students do not always appreciate the anonymity and emphasis of group output over each individual’s contribution. Although public resources such as *Wikipedia* celebrate the collective outcomes of collaboration, “[i]n classroom contexts, where students are familiar with each other, ownership appears to be an issue” (Wheeler et al, 2008:992). The concern of ownership highlights again the contrast between Laurillard’s (2009) and Plaisted and Irvine’s (2006) differing versions of the Conversational Framework: to what extent is the individual’s understanding hidden behind the processes of the wiki? Could using a wiki prevent the teacher giving effective feedback to individuals, particularly those whose perspectives may or may not be adequately represented in a series of wiki pages? Wheeler et al (2008:993) also observed that students tended to read only those pages that they themselves were actively editing – this served “to negate the original objective of collaborative learning through content generation”.

Wheeler et al (2008:994) conclude by saying:

Transferring some assessment activities to a shared, collaborative space such as a wiki would raise a number of issues of quality, authenticity and plagiarism. The problem of equitable marking of individual work would also require further thought, given the shared and public nature of the wiki.

Fortunately, we can achieve the collaborative benefits of wiki development alongside valid forms of assessment in formal education. Trentin (2008) outlines a process by which it is possible to evaluate both the collaborative wiki and individual contributions. Having each student take ownership for a discrete section of the overall wiki provides the basis for assessment. To prepare a discrete section, students must link it to others in the wiki and, to do this, they must browse across the entire series of wiki pages. Trentin (2008) also requires peer review comments across the entire wiki (peer review comments are provided as comments, rather than direct edits on the page). Students use the peer review comments to improve their own sections. Each student’s contribution can ultimately be assessed according to their particular section (its own

integrity and how well it links to other parts of the wiki), and each individual's peer review activity is also considered. Peer evaluation can also be conducted to help formulate an individual's final grade. All of this, of course, suggests a 'due date' by which the wiki will be evaluated.

It is clear from the literature that effective use of wikis in higher education requires clear instructions, effective user training, and recognition of the time and effort that must go into wiki construction (Choy & Ng, 2007). Instructions should include not just the technical details on how the wiki application works, but also about how to approach the wiki from a collaborative, rather than competitive, orientation (Wheeler et al, 2008). Establishing style guides for writing and editing is also useful (Trentin, 2008). Authentic and small, well-defined tasks seem a promising use of wikis in formal education (Bower et al 2006, in Choy & Ng, 2007). While it might be beneficial to assign roles (such as editor) within wiki groups (Richardson, 2006), this strategy could over-burden individual group members (Trentin, 2008).

Tools

As with all Web 2.0 tools, a variety of wiki applications are available to higher educators. Learning Management Systems (LMSs) such as Blackboard and Moodle have their own internal wiki tools. External applications such as Writeboard (<http://www.writeboard.com/>), PBwiki (<http://pbwiki.com/>) and Wetpaint (<http://www.wetpaint.com/>) permit anyone to create and manage a hosted online wiki, either open to anyone or passworded for invited members. MediaWiki (<http://www.mediawiki.org/wiki/MediaWiki>), the application used as the basis for *Wikipedia*, *Wikiversity*, and *Wikieducator*, is a free application that can be downloaded for installation on any server. Subscription-based online office suites such as Google Docs (<http://docs.google.com>) and Zoho (<http://www.zoho.org/>) permit collaborative editing and version control of documents, and are compatible with proprietary word processors.

Wikis are very flexible tools that reward creative and well-constructed learning tasks. As with all collaborative tools, it is crucial to recognise the time required for effective collaborative work, and to allow for this time in course workloads (Choy & Ng, 2007). To participate in developing a wiki, students need to commit significant effort – this is a serious pedagogical undertaking.

5.3.3 E-portfolios

An e-portfolio is defined on *Wikipedia* as:

a collection of electronic evidence assembled and managed by a user, usually on the Web ... E-portfolios are both demonstrations of the user's abilities and platforms for self-expression, and, if they are online, they can be maintained dynamically over time. Some e-portfolio applications permit varying degrees of audience access, so the same portfolio might be used for multiple purposes.¹³

E-portfolios are essentially digital versions of more traditional hole-punched and ringbinder portfolios; electronic portfolios are considerably more flexible, more easily revised, and can be made available to wider audiences.¹⁴

There are several e-portfolio typologies, such as this from Abrami and Barrett (2005):

- the process portfolio, which shows the owner's learning journey over time
- the showcase portfolio, which shows the owners' actual achievements
- the assessment portfolio, which demonstrates formal learning achievement.

It is also possible for an e-portfolio to be the basis of social networking (see Tosh & Werdmuller, 2004). However, in education contexts students are frequently given the task of forming a process, showcase, or assessment e-portfolio (perhaps according to a graduate profile). An e-portfolio enables users to assemble digital artifacts (any digital file, including those already available through online services such as Flickr, YouTube and blog services), store, and organise them using keywords (tags), and make any combination of those artifacts available to a variety of audiences (see Fig. 4).

13 I proposed the substance of this definition in 2007, and it is still largely intact. The definition by Sutherland and Powell (in JISC, 2008:7) is also excellent: "An e-portfolio is a purposeful aggregation of digital items – ideas, evidence, reflections, feedback etc, which 'presents' a selected audience with evidence of a person's learning and/or ability". Comparing this definition with that of *Wikipedia* demonstrates the issue raised by Mason and Rennie (2008:73) that "There is still lack of clarity about whether the term *e-portfolio* refers to the software, a particular presentation or all of the contents".

14 Traditional portfolios have the advantage of tangibility. However, even in this respect electronic portfolios are useful – digital images can be included as evidence of physical artifacts.

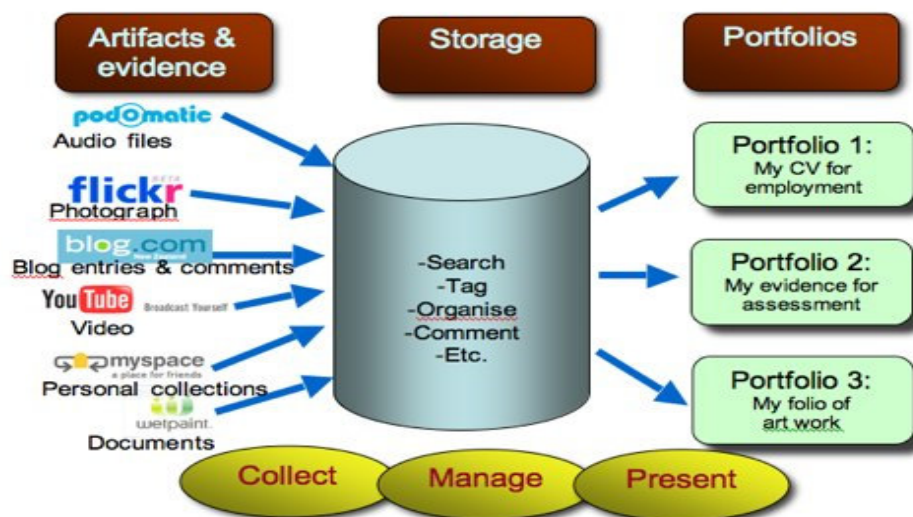


Figure 4 – Matching audiences with artifacts (from Derek's Blog: http://blog.core-ed.net/derek/files/2008/09/portfolio_diag1.jpg)

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In broad terms, therefore, constructing an e-portfolio requires the user to “reflect, select, connect, project” (Conrad 2008:143). The user reflects on the purpose of their e-portfolio and the pool of artifacts they have available, selects or creates those that will best meet that purpose, connects the artifacts in a way that demonstrates achievement, and projects the resulting presentation for others to see. Many e-portfolio tools enable matching artifacts to audiences in ways that are completely determined by the user.

The case study accounts in works such as Jafari and Kaufman (2006), Cambridge (2001), Stefani, Mason, and Pegler (2007), JISC (2008) and AeP (2008) demonstrate that the use of e-portfolios in education is extremely varied, both in the types of courses they are applied to and in what students are expected to do. While these studies indicate the versatility of e-portfolios, they also show that e-portfolio use in higher education is, at present, somewhat fragmented and characterised by “considerable exploratory use” (AeP, 2008:133). It is well demonstrated that e-portfolios have considerable potential as tools for assessment (Stefani et al, 2007) and for recognition of prior learning (Conrad, 2008). Preparing an e-portfolio has been termed an exercise in “assessment *for* learning” as well as assessment *of* learning (Chambers & Wickersham, 2007:351).

In a review of literature, Butler (2006:19) writes:

To be successful users of electronic portfolios, students need to understand the reasons for constructing a portfolio, be given clear guidelines, and have access to an electronic portfolio system that is easy to use and gives them as much flexibility or as much structure as they require. They also need the support of their lecturers. Academic staff need to be committed to the portfolio process, and willing to give students regular and useful feedback on their work and reflections.

Lane (2007) conducted research into how students perceived e-portfolios, and reported on three main findings:

1. Students base their understanding of e-portfolios on prior experience with other online tools, including social applications such as Facebook and MySpace.
2. Knowledge of the intended audience is key for e-portfolio creators.
3. Visual and web design skills are critical.

Lane's findings indicate that unless a particular genre or objective is clearly communicated to students, they tend to regard e-portfolios as an informal means of self-expression. Chambers and Wickersham (2007:354) demonstrate that integrating the requirements for student e-portfolios firmly within the programme of study, improving student efficacy and enhancing student "involvement and sharing of the e-portfolios" improves both student learning and their sense of ownership. Lumsden (2007) shows that a large-scale implementation of an e-portfolio across an institution can work if it is deliberately student-centred, well supported, and strongly linked to educational and career-planning outcomes. Wetzel and Strudler (2005) also found that broad-based planning, a clear purpose for e-portfolios, incremental implementation, and training are important factors in success. Providing feedback on student e-portfolios also enhances their value in students' minds (see, for example, Gülbahar & Tinmaz, 2006).

E-portfolios can be used as a central hub of evidence for learning. One way to achieve this is to require students to demonstrate they have achieved various learning objectives by providing artifact evidence. Another way is to have students demonstrate how they have integrated the various learning outcomes of a course (Mason, Peglar, and Weller, 2004).

An e-portfolio can be as simple as a PowerPoint presentation on CD-Rom. Early literature portrays e-portfolios as static webpages, sometimes made available through an institutional intranet (see, for example Cambridge, 2001). With the emergence of Web 2.0 and specific e-portfolio platforms that make e-portfolio creation more convenient, the static webpage approach is passé. Many e-portfolio platforms do more than simply store, manage, and display artifacts. Some include blogging tools, group and social networking functions, and features that make them viable alternatives to LMSs and Web 2.0 applications such as MySpace or Facebook. Some applications permit RSS feeds to be included; others permit grouping and the ability for others to add comments on particular e-portfolio presentations. Some allow templates for e-portfolio production; others are based on a competency or skill matrix, to which users attach

artifacts as evidence that they have achieved those competencies. Finally, some platforms (such as Mahara) facilitate the generation of multiple e-portfolio versions to multiple audiences, all drawing on the same pool of artifacts.

Tools

There is a broad selection of dedicated e-portfolio applications. Open-source solutions include Mahara (<http://mahara.org/>),¹⁵ ELGG community software (<http://elgg.org/>), and OSP (<http://osportfolio.org/>). Commercial options include ePortfolio, (<http://www.eportfolio.org/>), PebblePad (<http://www.pebblelearning.co.uk/>), ePortaro (<http://www.eportaro.com/>), and iWebfolio (<http://www.iwebfolio.com/>). Many LMSs (such as WebCT) include their own e-portfolio tools. Your choice of application is significant, because it determines where the application is hosted, what fees will apply to account holders, whether student portfolios can be made available outside the institution, and whether or not students can use their e-portfolio after they complete their studies. While interoperability standards are emerging through various initiatives (AeP, 2008), they are not yet broadly adopted. I suggest that you base your assessment of e-portfolio applications on the extent to which they enable flexibility for the user and provide sustainable access over time. If e-portfolio use in higher education were categorised according to three binary criteria – short-term or long-term, formal or informal, autonomous or coerced – most educationally-initiated e-portfolio activity would be short-term, formal, and coerced. While e-portfolios have considerable potential as personalised and reflective learning tools (JISC, 2008), they are frequently used in formal education contexts as stand-alone tools. There is a tendency in e-portfolio literature to consider e-portfolios solely in an educational setting. Cambridge (2001) places student e-portfolios firmly in the context of assessment. Lambert and Corrin (2007) talk of implementation based on the graduate profile. Lane (2007:np) draws a sharp distinction between social spaces and “academic and professional Web spaces”.

If you adopt an e-portfolio system for formal education, I strongly suggest that you implement it in ways that are congruent with lifelong learning. Providing an ‘e-portfolio for life’ is the goal of many governments and agencies. Both the Learning Innovations Forum d’Innovations d’Apprentissage (LIfIA) and the European Institute for E-Learning (ElfE-L) are pursuing the goal of an e-portfolio for every citizen (in the Americas and European Union respectively) by 2010. The goal is one e-portfolio for life for each citizen (Barker, 2006). The Department for Education and Skills (DfES) has also set specific actions relating to e-portfolios in the United Kingdom, linking them strongly to lifelong learning (DfES, 2005). Considerable work is being done by JISC (see for example Beetham, 2005; Gray, 2007) and other agencies (AeP, 2008) to ensure that e-portfolio tools and systems are considered in a lifelong context.

¹⁵ Since I chaired the development of Mahara while at Massey University, it has been established internationally as an e-portfolio system of choice. It was designed to be flexible, scalable, and viable as the basis for a user’s lifelong web presence. For one evaluation report, see Cox, Beers, and Verma (2008).

5.3.4 MUVES and Second Life

A MUVE is an online setting where people can meet and interact. The term applies to massive multiplayer online games (MMOGs, such as *World of Warcraft*) as well as virtual environments such as Second Life. While other MUVES might be used for educational purposes, Second Life is an advanced and well-established environment, and attracts the most interest from educators (Kelton, 2008; Salmon & Hawkridge, 2009; Salt, Atkins, & Blackall, 2008; Warburton, 2009). “Virtual Campus Could Aid in Emergency” (2007: np) describes Second Life as “Barbie, Ken, and hundreds of their clones dropped into the world of *The Matrix*.”

Second Life is described by Linden Research Inc., the company that owns and facilitates the Second Life MUVE, as “a free online virtual world imagined and created by its Residents”, a “fast-growing digital world filled with people, entertainment, experiences and opportunity” (Linden Research Inc.:np). Second Life is not, strictly, a game. What occurs in the Second Life setting is entirely open-ended: “there is no natural purpose unless one is created or built” (Warburton, 2009:416). Members can even own and customise virtual real estate. User accounts are free; however, ‘land’ in the virtual environment must be purchased. A virtual currency (the Linden dollar – bought with real money), facilitates virtual services ‘in world’. According to *Wikipedia*, in September 2008 there were 15 million registered Second Life accounts internationally. On 1 April 2009 at 6:26pm PDT there were 70,000 users online, and 1.5 million accounts were active in the preceding 60 days. Of these users, two-thirds are likely to be in the 25–34 age group (Berge, 2008). Users of Second Life are represented in the MUVE by avatars – three-dimensional characters that can be highly customised with dress and physical characteristics. Because they form communities and communicate through synchronous voice or text chat, users can choose to be completely anonymous. The environment itself has benefited from considerable activity by its Residents, who have purchased land and developed a multiplicity of environments and simulations for avatars to experience. Many companies have virtual presences in Second Life, though many of these have recently been downsized or even abandoned (Semuels, 2007).

Second Life has generated a great deal of interest in higher education circles and so provides an excellent case study for the potential of MUVES to be used in formal education. Rich simulation areas can be found for archaeology (see Edirisingha, Nie, Pluciennik, & Young, 2009), architecture, drama, language learning, fashion, history, archeology, science, geography, art, meteorology, programming and tourism – among many others. Innovative educational uses include role plays, problem-based learning, action learning, building objects, dramatic theatre, and other forms of experiential learning (see Molka-Danielsen & Deutschmann 2009 for a collection of innovative educational uses). Machinema, or virtual cinema recorded in Second Life, can also be used to help illustrate real-world scenarios (Middleton & Mather, 2008); the development of machinema becomes, in itself, an exercise in cinematography. Virtual museums provide three-dimensional representations of real museums. One simulated area exposes visitors to how schizophrenics experience their real-life interactions with the world. Communities meet for special event presentations and discussions.

Multimedia (video clips, slideshows, audio recordings) can be made available in world, and users can talk and type about their learning through their avatars. The International Society for Technology in Education (ISTE) maintains an educational portal of sorts in Second Life. Koru Island is a destination hosting various polytechnics and the Second Life Education in New Zealand (SLENZ) project (<http://slenz.wordpress.com/slenz-project/>), funded by the Tertiary Education Commission to “delineate and demonstrate to New Zealand educators and students the educational strengths or otherwise of learning in a virtual world” (SLENZ: np).

The difficulty of finding objective evaluations of education in Second Life is acknowledged by Salt et al (2008:8):

Almost all educational work in this field is less than two years old and very little has yet been published in established journals ... much of the literature around the educational use of MUVES in general, and Second Life in particular, is coming from the group of educators at the forefront of the experiment and who, not unexpectedly, have an inherent belief in the value of what they are doing.

Some peer-reviewed studies are emerging from enthusiasts. Recent issues of the journals *ALT-J* (16[3], 2008) and *BJET* (40[3], 2009) were dedicated to MUVE (primarily Second Life) use in higher education. In terms of the Community of Inquiry Framework (E-Primer 4.3.1) a study by Omale, Wei-Chen, Luetkehans, and Cooke-Plagwitz (2009:4932) concluded that MUVES can certainly enhance social presence but, in their study, “did not contribute greatly to participants’ cognitive presence”. It seems that Second Life has great potential for generating social presence, and potential to improve learning – mainly as it relates to artifacts in the learning environment (Edirisingha et al, 2009). Another study (Vogel, Guo, Zhou, Tian, & Zhang, 2008) compared Second Life with other means of online collaboration for educational purposes. Despite an attractive and engaging virtual location (a ski resort complete with timed slalom course), Second Life was rated lowest in terms of perceived usefulness, ease of use, team attitude, and intention to use when compared with MSN (synchronous text messaging), asynchronous online forums, videoconferencing, and email. On the other hand, Second Life rated highly for ‘fun’. According to Vogel et al (2008:20), the interface and bandwidth were significant barriers to students. The Asian value whereby “work and play do not mix” of the sample itself might also have further skewed responses. Other studies (such as those by Molka-Danielsen, 2009; Jægar & Helgheim, 2009), confirm little more than that Second Life has ‘potential’ and that it requires users to have significant technical literacy. Molka-Danielsen’s (2009:23) evaluation found that many students “had spent hours in trying to get it to work”. An account in Berge (2008:30) describes the issue:

Navigation is pretty hard at first in SL. In fact, everything is hard in SL the first time or two... or twelve... I am not a techie or programmer. I am not a gamer. If I had a background and familiarity with either or both of these skill sets, I could probably manage to get by in SL with a couple dozen hours of practice and play... when I found some educational locations, they were essentially empty of content and people. I went to many and found myself isolated, frustrated, and disappointed – another couple of hours down the drain.

At the time of writing, the value of Second Life as a *comprehensive* education solution is highly questionable. While the sense of being ‘immersed’ in Second Life can be “compelling” for users (Warburton 2009:419), the bandwidth and computer processing required for in-world experiences can result in considerable lag – resulting in a frustratingly stuttered and jerky sense of movement and orientation. There is also considerable difference between being immersed in an environment and being immersed in the ideas and perspectives found in it. While synchronous discussion is possible in Second Life, the predominance of text-only chat also stifles communication; Edirisingha et al (2009:472) note that “[c]ommunication in SL... involves a kind of choreography”. As Salt et al (2008:6) note, Second Life “is unlikely to entirely replace other forms of delivery and it is best seen as an adjunct to both face-to-face teaching and other online applications”. Work on integrating Second Life with Moodle (the Sloodle project, Livingstone, Kemp, & Edgar, 2008) will help to make this connection.

It is difficult to disagree with Berge (2008:30–31), who writes:

It is entirely possible, perhaps probable, that as SL evolves and matures, the current drawbacks will become less pervasive and less important, or that the current version of SL is a stepping-stone to something else that will be less cumbersome. Regardless, until educators figure out what to do in 3D virtual environments that cannot be more easily done in real life... educators in these virtual metaverses are relying on novelty and social presence to carry the day. I doubt it is enough after the initial experimentation for either students or faculty. Still, it is too early to dismiss the potential, and worth seeking to understand education, teaching, and learning in emerging virtual worlds.

Salmon and Hawkrigde (2009:403) echo Berge’s conclusion:

It may be too early to be sure that 3-D MUVE’s are more than a flash in the pan for higher education: after all, plenty of other technologies have been used for education for a few years only to disappear.

While it is certainly true that distance learning students in Second Life cannot ‘lurk’ (Mason & Rennie, 2008) and can participate in rich simulations, it is unlikely that Second Life will be a viable means for higher education until its usability problems are reduced and bandwidth access increases (still an issue in New Zealand). At present its ‘value-add’ is confined to the (virtually) experiential, making it an attractive option for helping learners to develop knowledge when simulated reality is not a barrier, or when simulation gives a distinct advantage. While conversation can also be facilitated through Second Life, it is uncertain whether its synchronous nature and virtual setting provide any real advantage over alternative (and asynchronous) means. However, once MUVE options become more accessible, we can imagine a single, avatar-based interface that facilitates a dialogue-based, resource-rich and (a)synchronously flexible education experience, in which we can introduce collaborative group work, presentations, and didactic teaching alongside opportunities for simulation. Cormier (2009) suggests that teachers will soon see the possibilities of Second Life once they are familiar with it themselves.

5.3.5 M-learning

Mobile learning involves using mobile technologies for educational purposes, so is based more on technological hardware than specific pedagogical possibilities. Price (2007:33–54) defines m-learning as “the use of handheld technologies enabling the learner to be ‘on the move’, providing anytime anywhere access to learning”. For training purposes, the promise of 10-minute bites of linear learning time leading to completion is promising (Vanthournout & Koch, 2008), making possible the mantra ‘just in time, just enough and just for me’ (Rosenberg 2001 in Peters 2009:114). However, for academic learning, m-learning’s usefulness is less poetic.

Mason and Rennie (2008:117) remark that “cell phones, personal digital assistants (PDAs), MP3 players, portable game devices, handhelds, tablets and laptops” are included in consideration of mobile devices,¹⁶ which at once makes clear their diverse potential. While devices are certainly converging (for example, mobile phones that run computer operating system software, computers with mobile internet access), the ability to create content, play multimedia and access the internet cannot be taken for granted when considering m-learning. It is also important not to exaggerate the ways in which devices converge, as they still maintain a clear sense of genre and frequently do not have all of the features that are required for true convergence of mobile technologies. The key differences relate to mobility (as in portability) and connection to a mobile network (as opposed to a wireless network).

Key features of mobile devices include:

- cellular network capability (traditional mobile phone; can include Short Message Service (SMS) and internet access through Wireless Application Protocol (WAP)¹⁷
- wireless network capability (computers and PDAs; access to full internet services through Wireless Local Area Network (WLAN)¹⁸
- multimedia playback, for digital video and audio
- multimedia recording, for video and audio.

A net book, or ultra-portable computer, is usually a full-featured laptop without an optical drive (for example, the Acer Aspire One). A typical net book computer runs standard computer applications, records and plays back multimedia, and connects to the internet wirelessly – but cannot be used as a mobile phone through a mobile network.¹⁹ A Playstation Portable (PSP) is a portable games console that can connect wirelessly to

16 Traxler (2009) excludes tablets and laptops on the grounds that they are not habitually carried around.

17 WAP tends to be limited to basic webpages. Multimedia and internet applications that require special player software tend not to be usable.

18 A WLAN differs from a WAP in that WLANs are designed to support wireless computer networks.

19 Skype can be used for sending SMS messages wirelessly and for calling mobile phones, but not for receiving either.

the internet (and can even be used for Skype calls), play back multimedia, and store digital multimedia files. However, it does not have mobile access to the internet (via a cellular network), lacks easy text input, cannot be used for SMS, and cannot record (<http://www.us.playstation.com/PSP>). An iPhone (<http://www.apple.com/iphone/>), on the other hand, is a full mobile phone and portable computer combination that includes wireless and mobile internet access, an on-screen keyboard, and digital camera and voice recording functions. On the whole, although almost everyone has a mobile phone, not everyone has access to the range of potential features available in an iPhone. The diverse device features (normal cell phones are more popular than PDAs), limited screen size, poor keyboard interface, and the cost of cellular network traffic are some of the technical issues that hinder m-learning. Poor sound is also often mentioned (Kukulska-Hulme & Pettit, 2009; Naismith & Smith, 2009).

M-learning, then, might include using classroom response systems (wireless units used by classes of students to rapidly answer multiple-choice questions) right through to collaborative data-gathering by students at different locations (Roschelle, 2003). It can also include using mobile devices as content repositories and personal organisers (calendar, contacts, and to-do lists) (Corlett, Sharples, Bull, & Chan, 2005). Case studies in Faux, McFarlane, Roche, and Facer (2006) also demonstrate the potential for mobile devices to interface with class projectors and interactive whiteboards, creating more flexible possibilities for lecture periods. Shen, Wang, and Pan (2008) demonstrate the viability of live lectures with opportunities for student responses to be broadcast to mobile devices. Flash-based content can also be used by PDAs that run Flash Lite software, creating opportunities for self-paced learning (Bradley, Haynes, Cook, Boyle, & Smith, 2009; Naismith & Smith, 2009).

Depending on the device, you can use mobile learning to supplement classroom or field trip activities (Price, 2007), improving communication between groups, and making information available “whenever and wherever learners need it” (Lai, Young, Chen, & Chan, 2007:328) during a field trip. In Lai et al’s (2007) study, students used mobile devices to record observations, photograph samples, and share results. The study used a control group and found that students who used PDAs for notetaking during a field trip generated more notes, and acquired slightly more knowledge. One concern, however, was that students with PDAs were less likely to rate the sensory experience of the field trip highly. Despite taking more notes, the students “with PDA in general lost interest in engaged observation” (Lai et al, 2007:335). Cavus and Ibrahim (2009) found that English language students who had technical vocabulary sent to their mobile phones via SMS reported it as very successful, though no comparison study was made with students who were not sent SMS. Rekkedal and Dye (2009) provided PDA-based mobile technologies to successfully increase flexibility of study for their students (who numbered fewer than ten), and Wishart (2009) in a ($n=12$) study of teacher trainee students found that they were more likely to use PDAs for note-taking (including multimedia recording), internet access, and as calendar scheduling than for collaboration.

Seppälä and Alamäki (2003) describe a mobile learning project that involved giving teacher trainees mobile devices (mobile phones and digital cameras). Students were required to use SMS and multimedia message service (MMS) to share brief teaching insights and digital photos (with SMS captions) of their supervision experiences. Using mobile phones also enabled the course teacher to “reach all students even when they are physically scattered in different locations” (Seppälä & Alamäki 2003:332). Students reported positively on the convenience, expediency, and immediacy of their experience. Teachers used SMS to provide immediate feedback, and students were provided with the technology they needed. While this example is extremely positive, the class size ($n=11$) must be borne in mind as such an approach might not be scalable across larger classes. Cook, Bradley, Lance, Smith, and Haynes (2007) required business studies students to gather video clips and photographs, and to respond to various questions posed via SMS for an assignment – mobile phones were provided ($n=12$). Cook et al reported high levels of student engagement, and a positive response to the various reminders sent to students by SMS; however, students were not so eager to access learning materials via their own mobile devices (36 per cent of respondents were generally positive about the suggestion; 55 per cent were neutral). A clear majority of respondents (82 per cent) were positive about being contacted for learning purposes via their own mobile phone. An online repository formed the focal point for multimedia files in both the Seppälä and Alamäki (2003) and Price (2007) case studies. Corlett et al (2005) found that students appreciated the opportunity to use mobile devices as personal organisers and as content repositories; however, gains in cognition were not measured. Participants were also reluctant to customise and extend the features of the devices they were loaned ($n=17$), and some experienced technical difficulties. Most found battery life to be a significant problem. However, there is some evidence that enhancing experiential learning through the use of mobile devices improves cognition.

The main use for deliberate m-learning for traditional mobile phones seems to be sending SMS reminders of key facts, reflective questions, and course notices. Beyond this, m-learning can provide student convenience depending on the features in their own mobile devices. Portable multimedia review, multimedia recording, and mobile internet access can significantly add to student convenience. Students with mobile access to the internet (and a device capable of easy text input) are able to participate in blogging, e-portfolio maintenance, and LMS activities and resources as regular parts of internet use.

The following recommendations of Faux et al (2006) are useful:

- Use handheld (mobile) devices in ways that integrate with other technologies and learning strategies.
- Have “an authentic purpose for use of the devices” (p. 2).
- Have deliberate learning goals, even if these are “as much about the culture of learning as about specific content or skills” (p. 2).
- Use mobile devices for “those particular activities which are appropriate for their use” (p. 4).

- Try to take advantage of the devices' abilities to replay and generate content.

A Becta project investigating the use of mobile devices in schools suggests that “[m]obile devices are best seen as an additional tool for learning” (McFarlane, Roche, and Triggs, 2007:15). The 2008 interim report is also tentative, with evidence-gathering still taking place. Early indications are that students benefit from using mobile devices, and that teachers are discovering more innovative and useful ways to use the devices for education. Frequently, the mobile PDAs in McFarlane et al are used as an element of a task rather than the sole means for completing a task. The network and technical support problems experienced in the large scale rollout have been significant. The 2008 report concludes that “mobile devices can make a very positive contribution to teaching and learning” (MacFarlane, Triggs, & Yee, 2008:24), adding that “[t]he main policy issues to be addressed are of sustainability and scalability”.

Depending on their features, mobile devices can be used to:

- record lectures
- record presentations by students, giving them opportunity to learn from their own performances
- photograph examples
- provide verbal or video messages as formative feedback
- provide access to course notes, which might include multimedia and self-paced modules
- facilitate communication
- interact with LMSs and online services.

Apart from their obvious uses for mobile phone calls and as personal organisers, it is increasingly common for mobile devices to be used successfully for such things as patient files and medical reference materials (Kenny, van Neste-Kennedy, Burton, and Meiers, 2009), training records, maintenance references and engineering instructions, project management devices, and a very broad range of additional uses in industry settings (Peters, 2009). In formal education, mobile devices can also enhance the flexibility of anytime, anyplace learning, which can be lost when paper-based distance education moves to using online resources, requiring students to sit with computers (Rekkedal & Dye, 2009). A useful framework for implementing m-learning is provided in Koole's (2009) FRAME model.

5.4 Designing for extended tools

It is clear from the sources cited above that using any extended tool requires a great deal of careful planning and dedicated involvement from a course instructor. Alignment with intended learning outcomes²⁰ is particularly important (see E-Primer 3.4.3).

The major issues to emerge from this E-Primer's treatment of various extended technologies are that of account ownership and, from time to time, a tension between student and institutional control. The longevity of student accounts is a clear issue with e-portfolios and blogs, both of which seem to work best in a lifelong context. In their natural habitat, Web 2.0 tools place the user at the centre of their own collaborative experience; formal education, with its more structured context and requirements for assessment, is not well positioned to facilitate this. There is an inherent mismatch between Web 2.0 tools and formal education, as described by Hemmi et al (2009:29):

The volatile modes of online interaction enabled by the new social media perhaps sit uncomfortably within existing higher education practice. The communicative landscapes opened up by social media can be spaces of strangeness and troublesomeness to the academy, both epistemologically and ontologically... They entail a shift towards new, volatile forms of textual mediation and subject formation and place increasing emphasis on collaborative modes of enquiry and the importance of group self-regulation and self-explanation. They have the potential to alter relations between process and artifact, permit fragmentation over cohesion, exploration over exposition and the visual over the textual. They are characterized by a tendency towards endless re-crafting, often involving rapid patterns of amendment, truncation, revision and addition. They are perhaps a product of speed... and fast time..., operating through trust and consensus, whereas the cloistered, analogue academy has required slow time, reflection and reference to authority and the authoritative. In the courses and programmes of study considered during this research, we found a tendency for both teachers and learners to 'rein in' these potentially radical and challenging effects of the new media formations, to control and constrain them within more orthodox understandings of authorship, assessment, collaboration and formal learning.

We can see that Web 2.0 tools can be refashioned for use in formal education settings. However, for Web 2.0 tools to add particular value to formal education, it seems necessary to 'rein in' the very things that make Web 2.0 so distinctive in the first place, to effectively emasculate the longevity, openness, and inclusiveness that mark Web 2.0 collaboration. When formal education is injected into Web 2.0, the inherent benefits die. However, neither is Web 2.0 an 'antidote' for higher education. The issue is really one of the extent to which the "more orthodox understandings of authorship, assessment, collaboration and formal learning" mentioned by Hemmi et al (2009) compromise the purpose and relevancy of formal education. Because formal education does not claim a monopoly on teaching and learning, and because students enrol in formal education contexts expecting to engage with a knowledgeable member of faculty and wrestle with academic knowledge, it could be argued that an incompatibility of Web 2.0 tools with formal education should be of no concern, and even of no consequence. This is not to

²⁰ The Auckland University "Technology and Teaching" wiki at <http://virtuallythere.wikispaces.com/Technology+%26+Teaching> provides this advice, also linking it to teaching and learning activities and assessment.

suggest that collaboration and authenticity are not important objectives for higher education, only that the sort of contribution Web 2.0 tools might make to these goals does not fit in formal education contexts. While Web 2.0 tools themselves are certainly usable in formal education, the usual genre underpinning their use is very much at odds.

This is nicely described by Singer (2008:21) in her discussion about blogs:

There is an argument, of course, that making the blog part of a graded assignment virtually mandates that students see it that way. Ardent bloggers might protest that the nature of blogs is free, open, and voluntary, and that a 'points for posting' scheme kills all that is wonderful about the format. That may be... but when the edublogs were entirely free, open, and voluntary, students ignored them.

The first principle of using Web 2.0 tools in formal education must be to realistically consider the advantages of the tools, with particular critique of the characteristic differences between social networking and formal education.

Laurillard (2008:8) notes that “[t]echnology works best when it has to meet a challenge; and worst when it is a solution looking for a problem”. Key to designing for extended tools is having a clear need for them to meet. If e-learning is, as E-Primer 1.1 contends, “pedagogy empowered by digital technology”, then a clear sense of educational purpose is the best basis for applying any e-learning tool.

Mason and Rennie (2008:50) provide four fundamental rules for applying Web 2.0 in education:

1. **No panacea:** don't use Web 2.0 in response to course deficiencies.
2. **Pedagogy first:** educational goals should underpin your use of Web 2.0 tools.
3. **Initial induction:** you must train students to use the technology.
4. **Need to be serious:** tasks “need to be real examples that are worthwhile doing”.

These very practical considerations give a good summary for implementing *any* extended possibility for e-learning, not just those identifiable as examples of Web 2.0. As Web 2.0 tools are typically applied to courses for reasons of collaboration, the principles in E-Primer 4 *Online discourse* are transferable. However, Web 2.0 tools must especially emphasise a strong sense of audience for students, and feedback ought to be rapid and constructive.

5.5 Summary

Extended tools do hold promise for formal education provided they are deliberately implemented, emphasise dialogue, feedback, and reflection, and do not compromise the pursuit of academic knowledge. Beyond this, the words of Nick Allen (in Miller, 2007:5), ring true in that unless Web 2.0 (and, I would add, other extended tools) can “help students learn more, provide access to larger numbers of students, improve learning outcomes, or help faculty teach... institutions should not be distracted by them”. However, it is also necessary to not completely close off any sense of worth for

extended tools. Salmon (2009:535), with reference to Second Life, approaches the matter from a different angle:

Apply a simple test: does this application offer any potential for low-cost, high-value learning? If the answer is yes or maybe, then I believe we should make a small investment of time and energy to find out more.

We ought to be especially open to exploring how we might use extended technologies in education, but do so by first being aware of their limitations, and being deliberate about what exactly it is we aim to achieve. The research cited in this E-Primer indicates that the benefits of extended tools in out-of-educational settings do not easily translate to educational benefits.

Using the various extended tools analysed in this E-Primer requires careful thought. Application should take account of the following:

- **Blogs:** genre of writing for self; longevity of ownership; the dynamic of usefulness in the long-term; tensions of providing too much/not enough direction.
- **Wikis:** establishing a sense of class ownership; the need to reward individual contributors; the need to enforce collaboration; small, well-defined tasks work best.
- **E-portfolios:** as with blogs.
- **MUVEs:** complexity of the interface; limitations of communication; best suited to the experiential or simulated (not a comprehensive solution).
- **M-learning:** no standard set of features in devices, making specific uses beyond SMS difficult unless devices are provided; limitations of screen and interface; using a mobile device may distract from the actual exercise.

It seems likely that the issues associated with blogs, wikis, and e-portfolios relate to implementation. Advances in MUVE and m-learning applications and hardware may eventually minimise the issues above.

So we must make a clear case for using extended tools before we apply them. Forms of literacy provide a useful rationale. Citing Lankshear and Knobel (2003), Bolstad and Gilbert (2006:27) point out that merely applying new technologies to education because they are popular entirely misses the point. Rather, it is the responsibility of teachers to identify which elements of information literacy such tools might encourage, “such as forms of analysis and synthesis associated with evaluating and producing knowledge in expert-like ways”. For this to apply to the extended possibilities considered in this E-Primer, it is clear that objectives and instructions must be carefully and realistically prepared. Bolstad and Gilbert (2006) add that using new technologies for new forms of literacy will require us to establish new cultures of use; what works well socially does not necessarily work well educationally. We must also be careful to not mistake the potential for fun and engagement as potential for improved academic learning. It is a mistake to assume that intrinsically motivating, ubiquitously accessible and socially informal uses of extended tools correspond to easy opportunities for formal education.

Laurillard (2007:174) (specifically referring to m-learning), places all of the extended possibilities discussed in this E-Primer into perspective when she says:

[they] offer exciting new opportunities for teachers to place learners in challenging active learning environments, making their own contributions, sharing ideas, exploring, investigating, experimenting, discussing, but they cannot be left unguided and unsupported. To get the best from the experience the complexity of the learning design must be rich enough to match those rich opportunities.

Successfully extending e-learning possibilities in higher education demands a thoughtful partnership between teacher, student, and technology. In the higher education context, this partnership is inevitably shaped by learning objectives and an overall learning design that is both informed and innovative.

References

- Abrami, P. C., & Barrett, H. (2005). Directions for research and development on electronic portfolios. *Canadian Journal of Learning and Technology* 31(3). Retrieved November 6, 2008 from <http://www.cjlt.ca/content/vol31.3/abrami.html>.
- Alexander, B. (2006, March–April). Web 2.0: A new wave of innovation for teaching and learning? *Educause Review*, 33–44.
- Ally, M. (2009). Introduction. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training*, 1–6. Retrieved May 6, 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.
- Anderson, P. (2007, February). *What is web 2.0? Ideas, technologies and implications for education*. (JISC Technology and Standards Watch). Retrieved February 19, 2008 from <http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf>.
- Australian ePortfolio Project. (AeP). (2008). *ePortfolio use by university students in Australia: Informing excellence in policy and practice*. Retrieved March 25, 2009 from http://www.eportfolioppractice.gut.edu.au/docs/Aep_Final_Report/AeP_Report_ebook.pdf.
- Barker, K. C. (2006) Foreword. In A. Jafari and C. Kaufman (Eds.), *Handbook of research on eportfolios*, xxvi–xxviii. USA: Idea Group Reference.
- Barnes, C., & Tynan, B. (2008). The adventures of Miranda in the brave new world: Learning in a web 2.0 millenium. *ALT-J* 15(3), 189–200.
- Bauerlein, M. (2008). *The dumbest generation*. New York: Jeremy P.Tarcher/Penguin.
- Becta. (2008). *The learner and their context*. Retrieved May 27, 2009 from http://emergingtechnologies.becta.org.uk/upload-dir/downloads/page_documents/research/reports/learner_context_interim.pdf.
- Beetham, H. (2005). *E-portfolios in post-16 learning in the UK: Developments, issues and opportunities*. Retrieved November 6, 2007 from <http://www.jisc.ac.uk/media/documents/themes/elearning/eportfolioped.pdf>.
- Bennett, S., Maton, K., & Kervin, L. (2008). The digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology* 39(5), 775–786.
- Berge, Z. (2008, May–June). Multi-user virtual environments for education and training? A critical review of Second Life. *Educational Technology*, 27–31.
- Bolstad, R., & Gilbert, J. (2006). *Zooming in on learning in the digital age: A literature review*. Wellington: NZCER Press.

- Bradley, C., Haynes, R., Cook, J., Boyle, T., & Smith, C. (2009). Design and development of multimedia learning objects for mobile phones. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training*, 157–182. Retrieved May 6, 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.
- Bradwell, P. (2009). *The edgeless university: Why higher education must embrace technology*. London: Demos. Retrieved August 30, 2009 from http://www.demos.co.uk/files/Edgeless_University_-_web.pdf?1245715615.
- Bruns, A. (2008). *Blogs, Wikipedia, Second Life, and beyond*. New York: Peter Lang.
- Bryant, L. (2007). Emerging trends in social software for education. In *Emerging technologies for learning: Vol. 2* (pp. 9–18). Retrieved January 15, 2008 from http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/emerging_technologies07.pdf.
- Butler, P. (2006). *A review of the literature on portfolios and electronic portfolios*. Retrieved June 17, 2009 from <http://eduforge.org/docman/view.php/176/1111/ePortfolio%20Project%20Research%20Report.pdf>.
- Cambridge, B. L. (Ed). (2001). *Electronic portfolios: Emerging practices in student, faculty, and institutional learning*, USA: Stylus.
- Cavus, N., & Ibrahim, D. (2009). M-learning: An experiment in using SMS to support learning new English language words. *British Journal of Educational Technology* 40(1), 78–91.
- Centre for Information Behaviour and the Evaluation of Research (CIBER). (2008). *Information behaviour of the researcher of the future*. Retrieved January 17, 2008 from http://www.jisc.ac.uk/media/documents/programmes/reppres/gg_final_keynote_11012008.pdf.
- Chambers, S. M., & Wickersham, L. E. (2007). The ePortfolio journey: One year later. *Education* 127(3), 351–360.
- Choy, S. O., & Ng, K. C. (2007). Implementing wiki software for supplementing online learning. *Australasian Journal of Educational Technology* 23(2), 209–226.
- Churchill, D. (2009). Educational applications of web 2.0: Using blogs to support teaching and learning. *British Journal of Educational Technology* 40(1), 179–183.
- Citizendium. (nd). *CZ: About*. Retrieved April 8, 2009 from <http://en.citizendium.org/wiki/CZ:About>.

- Conole, G., de Laat, M., Dillon, T., & Darby, J. (2006). *JISC LXP: Student experiences of technologies—Final report*. Retrieved January 15, 2008 from <http://www.jisc.ac.uk/media/documents/programmes/elearningpedagogy/lxprojectfinalreportdec06.pdf>.
- Conrad, D. (2008). Building knowledge through portfolio learning in prior learning assessment and recognition. *Quarterly Review of Distance Education* 9(2), 139–150.
- Cook, J., Bradley, C., Lance, J., Smith, C., & Haynes, R. (2007). Generating learning contexts with mobile devices. In N. Pachler (Ed.), *Mobile learning: Towards a research agenda* (pp. 55–74). WLE Centre: London. Retrieved March 26, 2009 from http://www.wlecentre.ac.uk/cms/files/occasionalpapers/mobilelearning_pachler2007.pdf.
- Corlett, D., Sharples, M., Bull, S., & Chan, T. (2005). Evaluation of a mobile learning organiser for university students. *Journal of Computer-Assisted Learning* 21, 162–170.
- Cormier, D. (2009). MUVE eventedness: An experience like any other. *British Journal of Educational Technology* 40(3), 543–546.
- Cox, R., Beers, M., & Verma, S. (2008). *SF State Leadership Activity: ePortfolio development*. San Francisco State University. Retrieved March 26, 2009 from http://teachingcommons.cdl.edu/eportfolio/media/documents/CSU_eport6-30-08.pdf.
- Daanen, H., & Facer, K. (2007). *2020 and beyond*. UK: Futurelab. Retrieved January 8, 2008 from http://www.futurelab.org.uk/resources/documents/opening_education/2020_and_beyond.pdf.
- Department for Children, Schools and Families (DfES). (2005). *Harnessing technology: Transforming learning and children's services*. Retrieved November 6, 2007 from <http://www.dfes.gov.uk/publications/e-strategy/docs/e-strategy.pdf>.
- Dickey, M. D. (2004). The impact of web-logs (blogs) on student perceptions of isolation and alienation in a web-based distance-learning environment. *Open Learning* 19(3), 279–291.
- Downes, S. (2005). *E-learning 2.0*. Retrieved January 8, 2008 from <http://www.downes.ca/post/31741>.
- Downes, S. (2007). Learning networks in practice. In *Emerging technologies for learning: Vol. 2* (pp.19–27) Retrieved January 15, 2008 from http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/emerging_technologies07.pdf.

- Edirisingha, P., Nie, M., Pluciennik, M., & Young, R. (2009). Socialisation for learning at a distance in a 3-D multi-user virtual environment. *British Journal of Educational Technology* 40(3), 458–479.
- Fatally flawed. (2006). *Encyclopaedia Britannica*. (2006). Retrieved December 12, 2007 from http://corporate.britannica.com/britannica_nature_response.pdf.
- Faux, F., McFarlane, A., Roche, N., & Facer, K. (2006). *Handhelds: Learning with handheld technologies*. Retrieved April 29, 2009 from http://www.futurelab.org.uk/resources/documents/handbooks/handhelds_handbook.pdf.
- Gilbert, J. (2005). *Catching the knowledge wave? The knowledge society and the future of education*. Wellington: NZCER Press.
- Goldman, R. H., Cohen, A. P., & Sheahan, F. (2008). Using seminar blogs to enhance student participation and learning in public health school classes. *American Journal of Public Health* 98(9), 1658–1663.
- Gray, L. (2007). *e-Portfolios: An overview of JISC activities*. Retrieved November 6, 2007 from <http://www.jisc.ac.uk/publications/publications/eportfoliooverviewv2.aspx>.
- Gülbahar, Y., & Tinmaz, H. (2006). Implementing project-based learning and e-portfolio assessment in an undergraduate course. *Journal of Research on Technology in Education* 38(3), 309–327.
- Hart, J. (2008). Understanding today's learner. *Learning Solutions*, September, 1–11. retrieved May 27, 2009 from <http://www.c4lpt.co.uk/articles/understandinglearners.pdf>.
- Healy, R. (2009). Mainstream Gen Y isn't buying into web 2.0. *Social Computing Journal*. Retrieved May 6, 2009 from <http://socialcomputingjournal.com/viewcolumn.cfm?colid=824>.
- Hemmi, A., Bayne, S., & Land, R. (2009). The appropriation and repurposing of social technologies in higher education. *Journal of Computer Assisted Learning* 25, 19–30.
- Horrigan, J., & Rainie, L. (2006). *The Internet's growing role in life's major moments*, Pew Internet & American Life Project. Retrieved July 2, 2008 from http://www.pewinternet.org/pdfs/PIP_Major%20Moments_2006.pdf.
- Ito, M., Horst, H., Bittani, M., Boyd, D., Herr-Stephenson, B., Lange, P.G., et al. (2008). *Living and learning with new media: Summary of findings from the digital youth project*. Retrieved May 27, 2009 from <http://digitalyouth.ischool.berkeley.edu/files/report/digitalyouth-WhitePaper.pdf>.
- Jafari, A. & Kaufman, C. (Eds.). (2006). *Handbook of research on ePortfolios*. USA: Idea Group Reference.

- Jægar, B., & Helgheim, B. (2009). Role play in a purchase management class. In J. Molka Danielsen & M. Deutschmann (Eds.). *Learning and teaching in the virtual world of Second Life* (pp.115–123). Trondheim: Tapir Academic Press.
- Jeanneney, J-N. (2007). *Google and the myth of universal knowledge: A view from Europe*. USA: Chicago University Press.
- Joint Information Systems Committee. (2007) *Student expectations study*. Retrieved July 2, 2008 from <http://www.jisc.ac.uk/media/documents/publications/studentexpectations.pdf>.
- Joint Information Systems Committee. (2008). *Effective practice with e-portfolios*. Retrieved April 1, 2009 from <http://www.jisc.ac.uk/media/documents/publications/effectivepracticeeportfolios.pdf>.
- Jones, S. (2009). *Generations online in 2009*. Pew Internet and American Life Project. Retrieved May 27, 2009 from http://www.pewinternet.org/~media/Files/Reports/2009/PIP_Generations_2009.pdf.
- Kelton, A. J. (2008, September/October). Virtual worlds? Outlook good. *EDUCAUSE Review*, 14–21.
- Kenny, R. F., van Neste-Kennedy, J. M. C., Burton, P. A., & Meiers, J. (2009). Using mobile learning to enhance the quality of nursing practice education. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 75–98). Retrieved May 6, 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.
- Kennedy, G., & Krause, K-L. (2008). First year students' experiences with technology: Are they really digital natives? *Australian Journal of Educational Technology* 24(1), 108–122.
- Kennedy, G., Dalgarno, B., Bennett, S., Gray, K., Waycott, J., Judd, T., et al. (2009). *Educating the Net Generation: A handbook of findings for practice and policy*. New South Wales: Australian Learning and Teaching Council. Retrieved August 30, 2009 from <http://www.netgen.unimelb.edu.au/downloads/handbook/NetGenHandbookAll.pdf>.
- Kerawalla, L., Minocha, S., Kirkup, G., & Conole, G. (2008). An empirically grounded framework to guide blogging in higher education. *Journal of Computer Assisted Learning* 25, 31–42.
- Koole, M. L. (2009). A model for framing mobile learning. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 25–47). Retrieved May 6, 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.

- Kukulka-Hulme, A., & Pettit, J. (2009). Practitioners as innovators: Emergent practice in personal mobile teaching, learning, work, and leisure. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 135–155). Retrieved 6 May 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.
- LaCour, S. (2005). The future of integration, personalization, and e-Portfolio technologies. *Innovate* 1(4). Retrieved January 8, 2008 from http://moodle.uacj.mx/moodledata152/7/Modulo_VI/Documentos_complementarios/Eportafolio.pdf
- Lai, C. H., Yang, J. C., Chen, F. C., Ho, C. W., & Chan, T. W. (2007). Affordances of mobile technologies for experiential learning: The interplay of technology and pedagogical practices. *Journal of Computer Assisted Learning* 23, 326–337.
- Lambert, S., & Corrin, L. (2007). Moving towards a university wide implementation of an ePortfolio tool. *Australian Journal of Educational Technology* 23(1), 1–16.
- Lane, C. 2007. The power of ‘E’: Using e-portfolios to build online presentation skills, *Innovate* 3(3). Retrieved November 6, 2007 from <http://www.innovateonline.info/index.php?view=articleandid=369>.
- Laurillard, D. (2002). *Rethinking university teaching* (2nd ed.). London/New York: RoutledgeFalmer.
- Laurillard, D. (2007). Pedagogical forms for mobile learning: Framing research questions. In N. Pachler (Ed.), *Mobile learning: Towards a research agenda* (pp.153–175). WLE Centre: London. Retrieved March 26, 2009 from http://www.wlecentre.ac.uk/cms/files/occasionalpapers/mobilelearning_pachler2007.pdf.
- Laurillard, D. (2008). *Digital technologies and their role in achieving our ambitions for education*. London: Institute of Education, University of London.
- Laurillard, D. (2009). The pedagogical challenges to collaborative technologies. *Computer-Supported Collaborative Learning* 4, 5–20.
- Lenhart, A., & Fox, S. (2006). *Bloggers*. Pew Internet and American Life Project. Retrieved February 19, 2008 from <http://www.pewinternet.org/pdfs/PIP%20Bloggers%20Report%20July%2019%202006.pdf>
- Lenhart, A., & Madden, M. (2005). *Teen content creators and consumers*. Pew Internet and American Life Project. Retrieved February 19, 2008 from http://www.pewinternet.org/pdfs/PIP_Teens_Content_Creation.pdf.
- Leslie, P., & Murphy, E. (2008). Post-secondary students’ purposes for blogging. *International Review of Research in Open and Distance Learning* 9(3). Retrieved June 3, 2009 from <http://www.irrodl.org/index.php/irrodl/article/view/560/1099>.

- Linden Research, Inc. (np). *What is Second Life?* Retrieved April 1, 2009 from <http://secondlife.com/whatis/>.
- Livingstone, D., Kemp, J., & Edgar, E. (2008). From multi-user virtual environment to 3D virtual learning environment. *ALT-J* 16(3), 139–150.
- Lumsden, J. A. (2007, Fall). Development and implementation of an e-Portfolio as a university-wide program. *New Directions for Student Services* 119, 43–63.
- McFarlane, A., Roche, N., & Triggs, P. (2007). *Mobile learning: Research findings*. Retrieved May 6, 2009 from http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/mobile_learning_july07.pdf.
- McFarlane, A., Triggs, P., & Yee, W. (2008). *Researching mobile learning: Interim report to Becta*. Retrieved May 6, 2009 from http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/mobile_learning.pdf.
- McMillen, S. (2005). *Amusing ourselves to death*. Retrieved September 3, 2009 from <http://www.recombinantrecords.net/docs/2009-05-Amusing-Ourselves-to-Death.html>
- Margaryan, A., & Littlejohn, A. (2008). *Are digital natives a myth or reality? Students' use of technologies for learning*. Retrieved May 26, 2009 from <http://www.academy.gcal.ac.uk/anoush/documents/DigitalNativesMythOrReality-MargaryanAndLittlejohn-draft-111208.pdf>.
- Mason, R., Pegler, C., & Weller, M. (2004). E-portfolios: An assessment tool for online courses. *British Journal of Educational Technology* 35(6), 717–727.
- Mason, R., & Rennie, F. (2008). *E-learning and social networking handbook*. New York: Routledge.
- Mezirow, J. (1990) *Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning*. USA: Jossey-Bass.
- Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress*. San Francisco: Jossey-Bass.
- Middleton, A. J., & Mather, R. (2008). Machinema interventions: Innovative approaches to immersive virtual world curriculum integration. *ALT-J* 16(3), 207–219.
- Miller, G. (2007). *EDEN looks ahead to the educational impact of web 2.0*. Retrieved July 2, 2008 from http://www.sloan-c.org/resources/EDEN_web2.pdf.
- Ministry of Education. (nd). *The future*. Retrieved February 19, 2008 from http://nzcurriculum.tki.org.nz/student_views/the_findings/the_future.
- Molka Danielsen, J. (2009). The new teaching and learning environment. In J. Molka Danielsen & M. Deutschmann (Eds.). *Learning and teaching in the virtual world of Second Life*. Trondheim: Tapir Academic Press, 13–25.

- Molka Danielsen, J., & Deutschmann, M. (Eds.). (2009). *Learning and teaching in the virtual world of Second Life*. Trondheim: Tapir Academic Press.
- Nackerud, S., & Scaletta, K. (2008). Blogging in the academy. *New Directions for Student Services* 124, 71–87.
- Naismith, L., & Smith, M. P. (2009). Using mobile technologies for multimedia tours in a traditional museum setting. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 247–264). Retrieved May 6, 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.
- Oblinger, D. G., & Oblinger, J. L. (Eds.). (2005). *Educating the net generation*. EDUCAUSE. Retrieved September 3, 2009 from <http://www.educause.edu/ir/library/pdf/pub7101.pdf>
- Oliver, B., and Goerke, V. (2007). Australian undergraduates' use and ownership of emerging technologies: Implications and opportunities for creating engaging learning experiences for the Net Generation. *Australian Journal of Educational Technology* 23(2), 171–186.
- Omale, N., Wei-Chen, H., Luetkehans, L., & Cooke-Plagwitz, J. (2009). Learning in 3-D multiuser virtual environments: Exploring the use of unique 3-D attributes for online problem-based learning. *British Journal of Educational Technology* 40(3), 480–495.
- Oravec, J.A. (2003). Blending by blogging: Weblogs in blended learning initiatives. *Journal of Educational Media* 28(2–3), 225–233.
- Owen, M., Grant, L., Sayers, S., & Facer, K. (2006). *Social software and learning*. Retrieved February 19, 2008 from http://www.futurelab.org.uk/resources/documents/opening_education/Social_Software_report.pdf.
- Pan, B., Helmbrooke, H., Joachims, T., Lorigo, L., Gay, G., & Granka, L. (2007). In Google we trust: User's decisions on rank, position, and relevance. *Journal of Computer Mediated Communication* 12(3), article 3. <http://jcmc.indiana.edu/vol12/issue3/pan.html>.
- Peters, K. (2009). M-learning: Positioning educators for a mobile, connected future. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 113–132). Retrieved May 6, 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.
- PewInternet. (2005). *Internet: The mainstreaming of online life*. Retrieved December 18, 2008 from http://www.pewinternet.org/pdfs/Internet_Status_2005.pdf.
- Plaisted, T., & Irvine, S. (2006). Learning from web 2.0 practices: A tool to support real-time student collaboration. *Proceedings of the 23rd Annual ASCILITE Conference*, University of Sydney, 679–683.

- Postman, N. (2006). *Amusing ourselves to death*. (20th anniversary ed.). USA: Penguin Books.
- Prensky, M. (2001). *Digital natives, digital immigrants*. Retrieved May 27, 2009 from <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives.%20Digital%20Immigrants%20-%20Part1.pdf>.
- Price, S. (2007). Ubiquitous computing: Digital augmentation and learning. In N. Pachler (Ed.), *Mobile learning: Towards a research agenda* (pp. 33–54). WLE Centre: London. Retrieved March 26, 2009 from http://www.wlecentre.ac.uk/cms/files/occasionalpapers/mobilelearning_pachler2007.pdf.
- Rainie, L., & Horrigan, J. (2005). *Reports: Internet evolution*. Pew Internet and American Life Project. Retrieved February 19, 2008 from http://www.pewinternet.org/PPF/r/148/report_display.asp.
- Reeves, T. C., & Oh, E. (2007). Generational differences. In J. M. Spector, M. D. Merrill, J. van Merriënboer, & M. P. Driscoll (Eds.), *Handbook of research on educational communications and technology* (3rd ed.). pp. 295–303). USA: Routledge.
- Rekkedal, T., & Dye, A. (2009). Mobile distance learning with PDAs: Development and testing of pedagogical and system solutions supporting mobile distance learners. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 51–74). Retrieved May 6 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.
- Richardson, W. (2006). *Blogs, wikis, podcasts, and other powerful Web tools for classrooms*. California: Corwin Press.
- Roschelle, J. (2003). Keynote paper: Unlocking the learning value of wireless mobile devices. *Journal of Computer-Assisted Learning* 19, 260–272.
- Salaway, G., Caruso, J. B., & Nelson, M. R. (2007). The ECAR study of undergraduate students and information technology. *ECA Research Study 6*. Retrieved February 19, 2008 from <http://www.educause.edu/ir/library/pdf/ers0706/rs/ERS0706w.pdf>
- Salmon, G. (2009). The future for (second) life and learning. *British Journal of Educational Technology* 40(3), 526–538.
- Salmon, G., & Hawkrigde, D. (2009). Editorial: Out of this world. *British Journal of Educational Technology* 40(3), 401–413.
- Salt, B., Atkins, C., & Blackall, L. (2008). Engaging with *Second Life: Real education in a virtual world*. Retrieved June 17, 2009 from <http://slenz.files.wordpress.com/2008/12/slliteraturereviewa1.pdf>.
- Savin-Baden, M. (2008). From cognitive capability to social reform? Shifting perceptions of learning in immersive virtual worlds. *ALT-J* 16(3), 151–161.

- Semuels, A. (2007, July 14). Virtual marketers have second thoughts about Second Life: Firms find that avatars created by participants in the online society aren't avid shoppers. *LA Times*, July 14. Retrieved April 1, 2009 from http://articles.latimes.com/2007/jul/14/business/secondlife14?s=0&n=0&rd=www.techcrunch.com&sessid=5c98be2c6df3227c665153e50b11bfe0e5239fc2&uuiid=5c98be2c6df3227c665153e50b11bfe0e5239fc2&pgtp=article&eagi=&cat=business&page_type=article&exci=2007_07_14_business_fi-secondlife14&pg=1.
- Seppälä, P., & Alamäki, H. (2003). Mobile learning in teacher training. *Journal of Computer-Assisted Learning* 19, 330–335.
- Sharma, P., & Xie, Y. (2008). Student experiences of using Weblogs: An exploratory study. *Journal of Asynchronous Learning Networks* 12(3–4), 137–156.
- Sheehy, K., & Bucknall, S. (2008). How is technology seen in young people's visions of future education systems? *Learning, Media and Technology* 33(2), 101–114.
- Shen, R., Wang, M., & Pan, X. (2008). Increasing interactivity in blended classrooms through a cutting-edge mobile learning system. *British Journal of Educational Technology* 39(6), 1073–1086.
- Singer, J. B. (2008). Posting for points: Edublogs in the JMC curriculum. *Journalism and Mass Communication Educator* 63(1), 10–27.
- SLENZ. (nd). *The SLENZ project*. Retrieved April 1, 2009 from <http://slenz.wordpress.com/slenz-project/>.
- Solomon, G., & Schrum, L. (2007). *Web 2.0 new tools, new schools*. USA: International Society for Technology in Education.
- Stefani, L., Mason, R., & Pegler, C. (2007). *The educational potential of e-portfolios*. London: Routledge.
- Tosh, D., & Werdmuller, B. (2004). *Creation of a learning landscape: Weblogging and social networking in the context of e-Portfolios*. Retrieved November 6, 2007 from http://eduspaces.net/dtosh/files/7371/16865/Learning_landscape.pdf.
- Traxler, J. (2009). Current state of mobile learning. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 9–24). Retrieved May 6, 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.
- Trentin, G. (2008). Using a wiki to evaluate individual contribution to a collaborative learning project. *Journal of Computer-Assisted Learning* 25, 43–55.
- Tubbs, N. (2005). *Philosophy of the teacher*. UK: Blackwell Publishing.
- Vanhournout, D., & Koch, D. A. (2008, September). Training at your fingertips. *Training and Development*, 52–57.

- Virtual campus could aid in emergency. (2007, June 28). *eSchool News*. Retrieved April 1, 2009 from <http://www.eschoolnews.com/news/top-news/index.cfm?i=46372&CFID=10050819&CFTOKEN=93534085>
- Vogel, D., Guo, M., Zhou, P., Tian, S., & Zhang, J. (2008). In search of Second Life Nirvana. *Issues in Informing Science and Information Technology* 5, 11–28. Retrieved April 2, 2009 from <http://proceedings.informingscience.org/InSITE2008/IISITv5p011-028Vogel498.pdf>.
- Warburton, S. (2009). Second Life in higher education: Assessing the potential for and the barriers to deploying virtual worlds in learning and teaching. *British Journal of Educational Technology* 40(3), 414–426.
- Ward, M-H., & West, S. (2008). Blogging PhD candidature: Revealing the pedagogy. *International Journal of Emerging Technologies and Society* 6(1), 60–71.
- Warlick, D. F. (2007). *Classroom blogging: A teacher's guide to blogs, wikis, and other tools that are shaping a new information landscape*. (2nd ed.). USA: Landmark Project.
- Weller, M., Pegler, C., & Mason, R. (2005). Use of innovative technologies on an e-learning course. *Internet and Higher Education* 8, 61–71.
- Wetzel, K., & Strudler, N. (2005). The diffusion of electronic portfolios in teacher education: Next steps and recommendations from accomplished users. *Journal of Research on Technology in Education* 38(2), 231–243.
- Wheeler, S., Yeomans, P., & Wheeler, D. (2008). The good, the bad and the wiki: Evaluating student-generated content for collaborative learning. *British Journal of Educational Technology* 39(6), 987–995.
- Williams, J. B., & Jacobs, J. (2004). Exploring the use of blogs as learning spaces in the higher education sector. *Australian Journal of Educational Technology* 20(2), 232–247.
- Wishart, J. (2009). The use of mobile technology for teacher training. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 265–278). Retrieved May 6, 2009 from http://www.aupress.ca/books/120155/ebook/99Z_Mohamed_Ally_2009-MobileLearning.pdf.
- Witte, S. (2007). "That's online writing, not boring school writing": Writing with blogs and the Talkback Project. *Journal of Adolescent and Adult Literacy* 51(2), 92–96.