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If They Build It, They Will Come:

Creating Opportunities for E-learning Communities of Practice

Keith Kirkwood

The University of Melbourne

Language and Learning Skills Unit

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Abstract

It is apparent that the primary use of the Web is for communication. With Web 2.0, a second generation of Web-savvy users is embracing applications which assist the creation of communities of practice (CoPs). These applications, in the form of P2P distributed networks, and in sites like Flickr, MySpace, and YouTube, allow users with like interests to find each other and form associations in which members can share information. These CoPs are self-regulating knowledge networks in which individuals are intrinsically motivated to participate and publish.

The principles and applications of Web 2.0 can be applied to e-learning to create opportunities for students to form e-learning communities of practice (ElCoPs). ElCoPs support collaborative and negotiated learning by allowing students to form peer networks, initiate peer teaching, share and workshop their projects, and to harness collective data. Tools such as wikis, blogs, and discussion forums, and the use of third-generation search techniques such as social tagging and preference filtering, afford e-learning interactivity which goes beyond radio buttons and static e-repositories. Knowledge networking and negotiated learning become the pedagogical foci of such interactivity.

One example of this kind of ElCoPs interactivity, initiated by the Horwood Language Centre at the University of Melbourne, is Virtual Babel (VB). VB is a 3D virtual space in which students, in the form of online avatars, practice their target language by meeting in this online environment and negotiating problem-solving tasks through synchronous exchange and manipulation of the objects of the virtual environment. The problems with VB, however, have been: 1) an over-reliance on an application subject to the vagaries of a technology in flux (the

use of the now-discontinued Adobe Atmosphere), and 2) that the 3D construct, Babel, was not built by the students themselves.

The proposition, then, is to offer learners the collaborative tools and the context for participation, and to give them the opportunity to establish and modify these tools as they see fit. Negotiation of shared space, creation of a knowledge network through tag clouds, personalization of an open source LMS through preference filtering, collaborative editing and refinement of topics on a wiki, profiling and journaling on blogs, workshopping and peer review through forums and conferencing--these are some of the student-driven learning opportunities afforded by Web 2.0 applications. As low participation rates in first generation e-learning sites indicate: if you build it, they may not come. Cede control, however, and let them do the building, and--as some of the most popular websites today indicate--they will not only come, they may build a Babel that is both architecturally and pedagogically innovative.

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Virtual learning systems have been assigned with the primary function of management. This is a label that demands revising. Systems management is indeed of paramount importance to campus decision-makers, but managed control at this level appears to have left little control for those who are actually using the systems. As recent research and practice informs us, management by the learner is often key to learning. (Jafari, McGee, & Carmean, 2006, p. 57-8)

[T]he best learners are not isolated scholars. We are often the best collaborators. Being really good at learning is often about tapping into the collective wisdom of the right group of peers. And being a good peer is about informing the group with your own intangible, personal intelligence. (Gilry, 2005)

The increasing corporatisation of academia is felt in many countries, including Australia. With neo-liberal policies being applied to universities, tertiary institutions have been forced by economic imperative to operate under business models of management (Bronwyn, Michael, & Peter, 2006; Davies, Gottsche, & Bansel, 2006; Fuyuki, 2002; Lerner & Heron, 2005). What kind of impact is this having upon the quality of education and services being offered to students? How is it possible to maintain a spirit of student-centeredness in the curriculum and classroom and a spirit of intellectual exploration and collaboration among the student and faculty bases, while the burden of a shrinking bottom-line fiscally cuts corners?

Online delivery of courses has been posited as one way of achieving some of the contemporary objectives in tertiary education, among them cost-effectiveness, competitive edge, extended reach and accessibility (Teghe & Knight, 2004). According to Song et al. (2004) students are also “increasingly demanding online access” (p. 59), and feel that some of the strengths of online course delivery include flexibility, convenience, and enhanced opportunities for reflection. But there have been problems with online course delivery as well. Teghe and Knight (2004) suggest that much of what has been called online learning has simply involved the inadequate migration of classroom materials to digital format, without sufficient training or thought put into the interactive or pedagogical potential of the new medium (Tu, 2004). From the student perspective also there are perceived problems: delayed feedback, difficulties with technology and access, difficulty in understanding instructional objectives, isolation and lack of a sense of community (Song, Singleton, Hill, & Koh, 2004). How do we overcome both the administrative and pedagogical problems experienced in this first generation of online learning initiatives and forge a more successful approach to online delivery, one that will accommodate the needs of the university as well as those of the student?

This paper explores ways in which educational institutions can provide students with an engaging online learning experience. Popular and emergent Web technologies and the business management concept of communities of practice establish opportunities for content creation, community building and knowledge sharing. A pedagogical focus on negotiation, collaboration and process-oriented assessment is recommended. Open and user-responsive digital platforms, sharing- rather than profit- oriented intellectual property rights regimes, and learning management systems based on semantic search capabilities and social networking could encourage the development of a mutually-supportive academy of learners and researchers.

Web 2.0 and the Net Generation

As business entities, universities need to find new and innovative ways of attracting and keeping its customer base -- and under an economic rationalist model of management the student is the foremost consumer of a university's products. One way to respond to consumer demand is to give the customers what they want. This is a good start, but it is only half the story. Another way is to give them the tools to help design the products they will use, and let them help with the building of these products. Forward-thinking economic theorists of customer management solutions are proposing business models in which consumers become instrumental in creating a company's products (Blosch, 2000; Prahalad, Ramaswamy, & Krishnan, 2000). The key to this is in collecting and harnessing the wealth of customer knowledge which sits at the periphery of any enterprise. Harnessing customer knowledge for product innovation makes sense: as political and economic analyst Joe Trippi (2004) asserts, if you empower your customers, they will form a loyal community around you and your products and will help you succeed.

Nowhere is this sense of loyal community more evident than on the Web -- where this kind of economic experiment in consumer empowerment is being vindicated. Those Web enterprises which are, today, most successful are the ones which empower Web users the most. These are second generation companies, like MySpace, YouTube, Flickr, Wikipedia. Profile- and community- building MySpace was the second most popular website early in 2006 (Musser & O'Reilly, 2006, p. 4); according to Molina, it surpassed both Yahoo and Google (2006, p. 117). From its inception, people have used the Internet primarily for communicating to one another via such protocols as email and Usenet (Bargh & McKenna, 2005). Today the forms of

communication are diversifying and deepening: people want to form wider, more meaningful, more responsive and more immediate social networks. They want to build *community*.

Collectively, this second generation of Web companies and the customer-empowerment and community-building tools they use have been dubbed “Web 2.0”. Musser (2006, p. 4) describes Web 2.0 as “a more mature, distinctive medium characterized by user participation, openness, and network effects.” Software developer Tim O’Reilly analyses the “core competencies of Web 2.0 companies (2005c):

- Services, not packaged software, with cost-effective scalability
- Control over unique, hard-to-recreate data sources that get richer as more people use them
- Trusting users as co-developers
- Harnessing collective intelligence
- Leveraging the long tail through customer self-service
- Software above the level of a single device
- Lightweight user interfaces, development models, AND business models” (n.p.)

He elaborates on some of the architectural design principles for the Web 2.0 developer: data-driven and data-rich “smart” applications that are modified and improved as users use them, and which respond intelligently to user’s input; open, collaborative, and syndicated services which can combine easily with other complimentary services; a content-sharing, minimally-restrictive intellectual property rights regime based on principles of collective endeavor and ownership; a non-proprietary and continually user -modified and -improved approach to application design, or “perpetual beta”. Mazurek (in O’Reilly, 2006b, n.p.) sums up neatly the essential components of Web 2.0 as “continual beta, engaging users as co-developers and principles of harnessing

collective intelligence”. This is seen by some as a paradigm shift, fundamentally different from the economic model of proprietary software development which precludes open participation in the improvement of systems and services. Web 2.0 is more aligned with the principles of open source software, with which it has many similarities. The “perpetual beta” state of open source software, the collaborative nature of its development, the harnessing of consensus and collective intelligence -- all of these feature in Web 2.0 applications.

What kind of applications are Web 2.0 applications? They are tools such as *blogs*, or easy-to-create chronological web journals hosted online. These can be coupled with “Really Simple Syndicate”, or *RSS*, whereby readers can subscribe to these entries and gather a collection of syndicated news from around the Web, thus personalizing their news sources. *Wikis* allow open collaborative creation and editing of a webpage, along with discussion threads about them - of which the popular Wikipedia is a foremost example. It is an application which taps collective enterprise and collective knowledge. *Tagging* and *tag clouds* are user-generated categories and directories, dubbed “folksonomies”; similarly, *social bookmarking* allows users to build up and share hyperlinks which may be of interest to others. *Podcasting* allows the relatively easy transmission of audio files to others via the ubiquitous ipod and similar digital devices -- and, like blogs, encourages free subscribers. Then there are *mash-ups* and *cut-ups* and other forms of creative digital expression, in which music and video elements are combined to create new works of art. On top of this, the sites which make use of these applications are adaptive to user input in a way that is much more compelling and gives many more options than, say, Yahoo’s personal page, My Yahoo. They make use of semantic search algorithms that may, for example, offer suggestions to the user as to a site to visit, a blog to read, a community to join.

What is it about Web 2.0 applications that make them so popular, especially among the savvy Net Generation -- today's students? For one, they encourage content creation. They encourage open sharing. They encourage collaboration. And they encourage social networking in a way that facilitates meaningful community locating and community building. These are fairly compelling aspects of self-empowerment in a world which is mostly politically megalithic, commercially manipulative and socially rule-driven.

Web 2.0 applications are increasingly seen as potentially powerful tools in education. Alexander (Alexander, 2006) refers to the ideology of openness which drives these "emergent" applications; they have, foremost, a social and collaborative orientation. They are also "bottom-up" applications, in that they grow and develop from the user-base. Contemporary students -- the ones who are primarily using Web 2.0 applications -- are the ones populating sites like MySpace (Hilton, 2006; Porter, n.d.). They are the ones creating content for these sites, and who are maintaining blogs, making movies, building links, writing reviews, sharing information, forming communities. And they are doing this willingly, and for free. There seems to be intrinsic motivation to establish an online presence, to develop social networks, and to belong to and participate in meaningful communities. Gee (n.d.) makes similar observations about good online and standalone video gaming: gamers (again, students from the "Net Gen" and younger) are highly motivated to learn complex rules, concepts and strategies in order to gain expertise in a simulated world. If educational institutions could capture some of that intrinsic motivation to create, to connect, to succeed, that savvy commercial enterprises have managed to do, by making online learning environments as engaging and self-empowering, there could be a dramatic shift in our institutions towards the *will* to learn.

E-learning Communities of Practice

Another concept from the business community which has entered academic parlance and research is that of Communities of Practice (CoPs). CoPs, according to Etienne Wenger, who coined the term, are nothing new. They are simply communities of people who come together out of a shared interest and which are subject to constant reinvention according to the needs and interests of their members. They are fluid and “bottom-up” communities whose membership is casual and voluntary. As Wenger (1998, n.p.) defines it, a CoP is different from a team in that it is “defined by knowledge rather than by task, and exists because participation has value to its members.” It is also different from a network, in that:

[I]t is ‘about’ something; it is not just a set of relationships. It has an identity as a community, and thus shapes the identities of its members. A community of practice exists because it produces a shared practice as members engage in a collective process of learning. (n.p.)

The strength of CoPs comes from their informal and grassroots architecture. Because they are voluntary and interest-based communities, and because CoP members have a range of expertise on a subject, they are valuable organizational entities for the purpose of knowledge management and knowledge sharing; indeed, this is the context in which they are most often studied (Johnson, 2001; Tu, 2004). Sharratt and Usoro (2003, p. 93) identify nine factors which contribute to knowledge-sharing in online CoPs; these include: organizational structure; the ease of use and perceived usefulness of the information system; trust based upon the benevolence, competence and integrity of the community; and a strong sense of community. Organizations are increasingly attempting to capture and harness the informal knowledge of CoPs -- the talk of the

staff room and at the water cooler -- because this is where much of an organization's knowledge is exchanged.

Another initiative is an attempt to design the digital architecture which will facilitate and support online CoPs. There are several things here to consider. One is that CoPs are informal, bottom-up structures which do not respond well to external shaping or management. However, as Tu (2004) argues, simply providing the technology and hardware won't necessarily lead to the creation of CoPs; they need to be encouraged: "Appropriate support is critical; too much support and members may lose interest; too little support and they may die" (p. 83). He suggests fostering CoPs by supporting them in several ways, online and offline, by recognizing and using existing CoPs, and by the use of semantic algorithms, or "intelligent agents" to assist their online creation (p. 77).

Much has been written in recent years about virtual or online communities in general, and about the establishment of a sense of community in online learning in particular. It was mentioned earlier in this paper that students often perceive a lack of community in online courses and feel they want this (Song, Singleton, Hill, & Koh, 2004). This observation is echoed repeatedly in recent research. Rovai (2002) concludes that distance education students who had a strong sense of online community and cognitive learning were more likely to feel satisfied with their courses and to maintain their course enrolment. In a study by Dewiyanti, et al. (2007) distance education students who participated in collaborative efforts and who felt a sense of group cohesion also reported greater satisfaction with their courses. As Tu warns about the establishment of CoPs, Kreijns, Kirschner and Jochems (2003) also maintain that social interaction and collaboration in online courses do not happen simply because the medium allows it: social and psychological aspects must be considered, not only cognitive goals. They suggest

promoting social interaction by making students positively interdependent on each other for success, by promoting student interaction and small group skills, by establishing individual accountability, and by group negotiation of the process of collaboration (p. 339). Other research has provided quantitative tools for measuring social interaction and sense of community (Cho, Gay, Davidson, & Ingraffea; Dawson, 2006). Cho et al. conclude that communication and social networks should be central features of an online learning environment.

As well as psychological reasons for developing collaborative learning communities in online courses, there are sound pedagogical ones. Cho et al. discovered that students who participated more readily in creating social networks and collaborative opportunities tended to do better in their final grades. According to Paloff and Pratt (2005, p. xi), “[c]ollaboration forms the foundation of a learning community online--it brings students together to support the learning of each member of the group while promoting creativity and critical thinking.” Kreijns, Kirschner and Jochems (2003), Palloff and Pratt (2005), and Tu (2004) all present a body of research indicating that social dialogue and collaborative activities promote deeper critical thinking.

Research also indicates the importance of informal social connections in the computer-supported collaborative learning (CSCL) environment (Contreras-Castillo, Favela, Perez-Fragoso, & Santamaria-del-Angel, 2004; Kreijns, Kirschner, & Jochems, 2003; Kreijns, Kirschner, Jochems, & van Buuren). Contreras-Castillo et al. (2004) assert that online courses often don't provide the opportunities for informal communication that the traditional classroom affords -- and which take place in social networks and the establishment of communities of practice. They set up CENTERS (CollaborativE INformal InTERaction System) in their e-learning courses -- an instant messaging application with an online presence indicator -- to encourage informal communication and to increase the sense of community, of belonging to the

group, and of trust. Kreijns, Kirschner and Jochems (2003) stress the importance of sociability in online environments. They call for the creation of environments that provide venues for “off-task” and impromptu communication and tools which indicate the presence of other learners (p. 349). Janssen et al. also indicate the importance of visual participation tools in establishing communicative frequency among online learners -- at least in the planning of social activities.

Online learning which supports informal communication may be seen to be directly encouraging the formation of CoPs in a learning environment. This can be seen, according to Hayes (n.d.), as a pedagogical shift:

The focus shifts from organizing content or subject matter, to designing opportunities for varying levels of participation in practice. Questions for educational designers shift from “what knowledge, skills, or attitudes do learners need to acquire?” and “how should this content be organized to facilitate acquisition?” to “what are the attributes of particular practice communities?” and “how can I create spaces for learners to engage in practices, to create identities, develop relationships, and make new meanings in the context of these practice communities?” (n.p.)

This shift situates *E-learning Communities of Practice*, or *ElCoPs*, as one of the core ingredients of successful e-learning environments. It also suggests additional shifts in perspective as to what constitutes a learning environment. Johnson (2001, p. 50) emphasizes the importance of the novice-expert association in ElCoPs, as well as the presence of other peripheral members which may add to the community’s collective knowledge, and he suggests the inclusion of a range of expertise within a class, as well as interdisciplinary participants (e.g. “non-majors”). Palloff and Pratt (1999) also identify the possibility of intercommunity collaboration in e-learning environments, as well as opportunities to define a shared goal, to negotiate guidelines,

to problem-solve, and to share in the facilitation of discussions. Collaborative learning should encourage “transformative learning”, self-reflection, process evaluation, and reflection on the learning process itself (p. 19-20). Tu (2004, pp. 23-26) also supports the idea of formative, peer- and self- assessment tasks in online collaborative learning. He mentions a group of doctoral students exchanging research ideas and the planning and writing of their dissertations as a positive example of such formative and peer-to-peer workshopping (p.74). Rubin and Hebert (1998) also advocate the benefits of collaborative peer teaching from the perspectives of active learning and deep cognition, intrinsic motivation, and social negotiation.

The educational paradigm shift suggested by these researchers places students at the wheel and hub of the learning process. Constructivist and constructionist theories of education have done so for decades; these posit that learning should be active, learner-centered, socially-constructed, and based on the creative construction of artifacts (Augar, Raitman, Lanham, & Zhou, 2006). As Herz (in Foreman, 2004) points out:

Any teacher knows that you learn by teaching, and when you have to create a scenario that is then used by some other person, you have to explain it, and in the course of explaining it, you yourself learn. You think things through more thoroughly when you have to defend them to other people. So what you’re really moving toward is more of a peer-based interaction and more peer-to-peer learning. If you ask people if they learned more in college from their professors or from their fellow students, most will say that they learned more from their fellow students. How can we enable that with interactive media and technology? (p. 63)

According to Weller (n.d.), the Internet was built on the principles of “openness, robustness, and decentralization”. These architectural design features were mirrored in the social

construct of the Web and consequently became its embedded cultural values. He maintains that they are also features of EICoPs. He argues that today's students, having internalized these values, already use the Internet to build communities, to share knowledge, and to create content. In other words, they are native constructivists and constructionists. Weller sees E-learning communities of practice as open and inclusive entities which welcome the participation of all students, are always accessible, and encourage the open flow and exchange of knowledge. In this sense, they are appropriate venues for learning for the Net Generation. The communicative tools and applications of Web 2.0 -- blogs, wikis, podcasts, tagging, social bookmarking, instant messaging, discussion boards, peer-to-peer networking, and smart search algorithms -- as well as open source software with its collaborative and perpetual beta orientation -- are the tools by which EICoPs can be supported -- and which students are already using to support their extracurricular online activities. Perhaps the cue for building the next generation of e-learning initiatives should be taken from this existing flurry of online involvement -- perhaps from the students themselves.

Raising the Barn

In an EICoP environment, students should be given the technology and appropriate guidance to enable them to negotiate the building of the learning community. This does not mean simply letting them loose with a swagful of tools: the instructor is still the master builder, as it were, of the online course. But the role of the instructor in an online course should be one of the facilitator of cooperative affordances and modeler of expert behavior and cognition. It is the EICoP instructor's job to provide learning opportunities and authentic problems and tasks in a

“just-in-time” manner. It is also an EICoP instructor’s role to think carefully about the overall blueprint of the online architecture in order to insure that operational measures are in place which will provide students with the tools to be able to assist with the design of the course and to negotiate the course structure and contribute to the knowledge sharing and information -searching and -dissemination. In this way the course is collectively and cooperatively constructed; in this way students are active participants in the learning process -- much more so than they are in first generation online environments which require them to check in once a week to download the latest lecture notes and read the latest course announcements.

Shea, Li & Pickett (2006) suggest that such “directed facilitation” on the part of the instructor is one of the most important contributors to a learner’s sense of both connectedness and learning. Kreijns, Kirschner and Jochems (2003, p. 347) also emphasize the role of the teacher in discussion management, timely contribution and feedback, as well as knowing when to relinquish control of the conversation. Moreover, Weller (in press, p. 8) observes that most first generation e-learning initiatives still operate under an “instructivist” pedagogy, in which “content is king”. Current practice often lags behind current pedagogy, however the decentralization of knowledge source and authority is critical to a more constructivist approach to learning. Lamb (2004), in promoting the use of wikis for collaborative writing exercises, concedes that a constructivist approach to teaching upsets the traditional power balance in education: “To truly empower students within collaborative or co-constructed activities requires the teacher to relinquish some degree of control over those activities. The instructor’s role shifts to that of establishing contexts or setting up problems to engage students” (p. 45).

Weller cites Castells (in press, p. 8-9) as arguing that the network has become the primary model of organization to express the postmodern conditions which the Net Generation

has inherited. Castells sees this as resulting from such phenomena as economic globalization, the Internet, and the value of free speech. For this reason, Weller contends, the next generation of learners will resist instructivist pedagogies. This may already be the case. Jafari, McGee and Carmean (2006) relate that students are already asking that communicative and collaborative tools such as SMS services, instant messaging, wikis, smart searching, bookmarking and environments like MySpace be added to current learning management platforms. They want an environment of participation and meaningful communication. At the same time, some have expressed hesitation about letting the academic community in on the communicative context of a forum like MySpace (p. 55).

Siemens (2004) has posited a new pedagogical theory based on the paradigmatic shift which the networked world has spawned: *connectivism*. He defines connectivism as “the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements” (n.p.). Central to this theory is the application of social networking to learning communities, and the flow of information and knowledge through the network. As a concept, connectivism helps define the pedagogical foundation of EICoPs and their practical applications.

If self-organization is a feature of connectivism, where might we find this expressed in EICoP applications? The Web 2.0 phenomenon of tagging is one practice in which webizens have taken it upon themselves to organize the Web’s content according to their own interests, needs, and systems of labeling (Alexander, 2006). Tags and grouped tags, or “tag clouds”, as well as social bookmarking on websites like del.icio.us (<http://del.icio.us/>), are forms of collaborative metadata creation that has arisen from a collective urge to share and to order the wealth of resources on the Web. Weinberger (2005) reminds us that this kind of collaborative

creation of metadata is rare, if not unique: taxonomies are not normally created from a bottom-up approach. By syndicating tags into “tagstreams” one can keep abreast of what others have found in one’s areas of interest. Tagging applications applied to social networks gives them the added power of increased relevancy. As Weinberg maintains, “tagging will help social groups form around shared semantics, in addition to shared semantics arising from, and helping to define, groups” (n.p.). Alexander (2006, p. 36) points out the pedagogical benefits of such so-called “folksonomies”: the open sharing of information; identifying the potential for new collaborations; new perspectives on one’s research; identifying new relationships from unintended taxonomies; monitoring the progress of, and thinking about, research. These are powerful benefits for student and teacher alike.

The semantic, or “intelligent”, approach to searching is indicative of current trends in the development of search tools -- what some are calling the “Semantic Web”. Puustjärvi (2006) maintains that a semantic metadata searching language can be useful for locating appropriate learning material, and for facilitating collaboration and the sharing of resources. He describes three different existing metadata e-learning systems: ARIADNE Knowledge Pool System, CUBER System, and ONES System--each using different architectures, information retrieval models and metadata standards. Beydoun, Kultchitsky and Manasseh (in press) use a semantic search tool called KAPUST (Keeper And Processor of User Surfing Trails) in an undergraduate Political Science class in Beirut. As an internet browser add-on, KAPUST keeps track of student's Web-surfing when logged into the server in order to provide intelligent search responses. The Semantic Web can help facilitate the formation of learning communities by applying algorithms to help students locate each other. Yang et al. (in press) report on such a system trialed in a Shanghai university which dynamically groups and regroups students based

on their learning needs and behaviors. One would want to make sure that such systems, if designed to facilitate communities of practice, didn't end up being too prescriptive and controlling, however; the student should be presented with suggestions and opportunities, not labeled and boxed into homogeneous groupings.

Experimentation with and application of different semantic architectures and algorithm standards raise the issue of incompatible platforms and mutually-incomprehensible languages -- as well as issues of deliberately proprietary systems and software that refuse to speak to their competitors. In such a world, communication and collaboration break down. Puustjärvi does call for standardization and interoperability of metadata e-learning systems, as do other authors who are developing semantic architecture for e-learning systems (Bouras, Giannaka, Nani, Panagopoulos, & Tsiatsos, 2006; Ma, 2006; Pahl, 2006; Sánchez-Alonso, Sicilia, & García-Barriocanal, 2006). The reuse, sharing, and interchangeability of e-learning modules, or learning objects, is now becoming a viable option; indeed, an IEEE Learning Object Metadata (LOM) standard has been created to assist with compatibility issues.

At the Horwood Language Centre of The University of Melbourne in Australia an attempt was made to create a 3-D virtual environment for language learners, dubbed Virtual Babel. The idea was to create a platform in which students, as online avatars, would engage in negotiated learning tasks in a target language immersion environment. The platform, built with the now defunct Adobe Atmosphere, was supported by synchronous communication and the visual representation of avatars which met and interacted both verbally and physically in the learning space to negotiate about and perform learning tasks together. There was some degree of functionality and manipulate-ability in the objects of the environment, based on the program's scripting language which provided additional authenticity to the virtual landscape. The central

tower of Virtual Babel was to hold a multiplicity of language spaces into which students could be teleported to engage in language practice. Although initially promising, the discontinuation of Atmosphere signaled the ultimate abandonment of the project, since the proprietary nature of the software's programming made it virtually impossible to migrate to another, more robust, platform. Ironically, Virtual Babel fell to the same fate as the biblical tower from which it took its name!

Web 2.0 applications are open and robust, and they are designed for interoperability. Alexander (2006, p. 42) stresses the flexibility of these systems, which are built upon open platforms, based on micro-content, and have a low user threshold. Aggregates of these applications are possible and encouraged: blogs come with RSS feeds and often tags, as do semantic search sites like YouTube, Flickr, and Pandora. Wikis come with asynchronous discussion pages. Instant messaging and streaming tools can be embedded into collaborative platforms, as can tools which assist in the search for appropriate communities or members based on previous, accumulated search preferences and page views.

The potential for developing imaginative and pedagogically useful collaborative e-learning systems based on this social software is only beginning to be tapped. Bouras et al. (2006) describe EVE (Educational Virtual Environments) II, an elaboration of the Virtual Babel concept which includes asynchronous/synchronous communication, user profiling, and user collaboration and manipulation of learning objects through negotiated task-based learning. The concept of community is central to the pedagogy of the project. Augar, et al. (2006) describe a pilot project at Deakin University in Melbourne using wikis as a tool for building virtual communities. Ortega and Sánchez-Villalón (2006) describe AWLA, A Writing e-Learning Appliance, which like a wiki provides an innovative collaborative writing platform, combined

with synchronous communication and other tools such as tracking of student input and plagiarism detection. It is also designed for multiple platforms: laptops, PDAs, projectors with electronic whiteboard, etc..

The dynamic range of Web 2.0 applications provides a fertile field for collaborative learning. Bielaczyc and Collins (Dede, 2004a) assert: “In the learning communities approach, the language for describing ideas and practices in the community emerges through interaction with different knowledge sources and through co-construction and negotiation among the members of the community. ... In contrast, in most classrooms the teacher and texts tend to promulgate the formal language to be learned” (n.p). Wenger et al. (2005) have mapped the technological-social landscape of EICoPs, which includes individual participation, community building, content creation, and a range of synchronous and asynchronous communicative opportunities. Some of the associations of an EICoP can be seen in Figure 1. The semantic associations of learning have broadened from the brick-and-mortar of the traditional lecture hall, as have the opportunities for meaningfully engaging students in their own education. The potential complexity of learning associations now more resembles an ecosystem than a building which one enters to be filled with information. As Ortega and Sánchez-Villalón (2006, p. 266) maintain: “The age of learning based on knowledge transfer is coming to an end. Learning lies now on knowledge construction.”

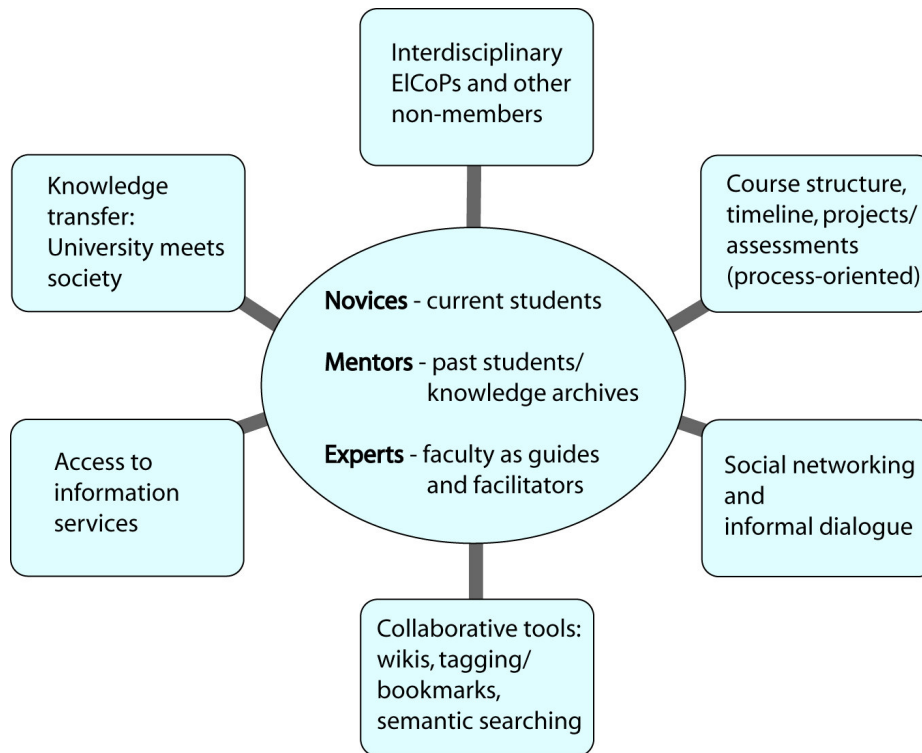


Figure 1: The ECoP: Networked Self-managing Learning Communities

Open vs. Closed Systems

Persistent yet surmountable problems in the development of e-learning tools and systems are those of proprietary software, closed systems, and intellectual property rights regimes. Profit-driven motives seem at the core of these problems. In contrast, as Weller (in press) has suggested, originally the Internet was based on the principles of openness, robustness, and decentralization. Web 2.0 applications, with their content creating, collaborative and sharing emphasis, are even more closely aligned with these values. The Net Generation seems to regard the dissemination of digital information -- whether copyrighted or not -- as a right, not a privilege for those who pay. How can the profit-driven world adjust to this new perspective on intellectual property rights, this new demand, and survive?

Just as the music industry has had to respond positively to Napster and the peer-to-peer file-sharing phenomenon, so will the education industry have to respond to this new behavior of open sharing. In terms of copyright issues, alternative measures have already been put in place. Lamb (2004, p. 46) describes the copyright situation with respect to the collaborative platform of wikis. There are three main schemes used: CommunityCopyright, PublicDomain, and CopyLeft. Each of these deals with issues of individual contribution/collective ownership and distribution and re-use in different ways, but all of them acknowledge that, in a digital environment, such sharing will take place. In addition, the increasingly popular Creative Commons (<http://creativecommons.org/>) alternatives to intellectual property licensing also acknowledge, and provide for, re-use and distribution in a variety of ways.

Many recognize the virtues of open sharing and open source software and the benefits these afford the academic community (Carmichael & Honour, 2002; Stephenson, 2006; Vest, 2006; Wiley, 2006). According to Carmichael (2002, p. 48): “‘Open Source’ software is the current manifestation of a culture of collaboration which has existed since the early days of computer science”. Stephenson (2006) encourages the use of Free/Open Source Software (FOSS) in education and, in turn, the development of Open Course Communities. Such communities would be based on a spirit of participation, support and collaboration, a collaborative IT infrastructure, and the co-development and sharing of learning and assessment modules. He calls for the development of academic communities of practice in which students are also invited to be members.

There are several Web-based initiatives which reflect Stephenson’s Open Course Communities, of which perhaps the best known is the MIT OpenCourseWare (OCW) project (Vest, 2006). Other sites which collect an open repository of learning objects are MERLOT (the

Multimedia Educational Resource for Learning and Online Teaching), Connexions, and the Visible Knowledge Project (Wiley, 2006). Wiley maintains that “this more comprehensive shift towards ‘openness’ in academic practice is not only a positive trend, but a necessary one in order to ensure transparency, collaboration, and continued innovation in the academy” (n.p.). There are currently hundreds of universities offering free access to open courseware, and thousands of courses available.

The alternative to this open, collaborative approach in the education industry is a perpetuation of costly duplication of resources in isolated ivory towers, is lock-down, inflexible systems and legacy and proprietary software. With the migration of courses to digital formats, educational institutions have needed to organize and facilitate course delivery through the use of learning management systems (LMS). While at first such systems seemed efficient, they have now proven to be in many ways bulky and unresponsive -- for both academic staff and students (Jafari, McGee, & Carmean, 2006). The first generation LMS has provided limited opportunity for collaborative learning, and have depended on a complex system of protocols to restrict access to courses. While discussion boards have featured in these systems, and instructor-determined groupings, the primary *modus operandi* for most online courses has been to use the LMS as a repository for the distribution of lecture notes and class announcements -- nothing that a table in a lecture hall couldn't just as easily provide. Blackboard, the biggest player in the lucrative LMS market, has recently (July 2006) managed to acquire the patent rights to the LMS concept; subsequently it has sued a small LMS company called Desire2Learn for copyright infringement (O'Reilly, 2006a). The open source LMS company Sakai Foundation has responded to Blackboard's behavior in an open letter:

The recent announcement by Blackboard that it is attempting to assert patent rights over simple and longstanding online technologies as applied to the area of course management systems and e-learning technologies, and its subsequent litigation against a smaller commercial competitor constitutes a threat to the effective and open development of software for higher education and the values underlying such open activities. (Severance, Hardin, & Wheeler, 2006)

Intellectual property rights regimes have become a central issue in the struggle between open and closed access to information (Vaidhyathan, 2004). Universities must spend huge sums on annual subscriptions to journal databases to enable researchers and students to access online research materials. In response to this, the Public Library of Science (PLOS) was created – a non-profit, peer-reviewed, open access online publishing company providing unrestricted use of the journals and contents under a Creative Commons Attribution License (Wiley, 2006). As Hilton maintains (2006, p. 68): “In the world of ideas, the battle lines are drawn between the technology that is predisposed to liberate information and the business models that seek to lock it down.” And yet inter-institutional collaboration and data gathering through the harnessing of grid technologies are seen as positive and necessary trends in current research (Braman, 2006; O’Brien, 2005). Huber and Hutchings (2005) call for a renewal of vigorous dialogue and research around best practice in teaching and learning through the establishment of a Teaching Commons. They suggest, as Stephenson does, that students be a part of this Teaching Commons, and that an online academic community be established and the infrastructure built and maintained “to make pedagogical work of high quality available and accessible to all” (pp. 122-23).

Perhaps this urge to collaborate and to share -- on both sides of the learning and teaching divide -- is a response to the closed systems that pervade much of our online and offline environments. Perhaps it reflects a natural urge towards altruism and collective survival. It is certainly spawning a new approach to academic endeavor. Molina et al. (2006) envision a research services “vortal”, a part of an overarching online campus portal, which would allow faculty to easily access needed applications and services. Similarly, students would have vortals providing access to campus social life, course communities, and administrative and information services. They define a vortal as “a community-based Web location that provides a self-managed, personalized, and customized information environment. This environment is focused on serving the needs of particular constituencies within the community” (p. 120). This second generation LMS, or LMS 2.0, could reflect the open and collaborative emphasis of Web 2.0 applications -- and be based on them as well: an aggregate of community-enhancing, intelligent applications that facilitate sharing of ideas and resources. They can be repositories for more than just a semester’s lecture notes and assessment guidelines; they can be knowledge banks as well. As Jafari, McGee and Carmean (2006, p. 58) observe, current LMSs, “in their conception as a management system, shut the learners and the instructor out after the semester ends, as if learning, teaching, and reflecting have symbiotically ended.” This is not evidence of a smart system -- nor does it go far in supporting an EICoP which, ideally, could maintain its own momentum and purpose and spirit of intellectual enquiry even after the course has finished. If nothing else, the captured discussions and blogs and wiki documents of this year’s students of a particular course could provide mentorship for next year’s students -- the full spectrum between novice and expert in an EICoP being thus satisfied. This idea is supported by others (Rubin & Hebert, 1998; Trentin, 2001). The Transition Program at The University of Melbourne this year

trialed the hosting of blogs of some first year students, called First_year@UniMelb (2006). There was an RSS facility and comments from other students to postings. The blogs proved popular with students on campus, providing a sense of community and even emotional support for the bloggers as well as for the readers. A recent University of Melbourne study indicates that up to a third of first year students have maintained a blog, and fifty-seven percent have read and/or posted comments on other blog sites (Kennedy, Krause, Churchward, Judd, & Gray, 2006).

Dodge (2003) describes an initiative at San Jose City College in which students formed online interdisciplinary learning communities in order to achieve their learning objectives. She maintains that “a more intensive participation in educational goals forges creative connections and innovative thinking across disciplines. Once students discover unexpected connections, this joy of discovery may remain with them, leading them to continue seeking pleasure in lifelong learning” (p. 73). The purpose of higher education is, in some respects, to encourage ongoing intellectual enquiry, lifelong learning, and a broadening of knowledge and perspectives.

An LMS 2.0 that supported social connections, interdisciplinary exchanges, and collaborative projects between both students and staff would be a holistic, responsive system. Built with semantic web architecture that allowed maximum access to applications and services, e-learning communities of practice could be allowed to form and build their own momentum and shape, and students could more easily find each other and provide the kind of support and mentoring that would benefit all concerned. Such a system could support faculty CoPs as well. Jafari, McGee and Carmean (2006) have developed a model of LMS designed to incorporate these features, based on Web 2.0 concepts and applications. The existing open source LMS Sakai also features Web 2.0 collaborative tools. Emergent design principles -- the idea that the direction and shape of a self-regulating system cannot be predicted -- should be at the core of

such an architecture, in order to support the unpredictable, student-directed growth of e-learning communities of practice. Advances in semantic web filtering and knowledge representation are enabling this kind of “smarter” and more responsive system (Carbonaro, 2006; Hatzilygeroudis & Prentzas, 2006; Sánchez-Alonso, Sicilia, & García-Barriocanal, 2006). Open courseware projects both within and among universities, social and learning communities among students that nurture community-building, intellectual inquiry and cognitive/creative connections, and the establishment of an academic commons in which there is dialogue about teaching and learning, and in which knowledge is the dominant currency -- these are some of the possibilities of a learning system designed around EICoPs and connectivist principles.

Conclusion: Keep the Customer Satisfied

Cede control. Once you invite the people in, they're going to want to do more. I know this violates everything they taught you in school, but you have to let go of the old command-and-control style of business. (Trippi, 2004, p. 215)

In a world driven by commerce, it is prudent to give credence to customers. In the discipline of knowledge management, there is an increasing trend to identify the needs of the consumer; as Blosch (2000, p. 268) maintains: “It is by understanding how customers interact with the organization and how the business processes respond that organizations can identify opportunities for innovation and development.” One way of doing this is by giving customers a platform within the organization from which to form a community and have a voice. For some,

this is to acknowledge that customers are pivotal to the success of the post-industrial organization, and that their behaviors are changing:

Consumers are better informed, connected, and have more choices. They have more power, and are increasingly originators of dialogue with traditional enterprises and other consumers. They now view themselves as active co-creators of value and expect to be engaged. (Prahalad, Ramaswamy, & Krishnan, 2000, p 74)

The same applies to the education industry. According to Carmean (in Jafari, McGee, & Carmean, 2006):

Students especially made the case that it's time for a change in how we think about teaching and learning and that the change is long overdue. It is time for them and for their technologies. They wondered why there is so little incorporation of the tools they use everyday, tools that they know are available (for free, they pointed out) but that instructors don't use. Why, in an age of speed and instant response, does everything take so long and seem so clumsy and hard to use? They told us that it is time for the academy to get with the program. (p. 60)

Web 2.0 applications, popular with Net Generation students, promote sound pedagogical principles of constructivist and connectivist learning. They promote content creation and collaboration, and the formation of e-learning communities of practice. The paradigm shift which these applications and learning principles support in knowledge transfer and instructional design has already taken place. Learning institutions should take their cue from the world around them and the community building tools and information management architecture that these students are intrinsically-motivated to use in their daily lives. The result could be an academic and intellectual cluster of dynamically-interacting, self-regulating online campus communities.

Courses could be teacher-facilitated conversations and peer-supported collaborations. In the language of commerce, “[M]anagers [teachers] will be forced to explicitly recognize and facilitate the formation and evolution of thematic consumer [student] communities. The process of value creation and retention of consumers [students] will be a function of the quality of the experience creation and fulfillment process” (Prahalad, Ramaswamy, & Krishnan, 2000, p. 76).

Students are ready to be engaged and to take control of their learning; instructivist teaching methods and non-‘smart’ autocratic systems, however, tend to inhibit this engagement.

Universities might consider the adoption of Web 2.0 tools and principles lest they fail to capture students’ desire 2 learn.

References

- (2006). First_year@UniMelb: A journal of the first-year experience
Retrieved 11 November 2006 from <https://airport.unimelb.edu.au/blog/>.
- Alexander, B. (2006). Web 2.0: A New Wave of Innovation for Teaching and Learning?
[Electronic Version]. *Educause Review*, 41, 32-44. Retrieved 22 August 2006 from
<http://www.educause.edu/apps/er/erm06/erm0621.asp>.
- Augar, N., Raitman, R., Lanham, E., & Zhou, W. (2006). Building Virtual Learning
Communities. In Z. Ma (Ed.), *Web-Based Intelligent E-Learning Systems: Technologies
and Applications* (pp. 72-100). Hershey, PA: Information Science Publishing.
- Bargh, J. A., & McKenna, K. Y. A. (2005). The Internet and Social Life [Electronic Version].
Annual Review of Psychology, 55, 573-590. Retrieved 8 November 2006.
- Blosch, M. (2000). Customer knowledge [Electronic version]. *Knowledge and Process
Management*, 7(4), 265-268.
- Bouras, C., Giannaka, E., Nani, M., Panagopoulos, A., & Tsiatsos, T. (2006). An Integrated
Platform for Educational Virtual Environments. In Z. Ma (Ed.), *Web-based Intelligent E-
Learning Systems: Technologies and Applications* (pp. 291-320). Hershey, PA:
Information Science Publishing.
- Braman, S. (2006). Transformations of the Research Enterprise [Electronic Version]. *Educause
Review*, 41, 26-41. Retrieved 4 November 2006 from
<http://www.educause.edu/apps/er/erm06/erm0641.asp>.

- Bronwyn, D., Michael, G., & Peter, B. (2006). The Rise and Fall of the Neo-liberal University. *European Journal of Education*, 41(2), 305.
- Carbonaro, A. (2006). Defining Personalized Learning Views of Relevant Learning Objects in a Collaborative Bookmark Management System. In Z. Ma (Ed.), *Web-based Intelligent E-Learning Systems: Technologies and Applications* (pp. 139-155). Hershey, PA: Information Science Publishing.
- Carmichael, P., & Honour, L. (2002). Open Source as appropriate technology for global education [Electronic Version]. *International Journal of Educational Development*, 22, 47-53. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6VD7-44NM3BG-6/2/2ee389c7591ec848bfcd8d89046b92a6>.
- Cho, H., Gay, G., Davidson, B., & Ingraffea, A. Social networks, communication styles, and learning performance in a CSCL community [Electronic Version]. *Computers & Education*, In Press, Corrected Proof. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6VCJ-4HC6KPD-1/2/8f84021edd52b22d82edded8552734b4>.
- Contreras-Castillo, J., Favela, J., Perez-Fragoso, C., & Santamaria-del-Angel, E. (2004). Informal interactions and their implications for online courses [Electronic Version]. *Computers & Education*, 42, 149-168. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6VCJ-49V1D4F-1/2/ac016bdb9b649241e9fbfab899a848a2>.
- Davies, B., Gottsche, M., & Bansel, P. (2006). The Rise and Fall of the Neo-liberal University [Electronic Version]. *European Journal of Education*, 41. Retrieved 2 November 2006

from <http://www.blackwell-synergy.com.ezproxy.lib.unimelb.edu.au/action/showCitFormats?doi=10.1111%2Fj.1465-3435.2006.00261.x>.

Dawson, S. (2006). A study of the relationship between student communication interaction and sense of community [Electronic Version]. *The Internet and Higher Education*, 9, 153-162. Retrieved 27 October 2006 from

<http://www.sciencedirect.com/science/article/B6W4X-4KNKH22-3/2/b36795c0716f9a275e1674abf2a168db>.

Dede, C. (2004a). Enabling Distributed Learning Communities Via Emerging Technologies - Part One [Electronic Version]. *The Journal* from <http://thejournal.com/articles/16909>.

Dewiyanti, S., Brand-Gruwel, S., Jochems, W., & Broers, N. J. (2007). Students' experiences with collaborative learning in asynchronous Computer-Supported Collaborative Learning environments [Electronic Version]. *Computers in Human Behavior*, 23, 496-514.

Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6VDC-4DTTBC0-3/2/515419bc21c7f71f6407621a511c04e6>.

Dodge, L. (2003). Building Academic Skills and Information Competency through Learning Communities [Electronic Version]. *Educational Technology & Society*, 6, 72-78.

Retrieved 2 November 2006 from http://www.ifets.info/journals/6_3/9.pdf.

Foreman, J. (2004). Game-based Learning: How to Delight and Instruct in the 21st Century [Electronic Version]. *Educause Review*, 39, 50-66. Retrieved 4 November 2006 from

<http://www.educause.edu/pub/er/erm04/erm0454.asp>.

- Fuyuki, K. (2002). Which Barbarians at the gates? From the culture wars to market orthodoxy in the North American academy. *The Canadian Review of Sociology and Anthropology*, 39(3), 323.
- Gee, J. P. Good Video Games and Good Learning [Electronic Version], no pagination. Retrieved 4 November 2006 from <http://www.academiccolab.org/initiatives/papers.html>.
- Gilry, K. (2005). E-learning 2.0, whatever that is [Weblog Entry]. DJ Alchemi. 21 December 2005. Retrieved 4 November 2006 from http://alchemi.co.uk/archives/ele/elearning_20_wh.html.
- Hatzilygeroudis, I., & Prentzas, J. (2006). Knowledge Representation in Intelligent Educational Systems. In Z. Ma (Ed.), *Web-based Intelligent E-Learning Systems: Technologies and Applications* (pp. 175-192). Hershey, PA: Information Science Publishing.
- Hayes, E. Becoming a (Virtual) Skateboarder: Communities of Practice and the Design of E-Learning [Electronic Version], no pagination. Retrieved 5 November 2006.
- Hilton, J. (2006). The Future for Higher Education: Sunrise or Perfect Storm? [Electronic Version]. *Educause Review*, 41, 58-71. Retrieved 25 August 2006 from <http://www.educause.edu/apps/er/erm06/erm0623.asp>.
- Huber, M. T., & Hutchings, P. (2005). *The Advancement of Learning : Building the Teaching Commons*. San Francisco: Jossey-Bass.
- Jafari, A., McGee, P., & Carmean, C. (2006). Managing Courses, Defining Learning: What Faculty, Students, and Administrators Want [Electronic Version]. *Educause Review*, 41, 50-71. Retrieved 4 November 2006 from <http://www.educause.edu/apps/er/erm06/erm0643.asp>.

- Janssen, J., Erkens, G., Kanselaar, G., & Jaspers, J. Visualization of participation: Does it contribute to successful computer-supported collaborative learning? [Electronic Version]. *Computers & Education*, In Press, Corrected Proof. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6VCJ-4JDVNV9-1/2/a18fb85461e76078b0ea70dbfc5da7bf>.
- Johnson, C. M. (2001). A survey of current research on online communities of practice [Electronic Version]. *The Internet and Higher Education*, 4, 45-60. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6W4X-44BMD1R-4/2/9d180362ba9cdcd2ce0b1b46265e4319>.
- Kennedy, G., Krause, K., Churchward, A., Judd, T., & Gray, K. (2006). First Year Students' Experiences with Technology: Are they really Digital Natives? [Electronic Version]. *Internal report, The University of Melbourne*. Retrieved 13 November 2006 from <http://www.bmu.unimelb.edu.au/research/munatives/index.html>.
- Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research [Electronic Version]. *Computers in Human Behavior*, 19, 335-353. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6VDC-47PG7JY-6/2/dbe3c98acdc71c6c3dc0f6a987f6b22>.
- Kreijns, K., Kirschner, P. A., Jochems, W., & van Buuren, H. Measuring perceived sociability of computer-supported collaborative learning environments [Electronic Version]. *Computers & Education*, In Press, Corrected Proof. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6VCJ-4GSJXC5-1/2/ca1c2c8814ac3a5c0762b5122f184302>.

- Lamb, B. (2004). Wide Open Spaces: Wikis, Ready or Not [Electronic Version]. *Educause Review*, 39, 36–48. Retrieved Accessed 2 November 2006 from <http://www.educause.edu/pub/er/erm04/erm0452.asp?bhcp=1>.
- Larner, W., & Heron, R. L. (2005). Neo-liberalizing Spaces and Subjectivities: Reinventing New Zealand Universities [Electronic Version]. *Organization*, 12, 843-863. Retrieved 2 November 2006 from <http://proquest.umi.com/pqdweb?did=930826641&Fmt=7&clientId=14623&RQT=309&VName=PQD>.
- Ma, Z. (Ed.). (2006). *Web-based Intelligent E-Learning Systems: Technologies and Applications*. Hershey, PA: Information Science Publishing.
- Molina, P. G., & the 2006 EDUCAUSE Evolving Technologies Committee. (2006). Pioneering New Territory and Technologies [Electronic Version]. *Educause Review* 41, 112-135. Retrieved 4 November 2006 from <http://www.educause.edu/apps/er/erm06/erm0659.asp>.
- Musser, J., & O'Reilly, T. (2006). *Web 2.0: Principles and Best Practices*. Retrieved 7 November 2006, from <http://www.oreilly.com/radar/web2report.csp>.
- O'Reilly, T. (2005c). What is Web 2.0? [Electronic Version]. Retrieved 7 November 2006 from <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>.
- O'Reilly, T. (2006a). Blackboard E-learning Patent [Weblog Entry]. O'Reilly® Radar. 13 August 2006. Retrieved 7 November 2006 from http://radar.oreilly.com/archives/2006/08/blackboard_elearning_patent.html.
- O'Reilly, T. (2006b). Web 2.0 Principles and Best Practices [Weblog Entry]. O'Reilly® Radar. 07 November 2006. Retrieved 7 November 2006 from http://radar.oreilly.com/archives/2006/11/web_20_principl_1.html.

- O'Brien, L. (2005). E-Research: An Imperative for Strengthening Institutional Partnerships [Electronic Version]. *Educause Review*, 40, 64-77. Retrieved 4 November 2006 from <http://www.educause.edu/apps/er/erm05/erm0563.asp>.
- Ortega Cantero, M., & Sánchez-Villalón, P. P. (2006). AWLA: A Writing E-Learning Appliance. In Z. Ma (Ed.), *Web-based Intelligent E-Learning Systems: Technologies and Applications* (pp. 254-269). Hershey, PA: Information Science Publishing.
- Pahl, C. (2006). A Conceptual Architecture for the Development of Interactive Educational Multimedia. In Z. Ma (Ed.), *Web-based Intelligent E-Learning Systems: Technologies and Applications* (pp. 101-121). Hershey, PA: Information Science Publishing.
- Palloff, R. M., & Pratt, K. (1999). *Building Learning communities in Cyberspace: Effective Strategies for the Online Classroom*. San Francisco: Jossey-Bass.
- Palloff, R. M., & Pratt, K. (2005). *Collaborating Online: Learning Together in Community*. San Francisco: Jossey-Bass.
- Porter, D. Lessons from the Web 2.0: Building contemporary learning communities. Retrieved 4 November 2006, from <http://www.sfu.ca/~davidp/community.pdf>
- Prahalad, C. K., Ramaswamy, V., & Krishnan, M. S. (2000). Consumer centricity [Electronic version]. *InformationWeek*, 781, 67-76.
- Puustjärvi, J. (2006). The Role of Metadata in E-Learning Systems. In Z. Ma (Ed.), *Web-based Intelligent E-Learning Systems: Technologies and Applications* (pp. 235-253). Hershey, PA: Information Science Publishing.
- Rovai, A. P. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks [Electronic Version]. *The Internet and Higher Education*, 5, 319-332. Retrieved 27 October 2006 from

<http://www.sciencedirect.com/science/article/B6W4X-46V4TGM-2/2/faefe5b1226cadde471fdb4713b5cf27>.

- Rubin, L., & Hebert, C. (1998). Model for active learning: collaborative peer teaching [Electronic Version]. *College Teaching*, 46, 26-31. Retrieved 4 November 2006 from <<http://find.galegroup.com.ezproxy.lib.unimelb.edu.au/itx/infomark.do?&contentSet=IAC-Documents&type=retrieve&tabID=T002&prodId=EAIM&docId=A20422084&source=gale&srcprod=EAIM&userGroupName=unimelb&version=1.0>>.
- Sánchez-Alonso, S., Sicilia, M.-A., & García-Barriocanal, E. (2006). Ontologies and Contracts in the Automation of Learning Object Management Systems. In Z. Ma (Ed.), *Web-based Intelligent E-Learning Systems: Technologies and Applications* (pp. 216-234). Hershey, PA: Information Science Publishing.
- Severance, C., Hardin, J., & Wheeler, B. (2006). Sakai Foundation Engages Software Freedom Law Center to Advise on Elearning Patents Threat [Electronic Version], 2006. Retrieved 7 November 2006 from <http://sakaiproject.org/>.
- Sharratt, M., & Usoro, A. (2003). Understanding Knowledge-Sharing in Online Communities of Practice [Electronic Version]. *Electronic Journal on Knowledge Management*, 1, 187-196. Retrieved 17 May 2005.
- Shea, P., Sau Li, C., & Pickett, A. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses [Electronic Version]. *The Internet and Higher Education*, 9, 175-190. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6W4X-4KMYG73-2/2/ee18b842a40c7285822c6d1d5550919f>.

- Siemens, G. (2004). Connectivism: A Learning Theory for the Digital Age [Electronic Version]. *elearnspace*. Retrieved 2 November 2006 from <http://www.elearnspace.org/Articles/connectivism.htm>.
- Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving online learning: Student perceptions of useful and challenging characteristics [Electronic Version]. *The Internet and Higher Education*, 7, 59-70. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6W4X-4BT6G1B-5/2/08cdb837debe566a85b648b005cb0f30>.
- Stephenson, R. (2006). Open Source/Open Course Learning: Lessons for Educators from Free and Open Source Software [Electronic Version]. *Innovate: Journal of Online Education*, 3. Retrieved 8 November 2006 from <http://www.innovateonline.info/index.php?view=article&id=345>.
- Teghe, D., & Knight, B. A. (2004). Neo-liberal higher education policy and its effects on the development of online courses. *Campus - Wide Information Systems*, 21(4), 151.
- Trentin, G. (2001). From formal training to communities of practice via network-based learning.
- Trippi, J. (2004). *The revolution will not be televised: Democracy, the Internet, and the overthrow of everything*. HarperCollins: New York.
- Tu, C.-H. (2004). *Online Collaborative Learning Communities: Twenty-One Designs to Building an Online Collaborative Learning Community*. Westport, CT: Libraries Unlimited.
- Vaidhyathan, S. (2004). *The anarchist in the library: How the clash between freedom and control is hacking the real world and crashing the system*. New York: Basic Books.

- Vest, C. M. (2006). Open Content and the Emerging Global Meta-University [Electronic Version]. *Educause Review*, 41, 18-30. Retrieved 4 November 2006 from <http://www.educause.edu/apps/er/erm06/erm0630.asp>.
- Weinberger, D. (2005). Tagging and Why It Matters [Electronic Version]. *Berkman*, May 2005. Retrieved 4 November 2006 from <http://cyber.law.harvard.edu/home/2005-07>.
- Weller, M. The distance from isolation: Why communities are the logical conclusion in e-learning [Electronic Version]. *Computers & Education*, In Press, Corrected Proof. Retrieved 27 October 2006 from <http://www.sciencedirect.com/science/article/B6VCJ-4GH49N8-1/2/6a3096dbac2d194d118285bd027f7d14>.
- Wenger, E. (1998). Communities of Practice: Learning as a Social System [Electronic Version], no pagination. Retrieved 5 November 2006 from <http://www.co-i-l.com/coil/knowledge-garden/cop/lss.shtml>.
- Wenger, E., White, N., Smith, J. D., & Rowe, K. (2005). Technology for communities [Electronic Version] from <http://technologyforcommunities.com/>.
- Wiley, D. (2006). Open Source, Openness, and Higher Education [Electronic Version]. *Innovate: Journal of Online Education*, 3, n.p. from <http://www.innovateonline.info/index.php?view=article&id=354>.