

Web 2.0: Promises and Realities

Patricia McGee, PhD

Patricia.mcgee@utsa.edu

The University of Texas at San Antonio

Abstract. Internet-based tools that allow the user to make, take, share, create, exchange, document, record, edit, push information, and receive information are everywhere. These Web 2.0 tools afford many opportunities for rich and enduring learning through orality, visualization, co-constructed knowledge, and self-organized knowledge.

At the start of the 21st century there began a shift in the nature of technology from a station-on-a-desk ball-and-chain to Internet as “platform” (O’Reilly, 2005) typified by what we call Web 2.0. The proliferation of Web 2.0 tools has introduced us to Internet as application; applications that are web-based, typically free to the user, support collaboration and interaction, and are highly responsive to the user. These tools can allow the user to make, take, share, create, exchange, document, record, edit, push information, and receive information passively. These tools tend to be multi-modal allowing the user to create rich content by combining audio, video, images, animation, and text in linear and non-linear formats. Many tools allow visitors to add comments or content, facilitating social interaction. Most significantly Web 2.0 introduces the idea of “microcontent” or small bits of information that are reduced to manageable bites, such as blog posts, podcasts, or video shorts. For higher education, Web 2.0 has expanded the potential suite of tools that instructors can offer learners, and placed the learner in a position of autonomy and self-directed learning. For example, in a Web 1.0 world when courses are offered within a course management system (CMS), if the system goes ‘down’ there is little option but for the instructor and learner to wait until it is restored. Course materials and information generated within the CMS are bound to the course semester – course shells are blank at the beginning of a course, and closed to learners at the conclusion of a semester. Web 2.0 endures – it lasts as long as the user decides it will last, provides ownership, and affords publicly constructed and shared knowledge.

Web 2.0 thrives on network effects: databases that get richer the more people interact with them, applications that are smarter the more people use them, marketing that is driven by user stories and experiences, and applications that interact with each other to form a broader computing platform (Musser, 2006).

Contributing to knowledge bases and sharing materials are not activities that are necessarily valued and condoned within the college classroom. Many argue that along with the Internet have come increased occurrences of plagiarism, cheating, and libel. There exist other paradigmatic conflicts between traditional learning and Web 2.0-based learning:

- Standardization vs. personalization. Ensuring that all learners receive the same content and perform against a set of pre-ordained standards.
- Intellectual property. Shifting from individually produced works to shared, modifiable open property that represents distributed intelligence.
- Bits of discrete knowledge vs. holistic schemas. Rather than experiencing course-based assignments that remain with the 'course' in a CMS, learners are afforded ways to store their work in personal environments as well as share and receive confirmation of their understanding of course content from others.

Increasingly we see arguments for the affordance of Web 2.0 to expand the critical and analytic skills of the learner as they conduct their own research and make sense of the information they encounter (Herdeen, 2005). When used strategically, these tools can assist the learner in constructing, documenting, and illustrating what they have learned and have come to know.

Technology has greatly impacted our capability to think and act strategically; Kurzweil's (2007) Law of Accelerating Returns, furthering Moore's Law¹, explains change in technology development as being exponential with a "long tail" rather than by incrementally equal steps. In order to work within an environment that continues to rapidly change, designers of learning require increased capability of capturing and sharing knowledge through personalized tools, such as those offered through Web 2.0. But how do we go about determining how to use them? Anderson (2007) analyzed the contributions of Web 2.0 applications for adult teaching and learning. Although the six features he identifies may be no surprise (see Table 1), the ideas do speak to the increasingly learning-centric opportunities that technology affords any learner with access to the Internet to create and disseminate their own ideas, experiences, and information.

¹ Moore (1965) predicted that integrated computer circuits ability to contain transistors would double in number for approximately every two years.

Patricia McGee, Creative Commons: Attribution-No Derivative Works 3.0 United States, see <http://creativecommons.org/licenses/by-nd/3.0/us/>

Table 1, Contributions of Web 2.0 (Anderson, 2007)

Big Idea	Description	Implication for T&L
Individual Production & User-generated Content (p. 14)	Anyone can create content and distribute/make public, reputation or personae appear to be important for makers of content.	Authority of knowledge is not limited to instructor; expertise is fluid; process is valued.
Harnessing the Power of the Crowd (p. 15)	Collective construction (e.g. crowdsourcing ²), critique, compilation and negotiation of what is known (e.g. folksonomy ³); exposure to open critique and debate.	Increase metacognitive abilities; distributed intelligence; collaboration; critical discourse.
Data on an Epic Scale (p. 18)	Raw, primary, and secondary data is freely available to be analyzed or used by anyone for any purpose.	Ability for learner to become researcher/inquirer; data can be generated by learner and contribute to professional knowledge base.
Architecture of Participation (p. 19)	Services are designed to be improved or expanded by user interactions (i.e., Google™, eBay™, Amazon™)	Learner contributes to an enduring effort instilling pride and ownership; peer coaching and teaching.
Networks Effects, Power Laws, & the Long Tail (p. 20)	The level of interaction is positively related to the level of user satisfaction, availability of a small selection to a large population.	Increased engagement and participation.
Open-ness (p. 25)	Intelligent access of primary data, open and just-in-time software development, user designated rights of ownership and reuse.	Ownership of knowledge; acceptance of freely available work that is freely critiqued.

Gradually but increasingly, Web 2.0 applications are evolving into denser and more concentrated versions of the first generation of tools; they are more user-centered, portable, mergeable, dynamic, and receptive to our needs, whims, and on-demand requests. Most of the Web 2.0 tools are “software as a service” (SaaS) that expands what a user has access to. The authority of virtual consensus nurtured and facilitated by the Internet evidences this. Google’s™ rationale for the Chrome™ browser⁴ is situated in our shift from accessing “pages” to applications that allow us to interact, not just view. Google’s answer is to deviate from a single thread to a multiple thread processor that will

² The utilization of multiple, possibly anonymous groups of people to solve problems, generate answers, or develop content through the Internet. Often used as an alternative to outsourcing (Howe, 2006) such as open source software development.

³ “Folksonomy is the result of personal free tagging of information and objects (anything with a URL) for one’s own retrieval. The tagging is done in a social environment (usually shared and open to others). Folksonomy is created from the act of tagging by the person consuming the information” (Vander Wal, 2007).

⁴ See <http://www.google.com/googlebooks/chrome/index.html>

segment individual applications thereby avoiding problems with any one application that can interfere with other applications. Such an approach begins to approach Web 3.0, or the intelligent web that promises to help us think and reduce our cognitive load (Markoff, 2005). Web 2.0 = “its all about me” to Web 3.0 “help me do more with less effort.”

Web 2.0 represents an emerging design paradigm that has less to do with structure and order, and more to do with user-centric experiences at any time for self-generated purposes (Carmean, 2008). The expanded sensibilities and dissemination opportunities available to instructors and learners offer different ways of constructing, sharing, collecting, and interacting. These include:

- **Orality.** Declarative knowledge must be memorized - preferably through constant repetition in order to be placed into short-term memory, and there is evidence that memorization utilizes an auditory code to process new information (Baddeley 1993). Producing digital narratives and communiqués (through videocasts, vlogging, or audiocasts) learners are practicing and encoding, even as they are constructing a product to share with others. Such learning can be reinforced through participation in a production experience where rehearsal and self-editing is inherent in the process (McGee, 2008).
- **Visualization.** Imagery assists memory, in that it assists our ability to manipulate data, add and encode details (particularly from our personal experience), and in recalling information or reliving experience (Rubin & Greenberg, 2003). Digital productions that combine imagery, or allows the viewer/listener to add personal interpretations or imagery enhances meaning and is more likely to personalize the learning experience, engage the learner, and support transfer of learning.
- **Co-constructed knowledge.** Constructing new understanding is what happens through instruction, minimally through interaction between the instructor and the learner. Within a group interaction framework, this process is less an act of cooperation than it is collaboration, generating new knowledge for at least the listener, or at least that is the intended outcome for learning. The act of learning however must be extended so that the learner has an opportunity to put the new knowledge in context, within a real world or authentic context. This iterative process requires that the learner is involved in multiple processes over time alone and with others (Stahl, 2000), something that occurs seamlessly in online environments. The “push” and “pull” functions of communication tools, supplemented by the data collection and construction tools of Web 2.0 make it difficult to discern where one person’s idea ends and another begins.
- **Self-organized knowledge.** Given that we have personal email accounts, organizational service accounts, commercial accounts, social network accounts, etc., it is easy to conceptualize a virtual ‘identity’ that is supported and enacted through a variety of virtual environments. Knowledge may be collected,

critiqued, shared, or stored in personal learning environments (PLE) that are just now becoming a reality, as in systems such as Epsilen™⁵.

Pedagogical solutions and strategies for utilizing Web 2.0 applications (see Table 2) are readily available (see <http://wetpaint.elearningtools.com>) but most importantly are the power of choice and flexibility between systems.

Table 2, Web 2.0 applications (McGee & Diaz, 2007)

Type	Function	Tools
Communicative	To share ideas, information, and creations	Blogs, Audioblogs, Videoblogs, IM-type tools, Podcasts, Webcams
Collaborative	To work with others for a specific purpose in a shared work area	Editing/writing tools, Virtual communities of practice (VCOPs), Wikis
Documentative	To collect and/or present evidence of experiences, thinking over time, productions, etc.	Blogs, Videoblogs, e-portfolios
Generative	To create something new that can be seen and/or used by others	Mashups, VCOPs, Virtual Learning Worlds (VLW)
Interactive	To exchange information, ideas, resources, materials	Learning objectives, Social bookmarking, VCOPs, VLWs

The trend toward portability between systems is evidenced by the IMS Common Cartridge Project⁶ that provides a framework for mobile learning. Such an approach has been adopted in formal learning environments, such as eTokens™⁷ that “offers management, downloads and uploads of learning resources (including assessment) between a Learning Management System (Moodle™) and mobile devices fitted with standard wireless communication. Students can download a variety of resources, complete the required task and then upload it back to the system. The eToken system tracks the changes made by students.” Truly anytime, anywhere learning that keeps the learner in charge and potentially on task.

As Web 2.0 morphs toward Web 3.0 and 4.0 the role and function of “teaching” may also morph. The key is to keep one eye on the learner, and the other on the tools that can allow the learner to participate in their personal, social, and owned knowledge in order to achieve the intended outcome of higher education – using what they learn in their non-academic world.

⁵ Epsilen™, see <http://www.epsilen.com>

⁶ IMS Common Cartridge Project, see <http://www.imsglobal.org/cc/ccfaqs.html#1>

⁷ Hong Kong University eTokens, see <http://people.cite.hku.hk/dkennedy/mToken/>
Patricia McGee, Creative Commons: Attribution-No Derivative Works 3.0 United States, see <http://creativecommons.org/licenses/by-nd/3.0/us/>

Resources

- *A New Wave of Innovation for Teaching and Learning*, Bryan Alexander – <http://educause.edu/ir/library/pdf/ERM0621.pdf>
- *Back to School with Web 2.0, Part 1* - <http://www.solutionwatch.com/512/back-to-school-with-the-class-of-web-20-part-1/>
- *ELearning 2.0*, Philip Downes - <http://www.elearnmag.org/subpage.cfm?section=articles&article=29-1>
- *eLearning Tools*, Patricia McGee, Veronica Diaz, and others - <http://elearningtools.wetpaint.com/>
- *Web 2.0 for Content for Learning and Teaching in Higher Education*, Tom Franklin and Mark van Harmelen – <http://www.jisc.ac.uk/media/documents/programmes/digitalrepositories/web2-content-learning-and-teaching.pdf>

References

Anderson, P. (2007). *What is Web 2.0? Ideas, technologies, and implications for education*. JISC Technology and Standards Watch Report. Retrieved July 8, 2008 from <http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf>

Baddeley, A. (1993) Short-term phonological memory and long-term learning: A single case study. *European Journal of Cognitive Psychology*, 5, 129–148.

Carmean, C. (2008). *E-Learning design 2.0: Emergence, distributed networks, and the creation of shared knowledge*. Unpublished doctoral dissertation. Capella University, Minneapolis, MN.

Herdeen, R. (2005). *Online research toolkit*. Available at <http://disedlibrarian.edublogs.org/start/>.

Howe, J. (2006). The rise of crowdsourcing. *Wired*, 14, retrieved June 23, 2008 from <http://www.wired.com/wired/archive/14.06/crowds.html>.

Kurzweil, R. (2007). *The law of accelerating returns*. Retrieved on June 25, 2008 from <http://www.kurzweilai.net/articles/art0134.html?printable=1>.

Markoff, J. (2005). *What the dormouse said: How the 60s counterculture shaped the personal computer industry*. NY: Penguin.

McGee, P. (2008). *The instructional value of storytelling*. Technical paper for AFRL, Mesa, AZ. Available at <http://faculty.coehd.utsa.edu/pmcgee/McGee-2008-AFRL.pdf>.

McGee, P., & Diaz, V. (2007). Blogs, wikis, and podcasting, oh my! What is a faculty

Patricia McGee, Creative Commons: Attribution-No Derivative Works 3.0 United States, see <http://creativecommons.org/licenses/by-nd/3.0/us/>

- member supposed to do? *EDUCAUSE Review*. Retrieved April 10, 2008 from <http://connect.educause.edu/Library/EDUCAUSE+Review/WikisandPodcastsandBlogsO/44993>
- Moore, G. E. (1965). Cramming more components onto integrated circuits. *Electronics Magazine*, 38, (8), 114-117. Retrieved on June 25, 2008 from <http://download.intel.com/research/silicon/moorespaper.pdf>.
- Musser, J. (2006). Web 2.0 Principles and Best Practices, Fall 2006. O'Reilly Media Inc. Retrieved August 25, 2008 from http://oreilly.com/catalog/web2report/chapter/web20_report_excerpt.pdf.
- O'Reilly, T. (2005). *What is Web 2.0? Design patterns and business models for the next generation of software*. O'Reilly Media, Inc. Retrieved June 20, 2008 from <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>.
- Rubin, D. C., & Greenberg, D. L. (2003). The role of narrative in recollection: A view from cognitive psychology and neuropsychology. In G. D. Fireman, T. E. McVay, & O. J. Flanagan (Eds.), *Narrative and consciousness* (pp. 53-85). New York: Oxford.
- Stahl, G. (2000). A model of collaborative knowledge-building. In B. Fishman & S. O'Connor-Divelbiss (Eds.), *Fourth International Conference of the Learning Sciences* (pp. 70-77). Mahwah, NJ: Erlbaum. <http://www.umich.edu/~icls/proceedings/pdf/Stahl.pdf>
- Vander Wal, T. (2007). *Folksonomy coinage and definition*. Retrieved June 20, 2008 from <http://vanderwal.net/folksonomy.html>.