

Chapter X

The Power and Promise of Web 2.0 Tools

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ABSTRACT

The key idea that sets constructivism apart from other theories of cognition was launched about 60 years ago by Jean Piaget. It was the idea that what is called knowledge does not and cannot have the purpose of producing representations of an independent reality, but instead has an adaptive function (Von Glasersfeld, 1996, p.3). In this chapter, a variety of Web 2.0 applications and their affordances are presented and discussed in relation to constructivism in higher education. The aim is to explain how these applications can be used in higher education to promote interactive and engaging learning environments. Recommendations for harnessing the potential of these tools along with practical examples will assist facilitators of higher education with creative means to design their courses and thus promote Learning 2.0.

WHAT IS WEB 2.0?

The Internet has presented great opportunity for global human participation by transcending geographical, cultural, religious, social classification, and political barriers. As the proliferation of learning with technology increases, there is

also amplification in the array of technological possibilities for a variety of asynchronous and synchronous interactions. Therefore, it becomes necessary to provide insight into the effective use of these technologies and the facilitation of e-learning. According to Schrum and Hong (2002) the goals of teaching with technology

should include facilitating higher-level, thinking skills, such as analysis, synthesis, and evaluation. Alexander describes this phenomenon:

Web 2.0 is defined as a way of creating webpages focusing on microcontent and social connections between people. It also exemplifies that digital content can be copied, moved, altered, remixed, and linked, based on the needs, interests, and abilities of users—quite against the grain of both traditional and recently expanded copyright (Alexander, 2008, p.151).

There are many creative Web 2.0 applications, tools, and services available online (See Appendix A for a list of digital resources and links). These tools or web-based learning objects have the potential to engage and involve the learner with technology as opposed to having a student learn from a computer module or digital lecture. There are many Web 2.0 tools that can be found at different sites on the web. For the purpose of this chapter, we will discuss blogs, wikis, widgets, nings, plugins, social networking (MySpace and Facebook), and virtual environments (Second Life). What issues will Web 2.0 solve? What are the potential learning outcomes from using Web 2.0? It is the promises of positive educational outcomes that web-based tools can potentially produce through quality interaction at a meta-level that are intriguing many educators and trainers.

This chapter has implications for instructors, students, instructional designers, and administrators involved with e-learning in higher education. This chapter also provides a synthesis of e-learning issues and an overview of Web 2.0 tools for promoting a constructivist environment.

The 5th edition of *The Principles of Instructional Design* (Gagne, Wager, Golas, Keller, 2005), states a very important instructional design question which is often overlooked. The question is “For what problem is instruction the solution?”(p.23). This question is especially relevant considering the numerous challenges and

limitless potential of Web 2.0 tools. By using Web 2.0 tools the theory of constructivism can be applied to reach new levels of digital creation and e-learning.

Constructivism is the process of linking new understanding to old, modifying and enriching existing knowledge, and enhancing depth of comprehension about a topic. McFedries refers to Web 2.0 as functioning as a platform (p.68) because of the ability to delete, edit, and add content and work collaboratively with others in a synchronous approach.

“Constructivism affords a knowledge building process that engages active learners with the physical and social world” (Twomey-Fosnot, 1996, p.30). These interactive online tools include portals, blogs and video blogs, widgets, plugins, wikis, conferencing, games, survey instruments and games. Using these Web 2.0 tools in an educational setting builds on Vygotsky’s (1978) view of interactive learning within the zone of proximal development (ZPD) and how the social process is crucial to the development of thought and behavior patterns. The application and integration of quality educational content is an important part of the constructivist framework. This is the adaptive function of constructivism alluded to by Von Glasersfeld (1996).

When interactive technology is applied in accordance with constructivist principles, it has been called “learning 2.0” (Brown & Adler, 2008). Learning 2.0 is about actively using technology. The multiliteracies of education (e.g., critical thinking, creating content, collaboration) are fostered due to the constructivist nature and exchange of knowledge that is part of the Web 2.0 phenomenon (Alexander, 2008). Learners taking the initiative to create content and learning by being engaged and involved is at the heart of constructivist practice. Brown and Adler (2008) acknowledge the impact of Web 2.0 and how it can add a new dimension to communication and participation:

The latest evolution of the Internet, the so-called Web 2.0, has blurred the line between producers and consumers of content and has shifted attention from access to information toward access to other people. New kinds of online resources—such as social networking sites, blogs, wikis, and virtual communities—have allowed people with common interests to meet, share ideas, and collaborate in innovative ways. Indeed, the Web 2.0 is creating a new kind of participatory medium that is ideal for supporting multiple modes of learning. (p.18)

THE USE OF WEB 2.0 APPLICATIONS TO PROMOTE CONSTRUCTIVIST LEARNING

This section will consider the benefits of constructivism and match them with the characteristics of a few of Web 2.0 applications. Constructivism, as a learning theory, provides an appropriate fit for the use of Web 2.0 applications. Constructivism as a learning framework can be served immensely by using the tools and affordances (Jonassen, 1999) presented by the Web 2.0 applications. Constructivism suggests that learners can enjoy their experience by being more involved in their learning than by being listeners (Franklin, 2000; Ge & Tok, 2003). The idleness or boredom aspects of passive listening prevent learners from realizing the potential of the subject matter being discussed. However, by engaging in relevant learning activities, the learner will have the opportunity to apply the concept learned. Web 2.0 applications can be very engaging for different reasons: the novelty of the technologies, the aesthetic appeal, and their interactive modes.

Web 2.0 applications present many affordances for constructivist learning. Some of these applications include social networking, blogs, podcasting, media sharing, and virtual worlds. The common trait of these applications is shareability. These applications and similar others allow for global interaction where participants contribute and use

others' contributions. The contribution can be as simple as a few paragraphs posted to a blog or as complex as creating avatars on a Second Life (SL) island. The main premise is that these applications represent great potential for learning. In this section, a sample of five Web 2.0 applications is used to illustrate the use of Web 2.0 applications as contexts for constructivist learning. This sample includes social networking and bookmarking, blogs and wikis, podcasts, and media sharing, and virtual worlds

Blogs have been around for several years and we are seeing the impact of their use for positive learning outcomes. Basically, blogs are web-based journals that allow participants to contribute to or create discussion threads. The threads can discuss different subjects separately or concurrently. There are possibly millions of blogs on the web whose subjects include religion, politics, medicine, and car repairs in addition to others. Blogs are characterized by their asynchronous nature and ease of use. However, they also provide opportunities for audio and video files. Blogs can be used for constructivist learning in many ways. First, a blog can serve as an individual learning journal. A learner may start a blog to keep inventory of his/her learning. This inventory will help learners build from one phase of their learning to another. By doing so, learners use previous knowledge to generate new insight. Another example of a blog being used for educational purposes is a class group project. Learners can be engaged with discussion topics and debates in a flexible learning space that allows for the incorporation of videos, graphics, and audio and the enhanced creativity. Blogs are user-generated web-based journals that offer opinions and information and that may include text, images, and links to other blogs and web pages. Some blogs are confined to personal expressions, but others make provision for reactions and comments from readers. In higher education, blogs have been used as a means by which students can collaborate asynchronously. A blog can also serve as a group

knowledge builder. A group of learners can join forces in order to complete tasks or projects. Each user is usually assigned a section of the task to complete and contribute to the blog. Through this collaboration, useful content is usually produced as a solution for the task or project. The produced content is presented as the fruition of the learning experience. By collaborating with others, a learner can benefit by adding to his/her knowledge through the different members' contributions.

A wiki is a collaborative website that allows visitors to add, remove, edit, and change content, typically without the need for registration. It also allows for linking among any number of pages. This ease of interaction and operation makes a wiki an effective tool for mass collaborative authoring. (e.g., Wikipedia.org). Similar to blogs in many aspects, Wikis can serve numerous constructivist learning opportunities such as content production. Wikis are made of many web pages that allow contributors to add and modify content, theirs and others'. The modification opportunities make it possible for all wiki members to share their knowledge in addition to assessing that of other members. By assuming the editor (modifier) role, a wiki contributor is improving his/her writing and critical thinking. Through this practice, new knowledge may be found and added to the learner's previous knowledge. The aggregation of faculty publications in a wiki is described by Conner (2007) as a means to socially construct an online library resource and promote research productivity.

An example of an educational wiki in higher education would be Ask Dr. Wiki (<http://www.askdrwiki.com/>). This is a medical wiki devoted to creating a free source of medical information. Individuals can publish clinical notes, pearls, X-ray images, angiograms and more on the site. Using this wiki, anyone with a medical background can contribute or edit medical articles.

Media Sharing and Construction

Podcasts and media sharing include video, audio, photos, slides, and others to present other constructivist learning opportunities through producing and sharing digital content. Media sharing is appealing because of its interactive and personal nature. The content can be audio or video files. The main premise here is that learners can generate new knowledge by creating these podcasts and learn from the creation process. Through podcasts, learners can share information and broadcast many useful materials. Learners, then, can use podcasts as tools to learn from and teach others and provide follow-up on previous discourse. Dearstyne (2007) notes the trends in collaboration such as the increase in blogs, mashups, and wikis. Mashups are websites, or other applications, that integrate and aggregate content from more than one source into an integrated application (e.g., combining data on a topic of interest with geographical data such as Google Maps).

Virtual worlds applications such Second Life are interactive environments where participants assume personalities (avatars) to interact with other individuals and objects such as rooms, documents, presentations, and videos. By interacting with the different objects, a learner will gain a bit of knowledge from each object and then connect these different bits from the different objects to form the new experience. Similarly, the virtual world setting provides group collaboration contexts, and consequently, opportunities for constructing content. The application of collaborative and social constructivist-oriented activities, such as virtual spaces and a "user-centric approach" that promotes higher level learning are described by Sommerville and Nino (2007). The social synchronicity achieved through these media allows distant learners to connect in real-time and promote connectedness and community.

The group experience and the community membership provide positive confines that embrace collaboration and individual creativity. While the participants are making products, they will have opportunities to acquire and gain feedback from other community members (Jonassen, 1999). That will provide the different participants with new skills and knowledge as benefits of the feedback. These applications present opportunities where a learner can physically actively engage through the human computer interface (HCI) technology, virtually, and mentally active. An example of how a learner can be physically engaged in a virtual environment (and arguably a web 3.0 phenomenon) is in the work of Mitch Kapor and Philippe Bossut (2008) who have developed a hands-free navigation device for SecondLife. A video of this prototype is available at: <http://www.youtube.com/watch?v=2t52gkAwJq8>

Consequently, by being mentally active, learners will expand their cognitive abilities to move beyond memorization. Within that practice, long-term critical thinking becomes the norm for these learners. Furthermore, as the learners' critical thinking evolves, a few positive habits such as planning and organization are gained. These habits become second nature for these learners in their potential careers. Web 2.0 activities are similar in those regard. For example, learners who use blogs to track their learning (writing) and to collaborate with others (building camaraderie) will develop better writing and interpersonal skills to help in their respective careers. The main point is that many of these learning experiences are transferrable, and can be potentially helpful in many different contexts.

Perhaps the most important aspect of constructivism is that learners are charged with their learning. That charge will breed a sense of ownership and accordingly, learners become more interested in the process. Similarly, Web 2.0 applications encourage all participants to create their own work that can be seen by millions around the world and have the potential for cross-hemispheric

collaboration. Because they own that work and the fact that it is in the public spotlight, those participants become more motivated to do work of high quality. There is an interesting dynamic and digital responsibility that is inherent to content creation on the web. The participants will seek and explore new venues and resources from which to learn to make better products. These results contribute to personal involvement. Furthermore, the experience will generate a long-term memory of the new knowledge and skills that are gained (Doolittle, 1999).

Another significant aspect which relates Web 2.0 applications to constructivist settings is that designing and implementing authentic activities to which the learners can relate can be a great motivation for the learner to participate (Zaulkernan, 2006). That authenticity can pique the learners' interest and curiosity. For example, the use of podcasting and vodcasting (video casting) by music students enhances the learning experience and enables the transmission of content to mobile devices (m-Learning) such as iPods and cell phones.

How will a facilitator use the different Web 2.0 applications as contexts for constructivist learning experiences? This question should be considered in relation to learning objectives, activities, and outcomes.

Implementing Web 2.0 technologies, while establishing learning objectives, is the beginning in creating a constructivist approach to learning. To accommodate for the potentially different levels of motor skills among the learner, the facilitator must include learning the technology as one of the learning objectives of the learning experience. By doing so, the learner will understand the importance of these technologies for completing their tasks. For example, a facilitator may create a list of learning objective as shown below in Table 1 to promote Learning 2.0.

Accordingly, the activities in the same learning experience should be planned to help the participants use the respective Web 2.0 tech-

Table 1. An example of implementing Web 2.0

<i>The learners will be able to</i>	
1.	<i>Identify what a learning strategy is.</i>
2.	<i>Explain what a lesson plan is.</i>
3.	<i>Create a lesson plan.</i>
4.	<i>Explain what a blog is.</i>
5.	<i>Use a blog to post his/her lesson plan.</i>
6.	<i>Provide and receive feedback.</i>

nologies while completing their tasks toward achieving the learning outcomes. In order to apply an activity to achieve Learning Objective 5, a facilitator may require the learners to find a blog and monitor the interaction or to set up an RSS feed to manage the flow of created content. Furthermore, the learners are asked to explore how to participate in the respective blogs they found. Since participation is multi-layered the teacher could also encourage the participants to use other Web 2.0 technologies on the blog such as widgets or avatar creation (meez.com). Assessments of the participating learners should include measure to assess whether they learned and used the respective Web 2.0 technologies. Using survey instruments such as Zoomerang or SurveyMonkey can provide feedback to faculty about the level of learning.

WHY ADOPT WEB 2.0 TOOLS?

There are numerous benefits of using Web 2.0 tools: access to social networking tools, knowledge sharing, digital publishing, and cost effectiveness, are just a few. *Computerworld* magazine (2008) reports that Web 2.0 tools such as wikis, blogs, and social networks are being used by many corporations (e.g., Intel Corporation) to solve complex problems, to promote training, and to build an online community. Higher education is also using these emerging tools in creative ways to promote a higher quality of interactivity and

collaboration among learners. Palloff and Pratt (2005) discuss the idea that teaching and learning involve more than taking old teaching models of lecture and transferring them to a different medium. They describe an engaged learner who collects, create, and recreates knowledge. The definition of dialogue is enhanced to included Web 2.0 tools such as blogs, synchronous audio and video conferencing. Social constructivist theory emphasizes the negotiation of meaning and construction of shared understandings through dialogue (Jonassen, Davidson, Collins, Campbell, & Haag, 1995; Bonk & Kim, 1998).

There are numerous issues with the quality of online or blended learning courses, including how course objectives are accomplished, and the levels of interaction with content, peers and the instructor (Legon, 2007). *Can Web 2.0 tools increase the Zone of Proximal Development (ZPD)?* Research centered on making the transition to the Web 2.0 world and the use of podcasting audio technologies to promote collaborative learning uncovered some interesting findings. Lee, McLoughlin and Chan (2008) found that students were empowered by the creation of rich content, as was evident in their own reflections and analysis of constructivist thought. However, Sandars and Schroter (2007) surveyed 3000 medical students and found that while there was a high familiarity and interest with a wide variety of Web 2.0 technologies, there was hesitancy in how to use these technologies. The authors conclude that there needs to be additional training in the instructional approaches for

achieving desired educational outcomes through the power of technology.

The increase of online interactivity through these tools offers solutions to communicating ideas collaboratively not only effectively and efficiently, but also with a high degree of creativity. Interactivity is complex and important to the learning process. There is interactivity between the learner and the teacher, the learner and peers, and the learner and the technology. Woo and Reeves (2007) deconstruct the notion of interaction in online learning through the social constructivist lens and show how it can promote meaningful learning. They conclude:

The bottom line is that to increase the learning effects of online interaction, we should, first of all, understand clearly the nature of interaction within the framework of social constructivist learning theory. Once we gain such an in-depth understanding, we should be able to engage in productive research and development to identify the necessary design principles for implementing more effective interaction activities within web-based learning environments. (p.23)

Likewise, according to Jonassen (1995), constructivists use technologies for purposes that are (1) applied to real-world situations, (2) problems and constructs, and (3) authentic and appropriate social context. There are numerous benefits to integrating the Web 2.0 tools as learners are empowered through the creation of content and the many forms of communication. What are some of these Web 2.0 tools and how are they being used in higher education?

WEB 2.0 AND HIGHER EDUCATION

Thompson (2007) reasoned that "Today's institutions of higher education (IHEs) need to consider how they can move from being Education 1.0 institutions because their competitors are revis-

ing how they provide services and coursework using Web 2.0 applications" (p.40). However, Eijkman (2008) believes that "... the effective educational use of Web 2.0 will in due time lead to a radical reframing of our educational thinking and practices and a redesign of digital learning spaces around interdependent acculturation..." (p. 102). From the standpoint of the learner, Karpinski (2008) found that a majority of learners surveyed were unfamiliar with Web 2.0 resources. While students may be familiar with the Web 2.0 tools there was hesitancy on their part to adopt them because of (1) difficulty of use (2) skepticism about the quality of content, and (3) the lack of perceived need. Clearly there needs to be more of an acculturation of Web 2.0 tools so that current and future educators can be more confident in effectively using them in their practice. In some cases there will be a need for an epistemic instructional transformation for faculty who are in various stages of adopting new technologies.

Campus Technology magazine published an article in April 2008 about creative ways that college instructors have integrated these tools into their practice. Examples include the use of a wiki that allows students to submit exam questions for consideration. A portal is a system that has many functions including serving as an online community and a means to catalog or organize different digital creations and provide them to members in an effective manner.

Alexander (2006) describes Web 2.0 tools and how this "heterogeneous mix of relatively familiar and emergent technologies" (p.33) is used in a social networking context. Another similar example is the University of Alaska Anchorage's Web 2.0 wiki which not only defines what a Web 2.0 tool is but how this online learning instrument can be used in an educational setting. Graduate students enrolled in an instructional design course collaborated to create the content on the wiki. Each learner was given editor status so that they could post their content defining and describing the technology but also sharing their creativity

by sharing how they used the tool for a positive learning outcome.

In addition to the most popular (blogs and wikis), other Web 2.0 tools include social bookmarking (de.li.ci.ous), collaborative webpage design (jot.com), and (Gnosh.org). Wix.com is a free online tool that helps the web designer with the development of a Flash interface website. This intuitive tool offers “what you see is what you get” (WYSIWYG) design that is dynamic and fluid.

Conferencing software is a tool that allows for the synchronous sharing of ideas. Commercial products include HorizonLive, Elluminate, and Adobe Breeze. WiziQ is a free online conferencing software which provides the interactivity of a whiteboard, webcam, direct messaging, and more, (<http://wiziq.com>). Understandably, Alexander concludes: “Meanwhile, academic implementations are bubbling” (2006, p.44) with the advent of Web 2.0.

While there have been studies on interactivity and collaborative learning through community building (e.g. Davies, Ramsay, Linfield, & Couperthwaite, 2005; Palloff & Pratt, 2005; Sherry, 2000), Hung (2001) contends there still remains much research on *how* the social interactions that are an inherent Web 2.0 component support the Vygotskian claim that cognition begins at the social level. What does this mean in terms of utilizing Web 2.0 technologies for facilitation of Learning 2.0? What is the educational utility of the Web 2.0 tools?

THE OPPORTUNITIES OF WEB 2.0

The purpose of this section is to convey how Web 2.0 applications represent and provide opportunities for constructivist learning. The capacity to apply and construct new knowledge, to encourage critical thinking, promote collaboration, and to use guided scaffolding to support higher level thinking and learning is at the very center of

the constructivist paradigm. It has been argued that higher education needs to move “beyond the individual mind to include learning that is built up by mediated conversations among members of peer groups, local learning communities, and broader cultural systems” (Sherry, 2000, p. 21). Conrad and Donaldson (2004) also take this point of view: “Engaged learning stimulates learners to actively participate in the learning situation, and thus gain the most knowledge from being a member of an online learning community” (p.7). Lave and Wenger (1991) state: “A learning curriculum is not something that can be considered in isolation, manipulated in arbitrary didactic terms, or analyzed apart from the social relations that shape legitimate peripheral participation” (p. 97). But what is meant by “actively participate” and which technologies and approaches support positive learning experiences and promote quality interaction or legitimate peripheral participation?

Social Networking

Social networking Sites (SNS) applications allow participants to belong to “friends” communities where individuals are invited to be friends. Two well-known applications are MySpace and Facebook. On the other hand, social bookmarking applications are used to help users organize information by saving different web sites in one location because the user deems these web sites important for learning and research. Tufekci (2008) did a study on social networking sites (SNS) by college students and draws an important distinction between the “expressive Internet” with an emphasis on the social interactions and networking and the “instrumental” Internet that focuses on e-commerce and news. Users of SNS are also much more frequent users of the expressive Internet.

Global access and democracy can easily intertwine to create new possibilities. For example, what if classrooms in Tasmania were paired with

their counterparts in Alaska to study polar science from an Antarctic and Arctic perspective? The learners could collaborate to write and illustrate a report that could involve topics such as global warming, environmental, or ecological science. The learners could communicate through web-based synchronous and asynchronous mediums.

The Internet has made digital space and the ZPD much larger and the world much smaller. Two video game players can enjoy the same game via separate individual web access points without regard to their location or time zone; that is the larger space. These games can be embedded within a blog, webpage, or wikis (See, for example, <http://onlinegames.net> for the extractable and embeddable code). With the possibility that one of these players may be in the USA and other may be in China, the world reach becomes smaller. The world of Web 2.0 applications such as MySpace (<http://www.myspace.com/>) and FaceBook is also small; through them, a person may have hundreds, if not thousands, of friends around the world. These and similar social networking applications make global interaction and cross-hemispheric collaboration easier and provide settings for global communities.

Another example of a Web 2.0 tool that promotes interactivity and community is the Ning. A Ning aggregates Web 2.0 tools such as a webpage discussion forum, file sharing, within its multi-functional framework. While MySpace and Facebook have been used for several years, a Ning allows the user to create their own network and not just be a participant in a network that has already been created. It is a means by which private or public groups with a shared interest can construct digital space and interact through a variety of mediums online. The Ning at <http://Classroom20.ning.com> is an example of constructed digital space for educators who can share how they are integrating technology into their practice. It is a dynamic community that is changing because of the content constructed by

participants. Nings have been created for a myriad of groups including those focused on action research, Scholarship of Teaching and Learning (SoTL), computer enthusiasts, history buffs, etc. It takes only a few minutes to construct a Ning and create a viable network that aggregates the virtual social presence of learners, their thoughts and discussions, and digital artifacts. The Ning has enormous potential for providing structured community and while it is in its early stages of development it has been widely adopted by higher education departments, workgroups, ESL classes, significant interest groups, and so on.

Web 2.0 tools support many forms of social networking and collaboration, including those which a more revolutionary sense of emancipatory Freirean education, such as Flash mobs, groups that get together physically to demonstrate or protest using digital technologies (e.g. LiveJournal.com). There are countless possibilities.

Widgets and Plugins

Other tools include widgets or interactive add-ons to supplement the learning experience. These widgets can be embedded into course blogs to achieve a variety of results. There are numerous widgets to help with the learning of language and testing of skills on a variety of topics, from tracking the financial markets, to creating artwork like Matisse. A good example of a widget used in education is to have it deliver course content that the students can embed in their individual web sites. Various widgets include embedded videos, photos, podcasts, maps, all aggregated on one page (pageflakes.com) (*The Chronicle of Higher Education*, 2008).

Web 2.0 tools may fill a specific need or address a certain problem, such as the management of the enormous amount of digital information. For example, a pragmatic plug-in tool for browsers is Real Simple Syndication (RSS). RSS feeds allow the user to aggregate various resources (e.g. blogs, wikis libraries, periodicals, websites) when

new content has been added. Another example is Zotero, a free plug-in for anyone who needs assistance when managing reference data from online database searches. It helps organize the citations of research articles and makes the writing experience flow easier because the knowledge can be arranged, classified, and shared. It also facilitates the importing and exporting of information. For example, you can capture citations from webpages, store documents, images, and other indexed citations from large databases. The user has the ability to co-create digital libraries and be notified via Really Simple Syndication (RSS) when a relevant research publication is tagged for retrieval from similar articles. Filters can also be set up for advanced searches. Users can also write annotations that will be saved with each reference.

FUTURE TRENDS

The question “What issues will Web 2.0 address?” was asked earlier in this chapter. The new approaches to learning with digital media have the potential to enhance the higher education learning experience. We are at the nexus of a historic transformation in how learning is shared, transmitted, collected, and constructed. The social web has seen a profound shift in higher education and the building of community through virtual social networking sites. As the facilitation of online learning evolves (artificial intelligence and non-human facilitation, web 3.0?) it becomes necessary to adopt Web 2.0 tools in the design of effective and efficient e-learning.

CONCLUSION

This chapter discussed the promise of using Web 2.0 technologies to extend the classroom. Some of the advantages associated with implementation of Web 2.0 were listed and discussed. The

potential for a revolution of learning that involves constructivism will inherently involve these tools. “Constructing an understanding requires that the students have opportunities to articulate their ideas, to test those ideas through experimentation and conversation, and to consider connections between the phenomena that they are examining and other aspects of their lives” (Julyan & Duckworth, 1996, p.58). We can use these Web 2.0 tools to transform our practice and enhance the reality of learning. The dialectic between the individual and society through the use of Web 2.0 tools is expanding dramatically as these new possibilities suggest that learning is a constructive building process of meaning-making. Faculty should adopt these constructivist tools or run the risk of “engage or enrage” (Prensky, 2005). Faculty cannot continue to teach as they were taught but rather they must employ the interactive Web 2.0 tools to engage learners. This is the power and promise of Web 2.0 tools.

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APPENDIX

Tool	Example	Link
Open Source Tools	Open Office Linux The Open Source Initiative Source Forge	http://Openoffice.org http://www.linux.org http://www.opensource.org/ http://sourceforge.net/
Open CourseWare	Massachusetts Institute of Tech (MIT) Carnegie-Melon University Utah State University	http://ocw.mit.edu http://www.cmu.edu/oli/ http://ocw.usu.edu/
Portals	Merlot (Multimedia Educational Resources for Learning and Online Teaching) UPortal	http://merlot.org http://www.uportal.org/
Collaborative design & Project Management	Jot Gnosh Project Zoho	http://jot.com http://gnosh.com http://projects.zoho.com/jsp/home.jsp
Survey Instruments	Zoomerang Survey Monkey	http://zoomerang.com http://surveymonkey.com
Video Blogs	Video Blogs	http://www.vblog.com/
Directory of Web 2.0 Tools	http://www.go2Web20.net/ Centre for Learning & Performance Technologies	http://www.allthingsWeb2.com/ http://c4lpt.co.uk/handbook/elearning20.html
Social Networks	Ning.com	http://education.ning.com http://www.classroom20.com/
Blogs	Blogger.com	http://asstechnology.blogspot.com
Wikis	PBwiki.com wikispaces.com	http://pbwiki.com http://wikispaces.com
Video Blogs	Vobbo	http://www.vobbo.com/
Webpage design	Weebly FreeWebs Google websites	http://Weebly.com http://webs.com http://sites.google.com/
Conferencing Software	HorizonLive Elluminate Live! Breeze, WiziQ;	http://Elluminate.com www.wimba.com http://www.adobe.com/resources/breeze/ http://www.wiziq.com
Social bookmarking	De.li.cious	http://delicious.com/
Widgets	Widget Box	http://www.widgetbox.com/tag/education http://pageflakes.com
Online Answers	One Big U	http://www.onebigu.com/user/homepage.php
Games	Online Games	http://onlinegames.net