

Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era



Catherine McLoughlin
School of Education (ACT)
Australian Catholic University

Mark J.W. Lee
School of Education
Charles Sturt University

The two-way Web has arrived, accompanied by a raft of affordances that expand how we teach, communicate, learn and create knowledge. New trends are emerging in the way information is distributed and consumed. Emerging “Web 2.0” services such as blogs, wikis and social bookmarking applications, as well as social networking sites like *MySpace*, *Friendster* and *Facebook*, are seen as more social and personal, and based on “microcontent”, i.e., digital content in small fragments that may be combined and recombined by individuals to produce new patterns, images and interpretations. This paper investigates the affordances of Web 2.0 and social software and the choices and constraints they offer to tertiary teachers and learners. A discussion of emerging pedagogical models is presented to demonstrate that we now have access to an enabling suite of tools to support greater learner choice and self-direction.

Keywords: Web 2.0, Pedagogy 2.0, social software, ICT affordance, learner choice, learning control, self-regulated learning, informal learning

Introduction: Social trends and challenges

In the present landscape of technological and social change, important transformations are underway in terms of how we live and work. We refer to contemporary times as the “information age” or “knowledge based society”, characterised by the diffusion of information and communications technologies (ICT’s) and the increasing demand for new educational approaches and pedagogies that foster lifelong learning (Fischer & Konomi, 2005). In the higher education arena, there are shifts in the views of what education is for, with a growing emphasis on the need to enable and support not only the acquisition of knowledge and information, but also to develop the skills and resources necessary to engage with social and technological change, and to continue learning throughout life (Owen, Grant, Sayers & Facer, 2006). With respect to ICT, we are witnessing the rapid expansion and proliferation of technologies that are less about “narrowcasting”, and more focussed on creating communities in which people come together to collaborate, learn and build knowledge.

At the same time, there are major social trends at work, such as the diversification of life trajectories, for example, multiple career paths, re-skilling and flexible working hours that are drivers of learning on-demand (Punie & Cabrera, 2006). In such a digital world, with high connectivity and ubiquitous, demand-driven learning, there is a need to expand our vision of pedagogy so that learners are active participants or co-producers rather than passive consumers of content, and so that learning is a participatory, social process supporting personal life goals and needs. Several authors have noted that “emergent new Web 2.0 ... concepts and technologies are opening doors for more effective learning and have the potential to support lifelong competence development” (Klamma *et al.*, 2007, p. 72). Beyond the walls of formal places of learning, there is a plethora of online groups of individuals that are self-directed, vital, self-managed and active in the generation of new ideas, and that are compelling examples of thriving knowledge creating communities, open to all who wish to participate. In this paper we identify the affordances of Web 2.0-based social software tools, and provide examples of current innovative pedagogies that leverage these affordances to support learner choice and autonomy.

Web 2.0 and its potential for transforming learning

Although there are multiple interpretations of the term “Web 2.0”, we define it broadly as a second generation, or more personalised, communicative form of the World Wide Web that emphasises active participation, connectivity, collaboration and sharing of knowledge and ideas among users. Web 2.0 is also referred to as the “Read-Write Web” (Price, 2006; Richardson, 2006), as it goes beyond the provision of viewable/downloadable content to enabling members of the general public to actively contribute and shape the content.

Web 2.0 applications, including but not limited to web logs (blogs), wikis, Really Simple Syndication (RSS), podcasting, social networking sites, tag-based folksonomies, and peer-to-peer (P2P) media sharing utilities, are receiving intense and growing interest across all sectors of the education industry (Allen, 2004; Alexander, 2006). They are seen to hold considerable potential for addressing the needs of today’s diverse students, enhancing their learning experiences through customisation, personalisation, and rich opportunities for networking and collaboration (Bryant, 2006). Later in the present paper, we explore the themes of pedagogical options and dynamic modes of social interaction and learning enabled by Web 2.0 tools and applications (Table 2). (For a comprehensive list of Web 2.0 applications with examples, see Carrasco, 2006).

Among the many commentators on the Web 2.0 phenomenon, Danah Boyd (2007) claims that it is the sociability aspects that have the most potential for enhancing education. She believes that these aspects are able to support three ingredients or activities that characterise learner-centred instruction, namely: (i) support for conversational interaction; (ii) support for social feedback; and (iii) support for social networks and relationships between people. Web 2.0 technologies are epitomised by the socially based tools and systems referred to collectively as “social software”, a term that came into use in 2002, and that has gained increased currency in recent years.

Defining social software

The term “social software” may be broadly defined as “software that supports group interaction” (Shirky, 2003, para. 2), although it is arguable that the Internet has always comprised a network of individuals connected through social technologies like e-mail, chat rooms and discussion boards (now referred to as the “1.0” technologies). Current social software tools not only support social interaction, feedback, conversation and networking (Boyd, 2007; Downes, 2005), but are also endowed with a flexibility and modularity that enables *collaborative remixability* – a transformative process in which the information and media organised and shared by individuals can be recombined and built on to create new forms, concepts, ideas, mashups and services.

Many current social software applications straddle the virtual and real social worlds, as they entail both online and offline interactions and visual/verbal connectivity. For example, *Flickr* and *YouTube* facilitate the sharing of photos and videos with both “real world” and “virtual” friends; social networking sites like *MySpace*, *Facebook* and *Friendster* allow users to build an online identity by customising their personal profiles with a range of multimedia elements, as well as interacting with existing contacts and establishing new relationships; another social networking site, *Stickam*, additionally allows users to interact in real-time using their web cams and microphones.

Mejias (2005) observed that “social software can positively impact pedagogy by inculcating a desire to reconnect to the world as whole, not just the social part that exists online” (p. 1). Mejias also has a much broader definition of social software that includes the categories listed in Table 1, which encompass both Web 1.0 and 2.0 technologies. For the purposes of the current discussion, the definition adopted here, to link in with the key notion of learner control and choice, is that proposed by Dron (2007): “social software ... is [where] control and structure can arise through the process of communication, not as a result of design, but as an emergent feature of group interaction” (p. 233). With this rich and varied functionality in mind, it is necessary to consider the affordances, limits and potential value adding of Web 2.0 and social software tools for learners in the Web 2.0 era.

Affordances of social software

While Web 2.0 does not involve radical changes in the technical specifications of the Web, most proponents of the concept describe it in terms of new possibilities and applications. O’Reilly (2005)

Table 1: Types of social software (based on Mejias, 2005, p. 3)

Social software category	Examples
Multi-player online gaming environments / virtual worlds	Multi-User Dungeons (MUDs); Massively-Multiplayer Online Games (MMOGs) such as Second Life, Active Worlds, World of Warcraft, Everquest
Discourse facilitation systems	<i>Synchronous</i> : Instant messaging (IM, e.g. Windows Live Messenger, AOL Instant Messenger, Yahoo Instant Messenger, Google Chat, ICQ, Skype); chat <i>Asynchronous</i> : Email; bulletin boards; discussion boards; moderated commenting systems (e.g. K5, Slashdot, Plastic)
Content management systems	Blogs; wikis; document management systems (e.g. Plone); web annotation systems
Product development systems	Sourceforge; Savane; LibreSource
Peer-to-peer file sharing systems	BitTorrent; Gnutella; Napster; Limewire; Kazaa; Morpheus; eMule; iMesh
Selling/purchasing management systems	eBay
Learning management systems	Blackboard/WebCT; ANGEL; Moodle; .LRN; Sakai; ATutor; Claroline; Dokeos
Relationship management systems	MySpace; Friendster; Facebook; Faceparty; Orkut; eHarmony; Bebo
Syndication systems	List-servs; RSS aggregators
Distributed classification systems (“folksonomies”)	<i>Social bookmarking</i> : del.icio.us; Digg; Furl <i>Social cataloguing (books)</i> : LibraryThing; neighborrow; Shelfari <i>(music)</i> : RateYourMusic.com; Discogs <i>(movies / DVDs)</i> : Flixster; DVDSpot; DVD Aficionado <i>(scholarly citations)</i> : BibSonomy; Bibster; rebase; CiteULike; Connotea <i>Other</i> : Flickr

believes that these new applications have emerged due to a changing socio-cultural context, giving rise to the perception of revolutionary new uses for the same technologies. What, then, are the implications of Web 2.0 for education? Social software tools such as blogs, wikis, social networking sites, media sharing applications and social bookmarking utilities are also pedagogical tools that stem from their *affordances* of sharing, communication and information discovery. An affordance is an action that an individual can potentially perform in their environment by using a particular tool (Affordance, 2007). In other words, an affordance is a “can do” statement that does not have to be predefined by a particular functionality, and refers to any application that enables a user to undertake tasks in their environment, whether known or unknown to him/her. For example, blogging entails typing and editing posts, which are not affordances, but which enable the affordances of idea sharing and interaction. According to Kirschner (2002), educational affordances can be defined as the relationships between the properties of an educational intervention and the characteristics of the learner that enable certain kinds of learning to take place. It is imperative to acknowledge that technologies are intricately related to many other elements of the learning context (such as task design) that can shape the possibilities they offer to learners, how learners perceive those possibilities and the extent to which learning outcomes can be realised.

According to Anderson (2004), “the greatest affordance of the Web for educational use is the profound and multifaceted increase in communication and interaction capability” (p. 42), which is even more evident in Web 2.0 when compared to the set of linked information sources that characterised “Web 1.0”. Advocates of Web 2.0 would say that the terms “co-creation” and “users add value” encapsulate the practices of those who participate in and use social software, showing that that is not just an assembly of tools, software and digital strategies, but a set of concepts, practices and attitudes that define its scope. This can be exemplified by contrasting two sites, *Encyclopædia Britannica Online* (2007) and *Wikipedia* (2007), the former maintained by a commercial organisation and the latter by an open community. In *Wikipedia*, an example of community publishing, users can participate and create content becoming “prosumers” (both consumers and producers). This openness is the characteristic hallmark of Web 2.0, as it allows users to mix, amend and recombine microcontent, collaboratively and open to the world, inviting revision and commentary. This “architecture of participation” (Barsky & Purdon, 2006, p. 65), the generation and sharing of digital artefacts by groups, teams and individuals, ensures that Web 2.0 is responsive to users. It thrives on the concept of collective intelligence, or “wisdom of the crowds” (Surowiecki, 2004), which acknowledges that when working cooperatively and sharing ideas,

communities can be significantly more productive than individuals working in isolation. For example, in *Wikipedia*, users create and evaluate content for other users, resulting a dynamic and ever-expanding repository of shareable, communal information.

By applying the concept of affordances to social software and Web 2.0 applications in general, we can ask the following questions:

1. How can the affordances of social software tools be conceptualised so that they are linked to process skills and socio-cognitive outcomes?
2. How can the affordances of social software support tertiary teaching and learning, and help us move beyond didactic paradigms that focus on the acquisition of information by students?

Learning occurs in a socio-cultural system in which learners use various tools and multiple forms of interaction to create collective activity, supported by technology affordances. Drawing on extant Web 2.0 research and practice, some examples of the affordances of social software tools are as follows:

- **Connectivity and social rapport:** Social networking sites like *MySpace*, *Facebook* and *Friendster* attract and support networks of people and facilitate connections between them. They are representative of what Gee (2004) calls affinity spaces, where people acquire both social and communicative skills, and at the same time become engaged in the participatory culture of Web 2.0. In these spaces, youth engage in informal learning, and creative, expressive forms of behaviour and identity seeking, while developing a range of digital literacies.
- **Collaborative information discovery and sharing:** Data sharing is enabled through a range of software applications, and experts and novices alike can make their work available to the rest of the online world, for example through their personal and group blogs. Social bookmarking tools such as *del.icio.us*, *Furl* and *Digg* allow people to build up collections of web resources or bookmarks, classify and organise them through the use of metadata tags, and share both the bookmarks and tags with others. In this way, users with similar interests can learn from one another through subscribing to the bookmarks and tags of others, and actively contribute to the ongoing growth and evolution of the “folksonomy” of web-based content and knowledge.
- **Content creation:** Web 2.0 emphasises the pre-eminence of content creation over content consumption. Anyone can create, assemble, organise and share content to meet their own needs and those of others. Open source and open content (cf. Massachusetts Institute of Technology, 2007; MERLOT, 2006; Beshears, 2005) initiatives, as well as copyright licensing models like *Creative Commons* (2007), are helping fuel the growth of user-generated content. Wikis enable teams and individuals to work together to generate new knowledge through an open editing and review structure.
- **Knowledge and information aggregation and content modification:** The massive uptake of Really Simple Syndication (RSS), as well as related technologies such as podcasting and vodcasting (which involve the syndication and aggregation of audio and video content, respectively), is indicative of a move to collecting material from many sources and using it for personal needs. The content can be remixed and reformulated (the concept of a mashup).

These affordances stimulate the development of a participatory culture in which there is genuine engagement and communication, and in which members feel socially connected with one another. Having said this, one cannot assume that just because social software provides affordances, that is all that is required for effective learning. Careful planning and a thorough understanding of the dynamics of these affordances are mandatory. Moreover, the deployment of ICT tools for learning must be underpinned by an explicit learning paradigm and informed by pedagogies that support learner self-direction and knowledge creation.

Extending paradigms of tertiary teaching and learning

Learning management systems (LMS's) that integrate geographically dispersed learners in asynchronous educational interactions have been widely available for a number of years. However, many higher education institutions are discovering that new models of teaching and learning are required to meet the needs of a new generation of learners. Today's students seek greater autonomy, connectivity and socio-experiential learning. Taking a broad view of the affordances – sharing, collaboration, customisation, personalisation, etc. – has given rise to a number of alternative paradigms for learning, examples of which follow. The first example is the concept of a Personal Learning Environment, or PLE. Downes (2005)

describes a learning environment as an approach, not an application, one that protects and celebrates identity, supports multiple levels of socialising and encourages the development of communities of inquiry. The PLE is an example of such a learning environment, in which learners manage their own learning by selecting, integrating and using various software tools and services. It provides contextually appropriate toolsets by enabling individuals to adjust and choose options based on their needs and circumstances, resulting in (ideally) a model where learner needs, rather than technology, drive the learning process.

The current generation of LMS's allows each student to have their personal view of the course(s) they are enrolled in, but many do not accommodate the social connectivity tools and personal profile spaces that students might choose. They conform to a classroom metaphor, which may explain, at least in part, why we "can't ... stop lecturing online" (Sheely, 2006). Many earlier e-learning efforts simply replicated traditional models of learning and teaching in online environments; by contrast, Web 2.0 tools and technologies offer rich opportunities to move away from the highly-centralised industrial model of learning of the past decade, towards achieving individual empowerment of learners through designs that focus on collaborative, networked communication and interaction (Rogers, Liddle, Chan, Doxey & Isom, 2007; Sims, 2006). While some LMS's now incorporate purportedly "Web 2.0" tools and features, these are typically situated in a "walled garden" within the "safe" confines of the institution's systems and networks. As such, online learning environments continue to be firmly set in frameworks and decisions made by teachers and administrators, who still have complete control over the tools available and the ways in which they can be used.

In addition to the PLE, another alternative pedagogical approach that takes advantage of Web 2.0 affordances is the knowledge building paradigm, proposed by Scardamalia and Bereiter (2003), based on the dynamics of how communities work. It privileges a less hierarchical form of learning based on small teams, sharing, content creation, and the use of ICT to access, create, share and continually improve ideas. Learning processes evoke a number of possible scenarios or metaphors; Sfard (1998), for example, distinguished between two metaphors of learning, the acquisition metaphor and the participation metaphor. The former views learning as a process of acquiring chunks of information, typically delivered by a teacher, while the latter views learning as a process of participating in various cultural practices and shared learning activities. According to the participation metaphor of learning, cognition and knowing are distributed over both individuals and their environments, and learning is situated in relations and networks of distributed individuals engaging in activities.

The participation metaphor is characteristic of how, using social software tools, learners engage in the processes of social interaction, dialogue and sharing, all of which are linked to socio-cultural theory (Lave & Wenger, 1991; Vygotsky, 1978). However, learners are also capable of creating and generating ideas, concepts and knowledge, and the ultimate goal of learning in the knowledge age is to enable this form of creativity. Current views of learning regard the notion of a teacher-dominated classroom and curriculum as obsolete, and embrace learning environments and approaches where students take control of their own learning, make connections with peers, and produce new insights and ideas through inquiry. Thus, to keep pace with the content creation processes enabled by Web 2.0 and social software, it appears to be necessary to go beyond the acquisition and participation dichotomy. Paavola and Hakkarainen (2005) propose the *knowledge creation metaphor of learning*, which builds on common elements of Bereiter's (2002) theory of knowledge building, Engeström's (1987; 1999) theory of expansive learning, and Nonaka and Takeuchi's (1995) model of knowledge creation.

In order to overcome the limitations of existing models of teaching and learning, and exploit more fully the affordances and potential for connectivity enabled by social software tools, it is possible to depict how an individual might operate and learn in a networked society, having access to ideas, resources and communities, and engage primarily in knowledge creation rather than consumption. Figure 1 displays the various networks and resources that enable what the authors of the present paper have dubbed *Pedagogy 2.0*. It shows how individuals link with communities and networks in the process of knowledge sharing, construction and understanding. The interdependence between ideas, individuals, communities and information networks, supported by technology, underpin the demands of Pedagogy 2.0, and offer a range of choices to individuals to suit their personal needs and goals. This reiterates the core principles of the Web 2.0 era – that the Web is about linking minds, communities and ideas, while promoting personalisation, collaboration and creativity leading to joint knowledge creation.

Pedagogy 2.0 makes use of the affordances of social software tools to enable connectivity, communication, participation and the development of dynamic communities of learning. In attempting to define Pedagogy 2.0, a number of dimensions can be identified:

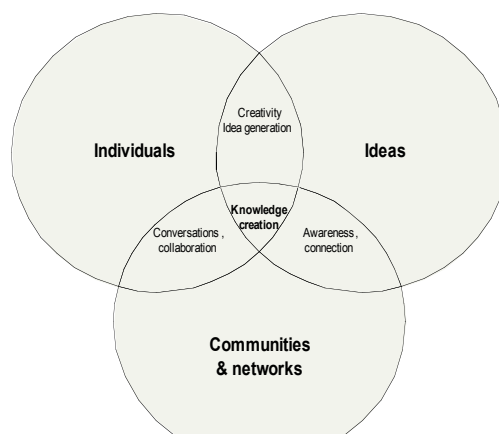


Figure 1: Framework for knowledge creation in Web 2.0 (adapted from Efimova, 2004)

- *Content*: Micro units of content that augment thinking and cognition; learner-generated content that accrues from students creating, sharing and revising ideas;
- *Curriculum*: Not fixed but dynamic, open to negotiation and learner input, consisting of “bite-sized” modules, inter-disciplinary in focus and blending formal and informal learning;
- *Communication*: Open, peer-to-peer and multi-faceted, using multiple media types to achieve relevance and clarity;
- *Process*: Situated, reflective, integrated thinking processes; iterative, dynamic and inquiry-based;
- *Resources*: Multiple informal and formal sources that are media rich and global in reach;
- *Scaffolds*: Support for students comes from a network of peers, teachers, experts and communities;
- *Learning tasks*: Authentic, personalised, learner-driven and designed, experiential and enabling multiple perspectives.

Learner choice, learning control and why it matters

Social software enables choice and allows learners to make decisions about which tools best suit their goals and needs for connection and social interaction (characteristic of Pedagogy 2.0). Apart from choosing which resources and sites to subscribe and contribute to, which tools to use, and how and where to use them, we are witnessing a shift in the modalities of expression that are now available. Text alone is not always preferred mode of communication, as web-based multimedia production and distribution tools incorporating rich audio (podcasting, *Skype*), photo (*Flickr*) and video (vodcasting, *YouTube*, *Stickam*) capabilities are growing, and provide engaging two-way experiences for users, while empowering them as “prosumers” of the multimedia content.

Recent research attests to a growing appreciation of the learner’s control over the whole learning process. Evidence suggests that we can improve learning effectiveness by giving the learner control over, and responsibility for their own learning. This is the foundation for such approaches as problem-based and inquiry-based learning (Desharnais & Limson, 2007; Edelson, Gordin & Pea, 1999), and is central to the grand vision of Pedagogy 2.0, where learners have the freedom to decide how to engage in personally meaningful learning through connection, collaboration and shared knowledge building.

Exemplars of pedagogical innovation and learner choice through social software tools

Pedagogy 2.0 can be demonstrated by a number of exemplary practices by tertiary teachers at various institutions worldwide, as shown in Table 2.

Many of the examples in Table 2 illustrate the power of social software to support learner-centred pedagogies. To support his course in General Psychology, Miller (2006; 2007) hosts weekly informal discussions with students following each week’s lectures. During these discussions, students are able to seek clarification on the course material and talk about it in greater depth, as well as to discuss issues not covered during the lecture. The discussions are recorded and made available to other members of the class as a series of podcasts. In this way, the podcasts are *about* course content (metacognitive) rather than simply being recordings of the course content itself (transmission of content). All students in the cohort are welcome to submit questions in advance of the discussion via email; these answers, as well as those asked by students who attend in person, are answered during the discussion.

Table 2: Examples of pedagogy 2.0 in tertiary teaching and learning

Reference/ author	Institution/ Country	Description of technology use	Pedagogy employed
Read (2005)	Drexel University, USA	Drexel distributed <i>iPod Photo</i> players to their Education freshmen in September 2005. Read reported there were plans for a variety of learner-centred applications, including but not limited to having students record study-group sessions and interviews, as well as having them maintain audio blogs to connect with administrators and peers during the work experience semester.	Peer-to-peer learning, distributed intelligence approach
Lee, Chan & McLoughlin (2006)	Charles Sturt University, Australia	Second year undergraduate students take charge of producing talkback radio-style podcasts to assist first year students undertaking a unit of study that the former group previously completed.	Learner-centred instruction; student-generated content
Evans (2006)	Swathmore College, USA	Students studying a literature course read short passages aloud and record them as podcasts, as well as creating separate podcasts discussing the passage they chose and its relationship to other material.	Development of digital and social competencies
Miller (2006; 2007)	University of Connecticut, USA	Three types of podcasts are used to support a General Psychology course: <ul style="list-style-type: none"> • <i>iCube podcasts</i> – Informal discussions with students following each week's lectures; • <i>Precasts</i> – Short enhanced podcasts previewing material prior to each lecture; • <i>Postcasts</i> – Short post-lecture podcasts containing re-explanations of selected concepts. 	Blending of formal and informal learning; mobile, ubiquitous learning
Frydenberg (2006)	Bentley College USA	Students in an introductory information technology class work in pairs or groups to produce vodcasts to teach topics from the course schedule to their peers.	Peer teaching, reciprocal learning
Edirisingha, Salmon & Fothergill (2006)	University of Leicester UK	Students make use of "profcasts", i.e. material designed to support learning distinct from that which is facilitated through structured on-campus or e-learning processes alone. E.g., weekly profcasts to supplement online teaching through updated information and guidance.	Extended learning, enrichment and extension activities, personalisation of learning content
Kukulska-Hulme (2005)	Open University, UK	Students studying German and Spanish courses in distance mode use digital voice recorders and mini-camcorders to record interviews with other students and with native speakers, as well as to create audio-visual tours for sharing with their peers.	Peer-to-peer learning, student-generated content
McCarty (2005; 2006)	Osaka Jogakuin College, Japan	Students are interviewed by their professor, perform roles, and/or present their own creations, in contribution to the professor's bilingual podcast feed and blog targeted to those studying Japanese or English as a foreign language.	Cross-cultural collaborative work using student-generated content
Sener (2007b)	University of North Carolina at Pembroke, USA	A wiki-based encyclopaedia is created by students, the goal being to create entries on a variety of subjects related to law, criminal justice, sociology and criminology.	Student-generated content, collaborative writing, organising and editing content
Wenzloff (2005); Richardson (2006)	Macomb Independent School District, Michigan, USA	Social bookmarking is used to compile and share resources with teacher training participants / student teachers. The instructor also subscribes to the RSS feeds of the students' <i>Furl</i> sites, to see what they are reading as well as their comments about the sites.	Resource-based and collaborative learning
Yew, Gibson & Teasley (2006)	University of Michigan, USA	Learners organise and display blog posts and bookmarks, with keywords or tags, openly and in a collaboratively manner. This allows all stakeholders to use social software to organise, share and coordinate knowledge.	Community of learning
Boulos, Maramba & Wheeler (2006)	University of Plymouth, UK	Blogs, wikis and podcasts are used for virtual collaborative clinical practice in health and paramedical education, to foster sharing and reflection.	Anytime, anyplace, peer-to peer learning community, self-regulated learning

Several examples in Table 2 go a step further, and focus on innovative uses of the technology to support what Boettcher (2006) terms “student performance content”, engaging students as content creators in peer-to-peer learning environments, and demonstrating the application of the metaphor of learning as both participation and knowledge creation. Heutagogical approaches are being hailed by some as the next stage in the evolution of andragogy (Hase & Kenyon, 2000), and are beginning to receive increased emphasis in a tertiary education climate where the value of textbooks is being questioned (Fink, 2005) and the open source and open content movements are beginning to enjoy significant levels of support and acceptance (Beshears, 2005; Massachusetts Institute of Technology, 2007; MERLOT, 2006). Sener (2007a) maintains a move towards student-generated content has the potential to increase student engagement, develop critical thinking skills and foster a sense of community, while simultaneously resulting in products of lasting value to students individually, to other students, as well as to the wider community and society as a whole. This, too, is part of what the authors have identified as Pedagogy 2.0. For example, at Bentley College, Information Technology (IT) students in Mark Frydenberg’s (2006) *IT Intensive* course purchase Pocket PCs instead of textbooks, which they use to explore technology concepts in a hands-on, learner-centred approach. They form pairs or groups and work together to plan and produce vodcasts. Each group produces a vodcast on a topic in the course schedule, for sharing with the rest of the class. This is a novel form of peer and reciprocal teaching that serves a dual purpose: Students not only display their understanding of the course topics through the production of content for their peers, but also develop IT competencies linked to the course objectives.

Principles underpinning Pedagogy 2.0

As social software tools become ubiquitous, several questions are being asked by educators and researchers who observe the changing trends and the power of Web 2.0 for connecting teachers, learners and resources. Bryant (2006, p. 42) asks: “How do we respond to the possibilities of what some call ‘e-learning 2.0’ based on shared environments, microcontent and learning?” One reply would be to reiterate the conventional principles of social constructivist learning, which tell us that effective learning is conversational in nature, and that it necessitates a social dimension, including communication, dialogue and shared activity. The benefits of making connections to others and communicating through instant messaging and social networking, for instance, can provide an impetus for inquiry-based approaches and collaboration.

Other aspects of social software can also be embedded in learner-centred pedagogical frameworks. Apart from the social and conversational affordances of social software tools, there are further social constructivist principles that apply to Pedagogy 2.0. Learning occurs as a socio-cultural system, within which many learners interact to create a collective activity framed by cultural constraints and practices. Typically, learners receive scaffolding through the help of others (peers, teachers, virtual community sources, technology). Social software can provide the building blocks for an environment that enables multiple forms of support, as it allows people to connect, interact and share ideas in a fluid way. For example, podcasting technology and software tools that allow easy broadcasting of audio files can support community building and enable the dissemination of learner-generated content, which in turn acts as a catalyst and support for authentic, peer-to-peer learning (McLoughlin & Lee, 2007).

A third critical component of effective learning is active participation with others, including peers, instructors, experts and community. Collaboration and cooperation have long been recognised as ingredients of effective pedagogy; wikis and collaborative writing and editing tools such as *Writeboard* and *Google Docs and Spreadsheets* are useful extensions to conventional writing approaches. Linked with this principle of collaborative production, there is the additional facility of sharing and publishing the artefacts produced as a result of the learning activity, and inviting feedback from peers (another form of scaffolding). By publishing and presenting their work to a wide audience, learners benefit from the opportunity to appropriate new ideas, and transform their own understanding through reflection (Williams & Jacobs, 2004). Researchers recognise that communication is often shaped by different tools and technologies. For example, Farmer (2004) proposes that blogs offer “new opportunities in the development of social, cognitive and teacher presence online” (p. 279). In examining the potential for social software tools to support social constructivism, Farmer is guided by Garrison, Archer and Anderson’s (2003) framework for the creation of a successful community of inquiry composed of “teachers and students transacting with the specific purpose of facilitating, constructing and validating understanding, and of developing capabilities that will lead to further learning” (p. 42).

A fourth link between current social software applications and established theory is evident in the principles of active participation, learner self-direction and personal meaning construction. A primary

goal of learning is that learners should *learn to learn*, and become capable of making their own decisions with respect to their learning. For example, though they are often viewed negatively, social networking sites and the “blogosphere” are nevertheless social interactive spaces where learners can choose to explore facets of their own identity, as well as engage in personal self-expression, dialogue and knowledge sharing with others. By engaging in these forms of conversation and interaction, learners explore and develop facets of their own identity and personal learning styles. They are afforded the ability to shape their own informal learning trajectories as well as becoming actively involved in those of others.

Conclusion

In summary, social software allows learners choice in controlling their own learning, mediated by a raft of tools, including the voice and direction of the group. Web 2.0 software such as blogs, folksonomies, peer-to-peer (P2P) media sharing, and of course the increasingly popular freely editable wiki, are providing students with unprecedented learning opportunities. Across the globe students are able to use collective intelligence to create “the wisdom of crowds” (Surowiecki, 2003), connecting within rich and dynamic social environments, rather than studying in solitude through impersonal learning management systems designed by administrators.

This paper has explored some of the affordances and constraints of social software and defined it as an open architecture that facilitates user-controlled, collaboratively generated knowledge and community-focussed enquiry. It is the combination of the technological affordances of social software, with new educational agendas and priorities, that offers the potential for radical and transformational shifts in teaching and learning practices, what we have referred to in this paper as *Pedagogy 2.0*. There are signs of optimism that the new tools will result in learning environments that are more personal, participatory and collaborative. However, in order for these goals to come to fruition, there is a need for careful planning, as well as developing a detailed understanding of the dynamics of Web 2.0 and social software tools and their affordances. The limitations of the medium and the importance of risk management cannot be ignored.

In tertiary learning institutions worldwide, we are witnessing a multitude of small-scale experiments and the integration of a variety of social software resources in pedagogies. For these to expand and flourish we will need to support innovation, and to ensure dialogue and partnerships between schools, universities, teachers, community and learners, about new approaches to learning that involve collaboration across organisations, sectors and disciplines. Recent contributions to the development of Pedagogy 2.0 by the adoption of social software and the “architecture of participation” were exemplified in Table 2, as evidence for the new landscape of teaching and learning. There are now richer and more engaging pathways to learn than ever before, but this calls for us to engage with the new tools and gain a deeper understanding of their potential for enabling choice, creativity and self-direction for learners.

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Catherine McLoughlin, School of Education, Australian Catholic University, PO Box 256, Dickson, ACT 2602, Australia. Email: catherine.mcloughlin@acu.edu.au

Mark J. W. Lee, School of Education, Charles Sturt University, Locked Bag 588, Wagga Wagga, NSW 2678, Australia. Email: malee@csu.edu.au

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