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Abstract
Purpose
The paper introduces an enterprise-wide Web 2.0 learning support platform—SNAP—developed at Victoria University in Melbourne, Australia.

Design/methodology/approach
Pointing to the evolution of the social web, the paper discusses the potential for the development of e-learning platforms that employ constructivist, connectivist, and participatory pedagogies and actively engage the student population. Social networking behaviours and peer-learning strategies, along with knowledge management through guided folksonomies, provide the backbone of a social systems approach to learning support.

Findings
Development of a cloud-based read-write enterprise platform can extend the responsiveness of the learning institution to its students and to future e-learning innovations.

Originality/value
The full potential of e-learning platforms for the development of learning communities of practice can now be increasingly realised. The SNAP Platform is a step in this direction.

Keywords: Communities, E-learning, Students, Knowledge sharing, Educational innovation, Australia

Article Type: Conceptual paper

1. **Introduction**
The Web has undergone a transformation. It is no longer only or even primarily about disseminating and linking information; it is about linking and empowering people. Staley (2009) claims that Web 2.0 technologies "represent as important a historical phenomenon as the birth of bureaucracy" (p. 38) in that "they signal a participatory turn in our culture" (p. 39). Far from being a passing fad represented by Facebook, YouTube, Wikipedia, Twitter, or any other individual instantiation, Web 2.0 is an evolution in the social architecture and functionality of the Web (Limpens, Gandon, & Buffa, 2008) representing

the potential of the individual—what Staley calls "wikinomics, a new form of social economy based on a truly participatory framework. About the future of the tertiary institution, he asks: "How will the logic of wikinomics affect [the] time-honored arrangement between teachers and students?" (p. 38).

E-learning platforms are also undergoing a transformation in response to the communicative and collaborative opportunities that Web 2.0 technologies afford. Learning Management Systems (LMSs) such as Sakai, Moodle, and even Blackboard have integrated many of the popular tools and functionality of Web 2.0: blogs, wikis, Really Simple Syndication (RSS) feeds, bookmarking. Despite these added tools, LMSs remain at core institution-centric. The focus of these platforms, in design as well as functionality, is primarily administrative. But does it make sense, from a pedagogical perspective, to have the student learning platform married to the administrative needs of the institution—especially when these systems are locked into access regimes that stifle rather than support the platform's learning potential? Some educators are now asking what a truly learning-centered platform would look like—one that was fundamentally in the service of learners. At VU, the SNAP Platform is being designed to support the development of students' academic skills. It is based on the principles of wikinomics and incorporates Web 2.0 tools, communicative and collaborative potential between staff and students, the opportunity to discuss and share resources, peer engagement and mentoring, the creation of learning communities of practice and—at its core and as its acronym indicates—*social networking for academic purposes*. This paper will discuss the pedagogical foundations of this platform in light of the personal and social affordances it seeks to support. It will then describe the components of the platform and how it may be extended into broader resource sharing and other enterprise-wide systems.

2. The Personal-Pedagogical Dimension

As a learning support lecturer at Victoria University I have individual consultations with students about their academic work. In the morning I might see a philosophy major engaged in researching a paper about economic paradigms of the European Enlightenment. In the afternoon I might be helping a history student organise her thoughts about a project on the early Industrial Revolution and the rise of the concept of consumerism. It would be evident that the two students' topics converge, and that they should be talking to each other, sharing their ideas and their research, and engaging in conversation together that might spark the development of these ideas. I am the students' only node of possible connection, constrained by university privacy policies that do not allow me to assist them in finding each other.

This highlights the need for a platform allowing students to locate each other via informal learning communities that develop out of mutual interests and needs. Many students spend a considerable amount of time on Facebook engaged in social networking, but where is the venue for them as learners to engage in social networking for *academic* purposes? And if one existed, would they use it?

In a knowledge economy the principles of active learning are paramount: students need to learn how to become arbiters of their own education, and how to negotiate and filter the increasingly complex and contradictory digital information and social environments to which they now have access (Hase & Kenyon, 2000; Huijser, 2006). Critical thinking and discriminatory skills are an essential part of the learning toolkit. Active learning principles and constructivist pedagogy support the notion that learning happens when students are engaged in producing knowledge (Staley, 2009, p. 40). In this sense the constructivist classroom is like a Web 2.0 platform in which everyone is invited to participate in content-creation, and peer production is central to the intrinsic value of the platform. According to Staley (2009), the constructivist classroom is transformational, and teachers "must cede some of the control of the direction of the learning" (p. 40) to allow for the emergent learning that takes place when students are allowed to interact. Yet despite the social and cognitive benefits of constructivist learning, the teaching paradigm of universities continues to be overwhelmingly that of the lecture and the lecture hall.

Other educational philosophies are useful in developing a pedagogical framework for Web 2.0 learning platforms. Among these are Heutagogy (Hase & Kenyon, 2000), Connectivism (Siemens, 2004), Multiliteracies (Huijser, 2006), and Media Literacy (Wesch, 2009). As described by Hase and Kenyon (2000), heutagogy is a model of proactive and self-directed learning that does not necessarily progress linearly through a prescribed set of learning resources, is not always planned or conscious on the part of the learner, includes intuitive processes, and is experiential and socially interactive. Central to this model is the development of a student's capability, both during formal education and after, as an effective, involved and empowered element of society. Connectivism (Siemens, 2004), a learning theory that has been gaining popularity and momentum over the last few years, also informs the learning design of the SNAP Platform. Siemens maintains that learning is dependent upon a diversity of opinions, that the knowledge landscape is constantly shifting and that learners must be able to accommodate those shifts, that being able to make and maintain connections and link ideas are essential skills, and that the health of a knowledge network is dependent upon the flow of information. According to Siemens:

> The starting point of connectivism is the individual. Personal knowledge is comprised of a network, which feeds into organizations and institutions, which in turn feed back into the network, and then continue to provide learning to individual [sic]. This cycle of knowledge development (personal to network to organization) allows learners to remain current in their field through the connections they have formed (2004, n.p.).

Like Siemens, Wesch (2009) maintains that knowledge is always and necessarily incomplete and subject to negotiation: "it becomes less important for students to know, memorize, or recall information, and more important for them to be able to find, sort, analyze, share, discuss, critique, and create information" (n.p.). Participation in the world is inevitable; how we participate defines us. And participation in media and content creation increases students' social and literacy skills, as well as their ability to communicate information and co-create knowledge.

3. The Social Dimension

Peer-assisted learning approaches have been receiving increasing attention in Australian/New Zealand tertiary institutions (Huijser, Kimmins, & Evans, 2008; Ladyshewsky & Gardner, 2008; van der Meer & Scott, 2008). For example, face-to-face peer learning approaches have been well established with the National Centre for PASS (Peer-assisted Study Support) at the University of Wollongong, PALS (Peer-assisted Learning Support) programs, as well as peer-assisted writing programs at various universities. Van der Meer and Scott (2008), of the University of Otago in New Zealand, view peer-assisted learning approaches as particularly important for first-year tertiary education, and argue for "shifting the balance from an instruction focus of learning support staff to facilitating or supporting peer learning" (p. 73). They call for "peer learning primacy" in learning support services. At VU, the School of Learning Support Services (LSS) has a robust peer mentoring program, as well as 'student rovers'—students who provide peer support in the University's Learning Commons (previously called the Library).

Online peer-assisted learning has become much more possible with the advent of Web 2.0 technologies and services. Peer learning, sharing ideas and resources, and cooperation are key elements of the SNAP Platform. The LSS student mentors and rovers provide online peer-learning in the form of blogposts and videocasts, and serve as stewards and moderators of the site's forums and commentary. Peer mentors not only play an important power-levelling role in a learning community of practice—they are authoritative without being an authority—they also model for other students the study and knowledge-seeking behaviours of successful and engaged learners.

Chatti, Jarke and Frosch-Wilke (2007) stress the importance of the social aspect of learning and knowledge management and the need for learning management systems to be people-driven rather than institution- or learning-object- driven. They suggest a shift towards the personal learning environment in which the instructor becomes "a knowledge broker, knowledge co-creator, mentor, coordinator and facilitator of the learning experience" (p. 412). Students, mentors and teaching staff can participate equally in the co-creation of resource-building on the SNAP Platform in several ways including sharing bookmarks to useful Web resources through a Delicious feed; commenting on blogposts; asking and answering questions; and sharing ideas on the threaded discussion forum.

The creation of shared metadata on e-learning objects through social tagging is another promising aspect of collaborative content creation in e-learning environments (Dahl & Vossen, 2008; Limpens, Gandon & Buffa, 2008; Lux & Dosinger, 2007; Maier & Thalmann, 2008). Rather than relying on established top-down ontologies and directories, bottom-up 'folksonomies' support the learner by providing a cognitive tool for knowledge building and negotiation: to tag a learning object the learner needs to develop an understanding sufficient enough to be able to summarize it by a set of keywords. Tagclouds, as a visual view of a set of tags, can help reveal relationships between learning

objects that "do not have any usual metadata fields like author, title, format, or location in common" (Dahl & Vossen, 2008, p. 45). In addition, tagging—along with other user input such as commentary and ratings—can be instrumental in helping students find each other and co-locate into communities of shared interest (Godwin-Jones, 2006, p. 10; Limpens et al., 2008).

Social folksonomies can be fraught, however, with the problem of 'noise': falsely-unique tags that are often created by misspellings, plurals, synonyms, homonyms and ambiguities, and the percentage of these 'errors' can rise as more tags are created (Limpens et al., 2008; Maier & Thalmann, 2008). One way to minimize this is by the initial seeding of a controlled vocabulary of tags (Limpens, et al., 2008, pp. 74-75)—a combination of ontology and folksonomy. Dahl and Vossen (2008) describe the difference between a broad folksonomy, in which each user contributes his/her own tags (e.g. Delicious), and a narrow folksonomy in which the object creator or administrator sets the tags (e.g. Flickr). Their E-Learning Repository at the University of Muenster uses a version of both broad and narrow tagging: its *share.loc* repository creates initial tags and users can add additional ones, while in the *Learnr* platform users set their own tags to which they alone have access (pp. 38-39). In this way the benefits of a seeded ontology with user contributions and a personal folksonomy can complement each other.

4. The Platform

In an effort to remove the 'management' aspect of Learning Management Systems, some educators (Bogdanov, Salzmann, Helou, & Gillet, 2008; Chatti et al., 2007, p. 412) prefer the use of the term Personal Learning Environments (PLE)—a reflection of a more learning-centered approach to enterprise systems. As the LMS evolves both conceptually and technically, a flurry of acronyms, habitats and atmospheres has been advanced: Virtual Learning Environment, Personal Learning Environment, Learning Platform, Learning Ecosystem, and Cloud. The progression is indicative of a move towards open systems. Farmer (2009) considers openness, flexibility and extensibility in LMS architecture to be critical components for creating a system that supports learning-centered pedagogies. He proposes an 'Open Learning Architecture' that contains four elements: 1) an IT Core combining backend and system integration with a content management system; 2) an LMS that provides course and ad hoc groupings; 3) a Presentation component that provides the user interface; and 4) an 'Open Adapter Framework' that allows developers to extend the functionality of the system with seamlessly integrated plug-ins from cloud-based applications such as Google Docs, Twitter, Facebook, and Delicious. Such architecture could maximize the means for students to engage in the collaborative and social opportunities that cloud computing affords. Tertiary students are increasingly opting for cloud applications over enterprise systems (Brown, 2009, p. 66), and this trend is likely to continue. Wheeler and Waggener (2009) point out the economic and pedagogical benefits of universities pooling their resources by establishing a cloud- and consortium-based approach to enterprise-wide systems.

VU currently supports a number of discrete, commercially-licensed enterprise e-learning systems: Blackboard as its LMS, ELGG as a social networking platform, and PebblePad as an e-portfolio platform. In contrast, the SNAP Platform is a purpose-built, cloud-hosted e-learning environment for student learning support; built with the open-source, content management system Drupal. Drupal's modular build allows the platform to be flexible and extensible, with core integration of read/write (Web 2.0) technology. In a common three-column layout, the central column contains a video player with ratings and commentary (see Figure 1). These 1-3 minute videocasts are produced by teams of mentors and student rovers, and are one component of the site's peer learning strategy. Below this is a tagcloud of the site's resources (based on the system's resource taxonomy). On the left-hand column are 'blocks' that push feeds from the site's discussion forum, and aggregate various staff and student blogs. The blogs are for posting informal tips about learning from staff and the peer mentors and rovers. VU students have the opportunity to comment on these posts as well and to rate them for their usefulness. The right-hand column contains blocks that 1) feed resources that are personalised to the authenticated student's profile preferences, 2) show upcoming calendar events (learning skills workshops and other events of potential interest to students), and 3) VU student profiles.
Take in Figure 1

The platform reveals an active and human side of the institution, a community of teachers and learners who are engaged in student learning and open to sharing ideas and resources. By modelling this engagement and active interest it is hoped that students will learn how to become self-directed and self-reliant learners.

The SNAP Platform also contains a widget library. Widgets—Web-portable blocks containing feeds and applications that get pushed to the user—are part of the growing ecosystem of the cloud-based Webscape (Mashery, 2009). The work of Scott Wilson (Sharples, Griffiths, & Wilson, 2008; Wilson, 2009; Wilson, Sharples, & Griffiths, 2008) to provide a W3C widget standard and the open standards widget engine Wookie is a promising addition to the functionality and extensibility of a personal learning environment. Widgets can be gathered and shared by students, and are not necessarily bound by a single platform or web page: a student can import a useful widget into his/her own iGoogle, Netvibes (http://www.netvibes.com/), or PageFlakes (http://www.pageflakes.com/) page, or into an LMS. A widget can be an RSS feed of the latest electronic articles on a particular topic, or shared bookmarks, a feed of course podcasts, or the latest contributions to a group project's online document. Mike Wesch uses widgets and Netvibes to great effect in the delivery of his courses at Kansas State University, and harnesses the involvement of his students in course content creation (http://www.netvibes.com/wesch). On the SNAP Platform, students are able to turn the system's widgets on and off, move them in and out of the homepage, and ultimately share them on other platforms such as Facebook or the institutional LMS. The VU Learning Commons has created widgets for its catalogue interface and other information services that will also be hosted on SNAP, as will VU's creative writing journal, *Platform*.

There may be, over time, ways to extend the search capabilities of the SNAP Platform. Varas-Vera and Lytras (2008) describe a semantic web-enabled learning portal in which students have access to a number of generated technologies, such as a question/answer function and an annotation tool. Their idea is to develop a semantic social platform that employs metadata to create a highly personalized learning environment, matching learner profile to learning object. The extensibility of the SNAP Platform and the in-built feedback mechanisms of commentary and rating give SNAP a responsiveness-to-user input and an ability to harness and implement innovations as they arise, far beyond that of proprietary first-generation e-learning platforms.

5. Conclusion

Many tertiary educators and educational designers are proposing more open-ended, learner-centric, flexible learning platforms, and some are employing the abundant and innovative learning tools of the Web to great success. Institutional demands, however, often require educators to work within commercial enterprise systems, licensed at great expense, that may limit pedagogy and student learning needs but many educators aim to nurture active and collaborative learning skills in their students. In order to do so, we need to give them voice and agency in the learning process. The SNAP Platform at VU aims to encourage these skills.

Central to the success of the platform is the engagement and participation of its users (Benkler, 2006; Hase & Kenyon, 2000; Sharples et al., 2008; Wilson, 2009; Wilson et al., 2008). The primary hurdle to *academic* social networking may not, in fact, be the constraints of the platform; it may rest, rather, in the academic culture itself—a culture that, from lectures and lecture halls to learning management systems, tends to encourage student passivity. The current redesign of classrooms and libraries into learning spaces and learning commons is an important start; the transformation of the lecture into a social learning event will be another. Assessment, in a heutagogical paradigm, could become "more of a learning experience rather than a means to measure attainment" (Hase & Kenyon, 2000, n.p.). Innovative measures such as these may help ensure that universities remain relevant to students' educational needs into the foreseeable future. It is hoped that the SNAP Platform might make a contribution towards helping students negotiate this future by encouraging them to become active participants in their learning and their lives.

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