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Next-Generation Teaching and Learning: Adopting and Adapting Web 2.0 to Pedagogy

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Abstract

Next-generation teaching and learning seeks to understand the student's experience of participation and collaboration in utilizing social media/Web 2.0 tools and incorporating these tools into a student-centered learning environment. This chapter will explore how the embedded principles of participation, collaboration, cooperation, and creativity inherent in social media/Web 2.0 tools can be applied to student-centered learning principles such as learner engagement, interaction in learning and learner ownership and management of learning. The discussion will detail how social media/Web 2.0 tools can be utilized to empower learners to contribute to the course material, formulate and express their own insights and opinions, construct their own understanding of material and connect concepts to personal experience on current events, and learn from one another in collaborative environments. In addition, the paper will discuss constructivism as a foundational perspective that supports the use of social media/Web 2.0 technology in the classroom.

Introduction

Almost thirty years ago Marshall McLuhan, a Canadian communication theorist, described how the world had been contracted into a village by electronic technology. In 1964 he wrote, "Today, after more than a century of electric technology, we have extended our central nervous system in a global embrace, abolishing both space and time as far as our planet is concerned" (1964, p. 3). In the 1960s the Internet as we currently know it was in its early stages of development. Originally called "ARPAnet," it was an experiment of the U.S. military to maintain communication systems in the event of a nuclear strike by developing a network of interconnected computers. A number of universities recognized the potential and power of networked computer systems and joined the experiment connecting their mainframe computers in order to enhance their research capabilities. In 1989, twenty-five years after McLuhan's vision of a global village, the Internet matured and evolved into the World Wide Web (WWW), a virtual world of interlinked documents and information accessible to anyone with a computer connection (Berners-Lee, 1989). In 1999, ten years after creating the WWW, Berners-Lee (2000) commented, "I have always imagined the information space as something to which everyone has immediate and intuitive access, and not just to browse, but to create" (p. 169). Today a simple click of a mouse button gains access to the WWW and a myriad of information pages, knowledge content, and knowledge experts.

With the advent of the twenty-first century, the discussion and debate about the affect of the digital age on education has evolved into a vision of twenty-first-century learning. Many educators imagined a learning environment that included virtual connections to other students and other teachers in other parts of the world. The formal structural hierarchy of the classroom wherein the teacher imparts knowledge and the student is the receptacle of that knowledge would be replaced by a global learning community with many teachers and multiple worldviews. Students and teachers would communicate and collaborate with peers and colleagues, interact with experts in their field, and participate in online courses from other institutions. Within the virtual world of the Internet, web applications would enable students and teachers to be actively engaged in real time, anytime and anyplace in a process of peer learning, exchanging ideas and creating new knowledge outside of the physical restraints of the classroom.

The WWW has made that vision a reality. The WWW, more commonly referred to as Web 2.0, is the current evolution of the Internet and consists of a variety of social media software tools that facilitate virtual interaction between individuals and allows information to be shared with other users having the same social media software. Kaplan and Haelein (2010) define social media as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content" (p. 61). Social media tools have created multi-user virtual environments where students and teachers can move beyond the static desktop computer interface to a virtual environment of blogs, wikis, personal learning networks (PLNs), and multimedia collaborations. Although social media tools are used primarily by the consumer to connect and establish personal relationships, the benefit of social media software tools to education promotes the creation of knowledge through collaboration with others. The most recent evolution of Web 2.0 to cloud computing has enabled access to information, resources, and databases unencumbered by wires and drives.

Many universities support twenty-first-century learning by providing open courseware collections that include audio and video lectures as well as access to their library collections. The Massachusetts Institute of Technology (MIT) was one of the first to offer open access to its online courses, setting an example and providing a model for open access education (http://ocw.mit.edu/index.htm). MIT's website receives two-million-plus visits from interested individuals, students, and educators from around the world. Cornell University offers a selection of its library collection on a free Internet archive. University of California, Berkeley, broadcasts on its own YouTube channel, and Apple provides many institutions with a platform for disseminating educational content via iTunes U. The recent emergence of the Massive Open Online Course (MOOC) allows any individual to take a lesson from the university of his or her choice, for free, with no limit on the number of students attending. Coursera.org offers MOOCs in partnership with universities to tens of thousands of students across the globe free of charge.

This chapter will describe the use of Web 2.0 social media software tools as an adjunct to enhancing instructional practice in the context of a constructivist paradigm. Web 2.0 social software tools employ web-based technologies to promote interaction between participants to not only contribute content but also interact with the content and create content. The chapter will explore how the embedded principles of participation, collaboration, cooperation, and creativity inherent in Web 2.0 social media tools can promote the active learning principles of engagement, interaction, and self-directed learning where students take ownership and management of their learning process (Mason & Rennie, 2008). In addition, the chapter will highlight the benefits of Web 2.0 social media tools in establishing a learning environment that empowers the social construction of knowledge within a student-centered learning environment. That is, how Web 2.0 social media tools can be utilized to empower learners to contribute to the course content, develop and communicate their own insights and opinions, integrate their own understanding of knowledge with their personal experiences, and learn from others' through collaboration. Although the use of social media tools continues to gain acceptance with educators and educational institutions, there are existing barriers that inhibit institutions and educators from incorporating social media into their curriculum, as well as issues of privacy and security that need to be solved.

Web 2.0

The World Wide Web (WWW) was created by Berners-Lee in 1989 and has evolved from a virtual environment that allows users to not just read but also interact, collaborate, and create knowledge that can be published on the WWW. At its inception, the WWW, commonly referred to as Web 1.0, was read-only. It was composed of static web pages that were portals to information posted and controlled by the site owner, the webmaster. There was no interaction with the user or between users and no exchange of information or communication. Technological advances allowed users to interact with each other and contribute to the web using social media software tools. Users could now read, write, and publish to the web. This evolution of the Internet became commonly referred to as Web 2.0. Web 2.0 is often called the social web and has democratized learning and knowledge generation by providing social media software tools that connect people to content and individuals to other individuals who collaborate in the creation of new content.

The term "Web 2.0" is attributed to being introduced by O'Reilly Media in 2003 (O'Reilly, 2005), and refers to the second-generation evolution of the WWW that allows for web-based interactions, applications, and communities. O'Reilly (2005) defined Web 2.0 as "a set of economic, social, and technology trends that collectively form the basis for the next generation of the Internet—a more mature, distinctive medium characterized by user participation, openness, and network effects" (p. 4). Gillmor (2004) described Web 2.0 as the "read/write Web." What were originally static web pages became interactive, and users began to access information using social media to remix content in unique and different ways. The WWW had evolved to become virtual communities promoting social and idea networking. The evolution of the WWW into Web 2.0 is more than a reiteration of Web 1.0 with refinements to its existing programming; it is an evolution of thinking that has created a new perspective on how software can facilitate social interaction and the generation of knowledge. The term "social media" is often used interchangeably with Web 2.0 and refers to social software tools that enable users to interact in virtual relationships and to create user-generated content (Cormode & Krishnamurthy, 2008). Social media includes global social network sites such as Facebook, videosharing sites such as YouTube, image-sharing sites such as Flickr, blogs such as Tumblr and WordPress, including the micro-blog Twitter, and social bookmarking sites that curate information and research sources such as Delicious, Evernote, and Pinterest.

Students in the twenty-first century have access to the sum total of human knowledge by accessing Web 2.0. They use social media software to make meaning of this myriad flow of information to create idea networks, exchange their views on content, create new content, and collaborate with others outside of the classroom. In the United States two-thirds (66 percent) of online adults and three-quarters (73 percent) of online teenagers (ages 12–17) use social media (Lenhart, Purcell, Smith, & Zickuhr, 2010).

Net Generation Learners

Net generation learners were born after 1982 during the advent of the personal computer (PC) and many are either in colleges and universities or are entering colleges and universities. Many are beginning their careers as educators in schools, colleges, and universities. They have coexisted with the virtual world of the Internet and have incorporated the Internet into each of their developmental stages and across their educational milestones. They are actively engaged in using Web 2.0 and social media applications to communicate and network to build relationships. Many have grown up with the WWW in their grade school and high school classrooms, and they are accustomed to accessing the Internet to enhance their learning during class and in completing homework assignments. This generation has never known life without the Internet, and they employ technology as a tool to engage in purposeful activity to gain instantaneous access to information and people. Their primary source of information about the world they experience is web-based content.

They are typically early adopters of the latest emerging technologies and are seen as using the technology in innovative ways to share their lived experience with their peers. Educators experience this generation as being focused on grades and performance and actively involved in extracurricular activities and social issues. As a generation they tend to identify with parent values and have a close ongoing relationship with their parents, often remaining at home longer than their parent's generation (Howe & Strauss, 2000).

What differentiates the Net Generation from earlier generations is their tendency to prefer hands-on experiential learning. Marc Prensky (2001) describes this generation of students as digital natives: "our students today are all native speakers of the digital language of computers, video games and the Internet" (p. 1). It is this experience of being born into the digital age that leads educators to believe, and to have had the experience, that the Net Generation conceptualize and integrate information differently from previous generations of learners. They access information quickly, remixing images, music, text, and video from multiple sources simultaneously and disseminating this information across multiple media platforms ranging from instant messages to videos on YouTube, podcasts, blogs, and personal updates on Facebook. They expect on-demand access to information and are in constant digital communication with their peer group to share the creation of their own content and their life activities. This technological competence enhances their personal lived experience and is grounded in social network relationships and entertainment. For many this competence with technology does not automatically translate to critical thinking, critical reflection, and problem solving in a learning environment.

An American study on teen content creators and consumers (Lenhard & Madden, 2005) reported that 57 percent of online teens create content and publish it on the WWW using one or more applications of social media. That is equal to half of all teens, ages 12–17, or about twelve million ado-lescents. Their activity on the Internet ranges from publishing their lived experience and worldview on a personal blog to creating web pages, and sharing and remixing original content in a combination of photos, stories, and/or videos online.

Their technological expertise and familiarity with the Internet do not guarantee that they can navigate the Internet to access knowledge resources to self-direct their learning. Educators should not adopt a default assumption that the Net Generation is hardwired to take responsibility for their own learning by using the Internet to enhance their existing learning environments. They may have grown up in a digital era and demonstrate technological competence, but they still require critical reflective thinking skills to discern what information out of the vast amounts of knowledge available on the Internet to integrate into their intellectual growth and development. It would be false to expect that this generation of digital natives requires or expects that their learning is dependent on technology. Hartman, Moskal, and Dziuban (2005) report that as an outcome of their research, students see technology as a means to an end; their expectation is to be involved with teachers and fellow students, overriding a desire to use technology.

A student technology survey by Oblinger and Oblinger (2005) revealed that the majority of students preferred a moderate amount of technology in their classes. Students reported that they appreciate the convenience of having access to online syllabi, class readings, and online submission of assignments. In addition, the survey highlighted that students also want face-to-face interaction. This replicates the results of many distance education studies that show students often report that the learning experience is lacking when all course interactions are maintained only in the online environment. Wegerif (1998) and Rovai (2007)

have documented that learning increased when students in online courses were able to increase their interaction, communication, and community with other students.

Net Generation Learning

Net generation learning (NGL) is an evolving educational movement committed to transforming the student learning experience by providing a learning environment that enhances the ability of every student to reach his or her individual learning potential. The pedagogical foundation of NGL focuses on an active learning environment that incorporates the experimentation and exploration of concepts and problems where the teacher is no longer central to the transmission of knowledge. Students are provided personalized instruction based on need, skill, and interest and are encouraged to utilize Web 2.0 and social media technology to engage each other in the process of collaboration and problem solving.

The purpose of employing technology in the classroom is as an adjunct to increase participation in learning, to increase contribution to learning, and to bring real-world experiences into the student learning experience. Net generation teaching and learning accepts the student experience of participation and collaboration in utilizing Web 2.0 tools and understands the benefits of incorporating these tools into a student-centered learning environment where students are empowered to take responsibility for their own learning.

Research in Education

Research in education reform has revealed a move from teacher-centered and didactic learning environments to an adoption of student-centered and constructivist methods (Aldridge, Fraser, Taylor, & Chen, 2000; Healey & Jenkins, 2000; Kolb & Kolb, 2005; Lee, 2007). Constructivism has its origins in the cognitive theories of Piaget (1926), who developed the concepts of active learning, schemes, assimilation, and accommodation, and Vygotsky (1978), who developed the concepts of social constructivism, group work, and apprenticeship. The basic premise of constructivist theory is that individuals create their own meaning through experience. The shift from an objectivist to a constructivist approach to learning and teaching is premised on the notion that "people learn best through personally meaningful experiences that enable them to connect new knowledge to what they already believe or understand" (Killen, 2007, p. 2). Education from a constructivist view focuses on learning as a "process," rather than on an objectivist view that concentrates on outcome. From a constructivist perspective, students are encouraged to learn the main ideas on their own through discovery of other viewpoints, critical thinking, and reflective discourse that emphasizes conceptual understanding rather than rote learning.

Constructivism (Piaget, 1926) is rooted in the belief that learning and knowledge occurs through mental construction and through fitting new experience and ideas into existing knowledge. Piaget (1971, 1973) emphasized the role of a learner's interaction with the environment and surrounding as critical to his or her understanding of the world and cognitive capacity. Meaningful learning is considered to occur through the construction of knowledge rather than passive receipt. Vygotsky (1978) acknowledges that knowledge is personally constructed; however, he also acknowledged that the cultural experiences and social interactions are necessary in forming an individual's construction of meaning. Glasersfeld (1995), a proponent of radical constructivism, defines knowledge construction as an adaptive activity requiring interaction with experience. Therefore, knowledge is not passively received but rather developed actively by the individual, "as our thinking, conceptualising, and our language are developed from and in the domain of our experience, we have no way of incorporating anything that lies beyond this domain" (p. 11).

More recent adaptations of constructivism further emphasize the social process of learning, and claim that learning is more effective when it occurs through interpersonal channels and in cooperative environments. Learning is believed to be collaborative, cooperative, and conversational, providing students with opportunities to interact with each other and to clarify and share ideas, to seek assistance, to negotiate problems and to discuss solutions. Taylor (1998) views constructivism within a social and cultural environment, but adds a critical dimension aimed at reforming these environments in order to improve the success of constructivism applied as a referent. McLoughlin and Lee (2007) stated that, "effective learning is conversational in nature, and that it necessitates a social dimension, including communication, dialogue and shared activity" (p. 671). Similarly,

Higgs and McCarthy (2005) claim that we learn the most through social and communal activities and that meaning is shaped and knowledge is constructed through interaction with peers and reflection. Constructivist pedagogy requires learners to construct their own meaning, and thus understanding, through problem solving.

Windschitl (1998) states that "constructivism in practice involves phenomena distributed across multiple contexts of teaching" (p. 132). Consistent to each school of constructivism is the premise that learning is an active and social experience in which learners are engaged in active dialogue with their classmates and their teachers. The goal is to establish and participate in interactive learning communities where teachers and students collaborate to solve real-world problems (Educational Broadcasting Corporation, 2004; Kearsley, 2009). Social constructivism emphasizes the importance of the learner being actively involved in the learning process, unlike other educational viewpoints where the responsibility rests with the teacher to deliver knowledge while the learner passively receives it.

Dalsgaard (2006) argues that social media software tools can support a social constructivist approach to learning by providing students with personal tools and engaging them in social networks, thus allowing learners to direct their own problem-solving process. Social media software allows students to have direct access to others' worldview, many teachers and peers in a collaborative, cooperative, and participatory experience of discovery, and development of new knowledge. Social networking sites and social media tools complement the constructivist paradigm of learning in that students are engaged through personal meaningful experiences that enable them to connect newly acquired knowledge to what they already know, believe, and understand. Web 2.0 and social media tools have promise and potential to enhance the social process of learning by utilizing cooperative, collaborative, and conversational learning.

Web 2.0 in the Classroom

Bennet et al. (2007) in a systematic review of the literature discusses the use of social media in education as a paradigm shift. The use of social media in the classroom or the incorporation of social media into one's teaching practice changes and challenges the traditional teacher-centered didactic paradigm and promotes a student-centered paradigm. Many teachers blog about their experience in incorporating Web 2.0 technology and social media tools to support teaching and learning in the classroom. They are advocates of the demonstrated potential of social media to transform the practice of teaching. This anecdotal support for the use of social media has provided numerous examples of how social media has been utilized in the classroom and the influence that social media has had on their learning environment. However, there is little research evidence about how effective social media tools are influencing education outcomes. Those who are using social media in their teaching are excited about the results. They write about increased student engagement and participation and that social media tools encourage learning communities where students and teachers learn from each other.

In a two-year investigation into the ways in which Web 2.0 technology and social media tools are being used to support teaching and learning in the classroom, Light and Polin (2010) reported that overall social media tools "show potential to transform many aspects of teaching when teachers are thoughtful about how they use the tools and they are blended with careful instructional design" (p. 3). They describe the current practice of what they refer to as "Web 2.0 teachers." They discovered that these teachers are using "the networked nature and ease of Web 2.0 to create virtual extensions of their classrooms and that the Web 2.0 tools that teachers are selecting are very easy to use, and this ease of use appears to be a key factor in the decision to use any individual tool" (p. 3). In addition, they report that "educators are using Web 2.0 tools to promote new avenues of communication among teachers, students, and the community in ways that can strengthen the community of learners" (p. 3). They note that "as the networked nature of Web 2.0 begins to blur our traditional boundaries between school/home, public/private or youth/adult culture, it presents an emerging challenge" (p. 3).

Web 2.0 is an integral part of the majority of individuals' lived experience in how they access information, communicate, and connect to relationships in the twenty-first century. It would seem to be common sense to incorporate Web 2.0 technology into schools and classrooms to promote relationships and communication in the acquisition of knowledge. Brown, Collins, and Duguid (1989) provided an argument against the perception that knowledge is separate from the real world by researching how cognition occurs in everyday activities. They conclude that "knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used" (p. 1).

Social Media Software

Blogs. A weblog or blog can be described as an online journal with one or many contributors. Besides straight text and hyperlinks, many blogs incorporate other forms of media, such as images and video. A blog is an individual's (blogger's) public commentary on news or particular subject areas or social issues. Blogs allow an individual to express his or her personal opinion and worldview to the WWW community. Blogs are used for any number of purposes determined by the blogger, for example, as a learning journal for students to reflect on learning, as well as a vehicle for social commentary or to promote professional development by providing research information of a specific field or profession.

Watrall and Ellison (2006) conducted focus groups with students who used blogs as part of their course work; they found that students liked the fact that everyone had a voice, they could write more naturally, they valued reading the view of other students, and they appreciated gaining access to new material. Research in the application of blogs to courses reported that blogs increase collaboration (Curtis & Lawson, 2001), promote a sense of community (Palloff & Pratt, 1999), and facilitate higherorder thinking (Garrison, Anderson, & Archer, 2001), interaction (Rovai, 2007), and reflection of time on task (Meyer, 2003). Farmer, Yue, and Brooks (2008) conducted a case study of blogging in an undergraduate liberal arts course. While 96 percent of the students made at least one entry, half of the students made eleven or more entries. The importance of posting was confirmed for students when early posts garnered comments from others, which kept the conversation going. In some cases, an accomplished writer would offer an idea that would "take off and spread throughout the class as a self-generating discussion" (p. 22).

By developing a blog, students not only develop critical thinking and experiment with articulating their views and opinions, they take creative risks by incorporating the use of learned sophisticated language and design elements. Students acquire creative, critical, communicative, and collaborative skills promoted by managing a blog that is beneficial to them in both scholarly and professional contexts. Rovai and Barnum (2003) argued that increased and active interaction was a significant predictor of students' perception of learning, and interaction increased when the topics of the discussion were authentic and meaningful to the students (Rovai, 2007). Many schools are seeing the educational benefits of blogging. Teachers are mainly creating subject-specific blogs or blogs documenting a particular project. The aim is to use them to provide a more collaborative and interesting learning experience. In addition, blogging:

- Encourages higher-order skills such as reflection and analysis in addition to reading, writing, and collaboration;
- Promotes peer learning, peer assessment, and a sense of ownership, all of which are highly motivational;
- Involves easy-to-use technology;
- Supports video, audio, and other media and file types, creating a very dynamic learning experience and supporting various learning styles;
- Extends learning to outside of the school environment.

Social Bookmarking. Social bookmarking enables individuals to curate and contribute to a collective research and resource gathering process. As an educational tool, these links are then organized and stored for personal use, but also shared with the entire class, enabling a rich and dynamic student-generated resource library for the course (Rheingold, 2009). Social bookmarking sites such as Delicious allow users to upload their own favorite site bookmarks so that everybody else in the world can see and use those bookmarks.

Using a social bookmarking site instead of traditional bookmarking has a number of advantages:

- Bookmarks are available on any computer. Since bookmarks are stored to the web, they can be accessed and edited from anywhere.
- Social bookmarks can be searched; this helps to locate sites in large bookmark collections. Additionally, the entire network's bookmarks can be searched. Users can often find new resources from their peers.
- A note can be written for each social bookmark. This can help a user to remember what was important for a certain bookmark, especially for large websites or for specific purposes for saving a website.
- Users can share their research with the entire network.

Wikis. A wiki is a group of Web pages that allows multiple users to add content, similar to a discussion forum or blog, but also permits others to edit the content (Arreguin, 2004). What distinguishes wikis from other forms of social media is that there is no inherent structure; wiki pages can be interconnected and organized as determined by the users, and, unlike blogs, information is not presented by default in a reversechronological order. Wikis can also serve as platforms to collectively develop and track group projects and teamwork and is a web application designed to allow multiple authors to add, remove, and edit content (Cunningham & Leuf, 2001).

Raitman, Augar, and Zhou (2005) surveyed students in online courses that used wikis and found that 90 percent of those responding were satisfied and 10 percent were unsatisfied with the experience. Positive comments about the wikis were their convenience and accessibility anytime, their editing ability, which seemed to increase ownership over the final product, and their democratic nature, which built on opinions and research by many students.

In essence, wikis offer an online space for collaborative authorship and writing. They are available online for all web users or for members of specific communities, and they include version-control tools that allow authors to track the history of specific pages and the history of their personal contributions. A wiki also offers the ability to interact with an evolving document over time. It allows teachers and learners to see the evolution of a written task, and to continually comment on it, rather than offering comments only on the final draft. A wiki can be useful for tracking and streamlining group projects. Because students are responsible for the content they add to the wiki page, wikis can cultivate a greater sense of accountability and information-filtering skills.

YouTube. YouTube has become the second-largest search engine on the Internet and has become an enormously popular form of Web 2.0 new media. *Wired Magazine* cites an average of 65,000 uploads and a hundred million videos viewed per day on YouTube (Godwin-Jones, 2007).

Traditionally, video has been adopted by educators as a powerful educational and motivational tool. YouTube is increasingly being used by educators as a pedagogic resource to achieve curriculum outcome goals offering vignette videos on almost every subject category from science to art to language to mathematics. Khan Academy tutorial math videos hosted by YouTube have become a favorite of students and teachers as a resource and study guide.

Teachers and students alike find that video is an effective catalyst and facilitator for classroom discussions. Coupled with hands-on learning, a video-enhanced curriculum can be influential in expanding the learning experience.

Twitter. Twitter advertises itself as a service for friends, family, and coworkers to communicate and stay connected through the exchange of quick, frequent answers. It is digital communication that takes place in a network formed around a shared interest. It allows 140 characters to say what you want to say. Founded in 2006, Twitter is an information and social network with particular designed elements and user practices that distinguish it from other social media. These include its follower structure, link sharing, use of hashtags, and real-time searching (Johnson, 2009).

Twitter has been incorporated into the classroom of many educators who use it for an open discussion in class that can be continued out of class. It has been used to engage students in creating a community of learners. Many educators use Twitter to provide instant feedback to students on homework assignments, additional resources, and follow-up comments on classroom discussions.

Greenhow and Gleason (2012) present a number of ways in which Twitter can be used in support of higher education. They consider Twitter to be a mechanism to:

- Increase student motivation and engagement with course content. Students can be engaged in short-term activities that help keep them progressing toward small, manageable goals that are more tangible than long-term, abstract objectives.
- Increase student-to-student interactions, which can help to build and maintain a learning community whose influence can stretch beyond the confines of the classroom or even the duration of the course.
- Increase student-instructor interactions. Some teachers use Twitter to increase their availability and provide a quick and informal way for students to ask questions or stay linked in to the course content.

- Promote collaborative meaning-making process with each other and their teacher. Twitter allows information to be quickly shared, considered, and re-shared in a process that can rapidly lead to new insights and understandings.
- Allow students to develop twenty-first-century skills. The very act of engaging in digitally mediated communications helps to develop useful skills that will be needed in the work world. The collaboration and teamwork skills that Twitter can support are also valuable in a hyper-connected work world where much of the daily communication may happen virtually.

Provide a low barrier to publishing and self-expression. The informal writing necessitated by working within the constraints of Twitter helps to remove many of the barriers to contributing to academic discussions that may make many students feel excluded. This does not represent a dumbing down of the content, but rather a way to make students think efficiently and express themselves clearly while still feeling that they understand the requirements of participation in a conversation.

Encourage academic risk taking. The informal nature of the medium and the seemingly temporary nature of it encourages students to share freely and to express themselves more candidly than may happen in a face-to-face classroom environment where all eyes are on them should they choose to speak (Greenhow & Gleason, 2012).

Twitter has become for many educators a primary source of professional development where they join (follow) other educators in sharing resources, experiences, and ideas on teaching in the twenty-first century and the evolution of social media as a teaching tool.

Benefits to Web 2.0 to Learning

Students and educators now have equal access to a virtual learning environment where it is possible to search for, locate, and quickly access a myriad of information resources anytime in any place to address immediate real-time learning needs. Woolfolk and Margetts (2010) state that one of the primary goals of education is to provide students with the skills and knowledge to successfully participate in society. In the twenty-first century most jobs and the majority of organizations use social media. Therefore, many educators believe that it is their responsibility to integrate social media into their teaching practice in order to meet that goal.

Web 2.0 technology enables students and educators to collaborate and participate in a creative learning experience, constructing and generating knowledge personalized to their own unique learning style. Social media has the potential to transform learning and teaching processes by offering innovative ways to learn by supporting learner-centered approaches; group work and inquiry projects; interactive forms that lead to reflective, deeper, and participative learning; learning by doing; inquiry learning; problem solving; and creativity (European Commission, 2008).

It is believed that members of the Net Generation have experienced a change in cognitive processes and learning patterns due to having grown up in the digital age of information and communication technology and that their familiarity with social media and technological competence can be utilized in facilitating knowledge acquisition. Attwell (2007) notes that use of social media tools reflect current communication and working patterns in the world outside the classroom and therefore incorporating social media into the classroom is better fitted to preparing learners for the demands of society and equipping them with the necessary skills for a successful professional career. For the educator, social media enhances teaching style, offering a familiar way for students to engage in learning and with the educator facilitating the discovery of knowledge.

Advocates of incorporating social media into their teaching practice espouse a number of benefits to the process of learning and the acquisition of knowledge. For them, social media facilitates pedagogical innovation by enhancing traditional learning and teaching patterns and generating new and innovative ways of acquiring and managing knowledge. In addition, they utilize social media tools to recognize the diversity of users and to develop personalized educational experiences, offering opportunities for flexible, distributed learning, which could provide learners with more varied opportunities to engage with learning and develop their own creative skills (Rudd, Colligan, & Naik, 2006). Educators currently incorporating social media into the classroom curriculum employ it as vehicle to promote autonomous, independent, and self-directed learners and to facilitate the development of twenty-first-century skills that enable them to connect, interact, and collaborate successfully with a variety of people on different tasks and in diverse environments. Brock (2005) identifies a number of potential benefits for learners by incorporating social media into the learning process. He considers that social media:

- Promotes critical and analytical thinking;
- Promotes creative, intuitive, and associational thinking;
- Promotes analogical thinking;
- Has the potential for increasing access and exposure to quality information.

The decision of which tools should or shouldn't be used by learners and teachers should depend on the specific pedagogical needs of a teaching situation as determined by the teacher. Social media tools and Web 2.0 technologies are congruent with the understanding of learning as socially constructed, which has been a cornerstone of twenty-first-century pedagogical theory. Blogs, YouTube, and wikis provide a means to encourage and make visible the social construction of knowledge as defined by a constructivist theory.

Social media software tools promote twenty-first-century thinking about educational practice. In particular it provides learners with new opportunities to be self-directed in their learning and to engage in collaborative and cooperative research. Incorporating social media into teaching and learning can facilitate collaborative ways of working with peers, teachers, and expert in the field, which promotes the development of new knowledge. Social media can promote the development of the twentyfirst-century skills of collaboration, critical thinking, and digital citizenship, which equips students well for the world of work.

However, there is limited research evidence to confirm how widely online forums, wikis, blogs, podcasts, and so on are being used in virtual learning environments and if the use of social software increases learning outcomes. Cook, Holley, and Andrew (2007) describe one of the primary challenges to integrating social media into the classroom as one between welcoming a diversity of resources that the WWW has to offer while acknowledging the need to facilitate the students' ability to navigate the WWW using digital competence and critical thinking. Adopting social software tools in education as a default because students are already using it may abdicate responsibility of thoughtfully incorporating the tool into the curriculum to enhance classroom discourse and reflection and to engage students in the exploration of critical thinking. Incorporating social media only to digitize lectures, texts, and journals without the interaction of reflection and discourse fails to recognize the ability of students to learn how to harness the web as a tool as opposed to a toy.

Pedagogical Challenge

Why use social media software in education? One popular argument for the use of social media is that students have incorporated social software tools into every aspect of their lifestyles. It is for them integral to how they interact, communicate with each other, and participate in society. Incorporating Web 2.0 technology into education is congruent with a student-centered approach to learning. It allows students to communicate with other students, with experts in the field, and to expand their networks to include many worldviews. The Web 2.0 technology allows and encourages individuals to learn from each other while retaining individual control over their time, space, activity, and learning relationship.

There continues to be a significant debate over what constitutes the advantages and disadvantages of incorporating social software into mainstream education. The debate is fueled by the lack of reliable, original pedagogical research and evaluation evidence to support incorporating social media/Web 2.0 into the classroom. To date, much of the actual experimentation using technology within higher education has focused on particular specialist subject areas or research domains (Fountain, 2005).

Research on utilizing social media tools in education has emphasized that students will engage in the use of social media in the classroom in collaborative, inquiry-based learning environments with teachers who are willing to facilitate access to Web 2.0 to assist them in transforming knowledge and skills into product, solutions, and new information. However, some members of the teaching community have been hesitant to use social media tools in the classroom because it competes with their traditional educational paradigm that is more hierarchical and instructional and less student-centered (where students contribute to the educational experience and participate in peer-to-peer learning).

Despite the fact that the majority of higher educational institutions utilize Learning Management Systems (LMS) and the LMS offer social media tools in some capacity, the tools are underutilized by instructors. A study by Hanson and Robson (2004) demonstrated that 95 percent of LMS usage involved the minimal use of the available content management and communication tools. Educators posted the course syllabus, made announcements, and used assessments that are congruent with a teacher-centered paradigm and merely replicated the traditional course model online. The tools that encourage participation, collaboration, and a more student-centered paradigm such as wiki, blogs, and discussion boards/forums were not used to their potential.

Savery and Duffy (1995) state that learner motivation increases when responsibility for the solution of a given problem as well as the process of inquiry rests with the learner. Motivation also expands as student ownership for learning increases (Savery, 1998, 1999). An integral component in the design of student-centered learning is a declaration by learners of what they know combined with the recognition of that which they need to learn more about. Student-centered learning is collaborative learning wherein the learners accept responsibility for acquiring information and resources and bringing that back to the learning group to help inform the development of a solution to a problem.

The debate about the effectiveness of incorporating social media into the classroom learning environment needs to evolve from being critical of or advocating for to a more evidence-based discussion. Tools are understood only through their use and uses, rather than through some abstract conceptualization of their characteristics. This means that social media tools are best understood by evaluating what students learn through their use in education and whether there is a measurable influence on education outcomes. The challenge for educators in the twenty-first century is pedagogical change as their role evolves from one of delivering content to one of assisting students to discover content on their own.

Anecdotal evidence of an individual educators' experience of why incorporating technology into the classroom is an advantage or disadvantage is more often grounded in pedagogical bias rather than how the technology might advantage students. Embracing the benefits of incorporating technology into the classroom requires a pedagogical shift from an objectivist paradigm, where learning is external to human experience, to a constructivist paradigm, where learners construct their own reality and an individual's knowledge is a function of one's prior experience (Jonassen, 1991). The use of social media/Web 2.0 tools from a constructivist theory enhances instructional practice in which expertise is distributed, knowledge is shared, and work is collaborative. The learning process of making connections is constructive as opposed to instructive. The pedagogical challenge is not whether technology aligns with a constructivist paradigm and is not aligned with an objectivist paradigm; the challenge in teaching in the twenty-first century is understanding and meeting the needs of today's learners. Technology should always be at the service of pedagogy.

Conclusions

Prensky (2001) suggested that the Net Generation learners are digital natives taught by "digital immigrant instructors, who speak an outdated language" (p. 2). While this may have been the case a decade ago, as the Net Generation brought technology to school and teachers struggled to comprehend its place in the classroom, many educators have embraced the potential of Web 2.0 tools in engaging students and have become assimilated into the digital age. These educators fully comprehend that technology skills have become an essential component of student success and future employment. Net Generation teachers not only employ the use of technology to facilitate the learning process but also provide the learner with critical skills in collaboration and communication to be successful in acquiring the evolving occupations of the digital age.

The Internet has evolved into a participative medium from just a mere source of information. There is less of a divide between digital natives and digital immigrants as each has become a citizen of a community, the global village, where technology serves the purpose of providing access to the WWW and the ability to tailor information to meet one's specific needs.

The Net Generation demonstrates the technical competence to navigate the web to access specific information of personal interest and utilizes social media primarily for socializing and entertainment. However, educators experience that they lack the information technology literacy required to meet the needs of the twenty-first-century workforce and often struggle to transfer their technological competence into an academic setting that requires critical thinking and reflection on knowledge. As Lippincott (2006) notes, an emerging area of literacy is needed for students to increase their fluency with representing their knowledge in the digital world.

The reality is that the Net Generation are digital natives fluent in the language of technology and adaptable to the evolving technology of the digital world; however, teachers are no longer digital immigrants struggling to integrate into a digital culture. In a 2012 social media survey by Pearson Publishing on faculty use of social media, they revealed that most faculty use social media, the majority (64%) using it for personal reasons rather than professional or for teaching. Also, 44.7 percent of the faculty surveyed disclosed that they use social media professionally and 33.8 percent of faculty surveyed disclosed that they use social media in their teaching practice (Moran, Seaman, & Tinti-Kane, 2012). The advancing wave of new technologies and the gravitation to cloud computing challenges both twenty-first-century learners and teachers to find new ways of incorporating technology rather than employing new technology in old ways. Social media and Web 2.0 tools enable students and teachers to not only collaborate and cooperate but also navigate the classroom of the global village.

Net Generation teachers incorporate social media tools in a learning environment of exploration where students learn to use Web 2.0 technology to acquire the twenty-first-century skills of thinking critically about concepts and issues and understanding the process of inquiry and critical analysis in order to make meaning of the overwhelming amount of information through cooperation and collaboration in the creation of knowledge. Successful and effective use of social media in one's teaching practice is about the pedagogy, not the technology. The purpose is to incorporate social media tools in such a way that promotes engagement, participation in the learning process as well as collaboration in the building of new knowledge. The challenge is to facilitate innovative ways to stimulate students to learn, collaborate, and create, and not just adopt Web 2.0 technology as an electronic version of storing read-only content and maintaining traditional assumptions about learning and knowledge (Bryant, 2007).

Web 2.0 levels the playing field between the Net Generation and educators. Each has equal access to the WWW where they can collaborate, create, and share information. This virtual learning environment can be connected directly to the classroom to engage students and teachers in becoming interactive participants in building knowledge via blogs, wikis, social bookmarking, and social network sites. The social media tools are intrinsically user-centered interactive and participatory and therefore congruent with a student-centered teaching and learning environment.

Despite being a decade into the twenty-first century, there is minimal empirical research on the effectiveness of social media in learning compared to the growing anecdotal evidence that social media is a benefit to the learning process in that it promotes engagement, participation, and collaboration. Adopting social media in the classroom because of one's own comfort and familiarity for personal use or taking a default position that the students are already using it, so there is no choice, ignores the barriers to effective use of social media in education. Careful analyses of the use of social media and its effect on learners involves considering the following barriers and seeking solutions (Wood, Mueller, Willoughby, Specht, & Deyoung, 2005):

- Concerns about the integrity of online student submissions
- Concerns about privacy
- Lack of integration with learning management systems
- Takes too much time to learn or use
- Lack of support at institution

In addition, there are a number of potential consequences in digitally engaging students or implementing new curriculum that requires students to participate in online activities. Not only is there a need for continued research into the benefits of social media to learning, educators and education administrators need to create appropriate technology policies and curriculum that evolves with legislation, privacy, and appropriate online conduct.

Educators need to participate in ongoing professional development on privacy and security as much as they participate in professional development on the innovative uses of social media to enhance learning. Finding solutions to the barriers will require continued research into the effectiveness of social media in improving the actual outcomes of education.

Although the debate over the place of social media in education needs to continue in order to fully comprehend the potential and effectiveness of social media in education, there is a consensus in education. The Internet will continue to evolve, and the WWW will continue to mature, changing and enhancing the way society interacts and communicates. John Culkin (1967) summed up Marshall McLuhan's position on the influence of technology on society with the quote: "we shape our tools and therefore they shape us" (p. 3).

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