

Web 2.0 Tools in an Educational Setting:

A Literature Review

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Since the development of the Internet in 1989, the role of the Web in our society has vastly changed. In the early 1990s, Internet users were generally looking to consume online content, but in the past decade, Internet users have instead become *creators* of online content. This has become known as the Read/Write Web. Anyone with Internet access now has the ability to become an author, editor, contributor, or publisher. This shift in Internet use has not only led to technological changes, but it has also continued to move our society towards an ever-changing, digital culture. Communication and collaboration with peers and colleagues near and far has become the everyday norm through the use of the Internet.

Considering the rapid and immense changes that the Internet has made since its development, it is time to analyze our educational settings and determine how the teaching and learning process is reflecting these changes. It is important that engaged learning through technology use, specifically the use of the Internet and the Read/Write Web, becomes a reality in our classrooms. It is easy to see that technology integration will continue to grow as an overwhelming force in our society and workplace. To be successful in the 21st century, students will need to become adults who are critical, technological thinkers. It is the job of the current educators to prepare the students and learners for what is to come. To be an effective and authentic educator, it is crucial to make learning experiences based on the real world. The real world is filled with Internet tools such as the social networking, wikis, blogging, and multimedia publishing; therefore, these elements need to be brought into the classroom to create meaningful learning opportunities that students can apply to their school experiences as well as their experiences at home. Well thought-out Internet experiences can be infused in the curriculum to develop stronger understanding, but it can also be used for long term purpose of preparing our

students for their future endeavors. Ultimately, use of the Read/Write Web in the classroom will lead to well-prepared individuals in the real world.

The goal of this review is to synthesize literature that has examined the use of web tools in an educational setting. It should be noted that this was not an exhaustive review, but was instead a focused review limited to current literature. I first define the term web 2.0 tool and how it can be applied to an educational setting. Then, I explain the method for choosing the studies in this literature review. To determine which studies to review, I used research questions that directly correlated with web 2.0 tools and their uses in a classroom environment: (a) What web tools are available for classroom instruction? (b) How does the implementation of web tools effect educators and teaching? (c) How can web tools be effectively implemented? and (d) How does the implementation of web tools effect student learning? These four research questions guided my decision regarding which articles and studies should be included in this literature review. After reviewing the included studies and articles, I discuss the conclusions that have been drawn from the review of literature and how this information should be used to further inform educators.

Web 2.0 Tools in an Educational Setting

When Berners-Lee invented the World Wide Web, his intention was to create “a collaborative medium, a place where we all met and read and write” (as cited in Richardson, 2010, p. 1). This was the beginning stages of development of the term Web 2.0 tool as we know it today. The term Web 2.0 tool was first used in the late 1990s, but its definition, as we use it now, was not fully developed until mid-2000s (Gross & Leslie, 2008, p. 791). O’Reilly explicitly states, “Web 2.0 is a collaborative web development platform that refers to the cumulative changes in the ways software developers and end-users achieve benefits from the web” (as cited

in Hossain & Aydin, 2011, p. 116). According to Lenhart, Fallows, and Horrigan, a Web 2.0 tool is a way to use the Internet to publish “thoughts, respond to others, post pictures, share files, and other contribute to the explosion of content available online” (2004). While the Internet at a basic level is used to obtain information, Web 2.0 tools are used to create and share information. When referring to an educational setting, these definitions can directly apply as well.

In summary, Web 2.0 tools are characterized by: “two-way communication between the site and the user itself” (Cifuentes, Xochihua, & Edwards, 2011), being “participatory and collaborative, reflecting the way youth engage with technologies and connect with multiple social worlds” (McLoughlin & Lee, 2008), supporting creative and collective contribution (Nelson, Christopher, & Mims, 2009), and providing “online users with interactive services and control over their own data and information” (Hartshone & Ajjan, 2009). This literature review uses the term Web 2.0 tool interchangeably with the terms “Internet tool”, “Read/Write Web”, and “Web 2.0”.

Research for this literature review was driven by four themes: (a) web tools used for instructional purposes, (b) the effect of web tools on educators and teaching, (c) effective implementation of web tools, and (d) the effect of web tools on student learning. These four themes were used to develop four guiding research questions for this literature review: (a) What web tools are available for classroom instruction? (b) How does the implementation of web tools effect educators and teaching? (c) How can web tools be effectively implemented? and (d) How does the implementation of web tools effect student learning?

Method

Criteria for Inclusion

Studies, refereed journal articles, and textbooks that examined the use of Web 2.0 tools within an educational setting (e.g., classroom, K-12, collegiate) were selected for this literature review. After the initial selection of articles, inclusion criteria were used to identify which studies would be included in this literature review. These criteria focused on the research questions.

Studies were included only if they examined one of the four questions in this literature review: (a) What web tools are available for classroom instruction? (b) How does the implementation of web tools effect educators and teaching? (c) How can web tools be effectively implemented? and (d) How does the implementation of web tools effect student learning? The rationale for focusing on these four questions is based on the educational implications that arise from analyzing these four research questions. Educational implications for Web 2.0 tools is best understood when focusing on *what* web tools are currently available for classroom instruction, *how* web tool implementation effects teaching and student learning, and *how* to effectively implement web tools. Thus, studies, articles, and textbooks analyzing the effect of Web 2.0 tools in an educational setting were included in this literature review. Studies that addressed research questions outside these themes were excluded.

Search Procedures

The search includes two phases: (a) gather all relevant articles in the initial search and (b) based on the inclusion and exclusion criteria for this literature review, choose articles from the initial search that align with the focus of this literature review. In the first phase of the search, ProQuest Education Journals and ERIC databases were searched for literature published after 1993 because Internet use was limited, especially in educational settings, before 1993. When searching for this initial set of studies and articles, the following keywords were used in the

search: “web tools”; “internet tools”; “web tools and teaching”; and “internet tools and teaching”. The first phase of search yielded 1,045 articles. Next, trade journals and magazines were excluded, and only peer-reviewed studies and articles were included. With the remaining articles, the previously identified inclusion and exclusion criteria were used to finalize which studies and articles would be included in this literature review. Out of the total 390 articles found in the first phase of the search, 25 articles met these criteria and were used for this literature review.

These 25 articles were grouped based on the four research questions. Five articles examined web tools that are currently available for classroom instruction. Second, eight articles focused on the effect of web tool implementation on educators and teaching. Third, three articles focused on the effective implementation of web tools. Finally, nine articles studied the effect of web tool implementation on student learning. These four themes represent the four research questions of this literature review and serve as the organizational structure.

Results

What web tools are available for classroom instruction?

This section presents findings from studies and articles that examined web tools that are available for classroom instruction and educational settings. While Combs suggest that Web 2.0 “is often defined by the technologies that are a part of it: social software, Weblogs, linklogs, folksonomies, podcasts, RSS feeds, and Web services” (as cited in Gooding, 2008, p. 45), research suggests that Web 2.0 tools can be categorized into six overarching categories: audio and video conferencing, blogs, podcast, RSS feeds, social bookmarking, and wikis (Gooding, 2008).

Audio and video conferencing is a means to use technology to communicate and collaborate with others. Audio conferencing generally requires the use of a computer and a microphone while video conferencing requires the use of a computer and a webcam. In recent years, audio and video conferencing has become increasingly popular as services such as Skype have increased in prevalence (Gooding, 2008).

Blogs are characterized by a narrative style of writing, most recent information is posted first, and interaction is feasible through commenting. Many blog services are available and many providers are free. Blogs can be created at www.blogger.com, edublogs.org, and www.weblog.com. Blogs are often used as a communication tool for teachers and parents, but Freyer insists that blogs are most effective when “teachers set up blogs for use with their students” (as cited in Gooding, 2008, p. 47). Blogs allow for collaboration amongst the students within a classroom as well outside the classroom.

Podcasts describe audio or video broadcasts that can be played on an iPod. Smythe and Neufeld analyze the use of podcasts in an educational setting:

One of the attraction of podcasting as a learning tool is that learners can create content relatively quickly and easily, often collaboratively, with the intention and capacity to reach an authentic audience. Podcasting does not require a high level of technological knowledge, its product is reusable and portable (p. 489).

In a study of digital literacies and communities of learning in a middle years ELL classroom in an urban school in North America called the podcast project, a teacher in a grades 6 and 7 classroom participated in a study lasting seven months (Smythe and Neufeld, 2010). The teacher observed 42 hours of participant observation in a grade 6 and 7 classroom during the 2007-2008 school year. Twenty-four podcast project sessions, as well as the usual classroom

lessons in language arts, were observed. The teacher documented the students' participation in the project at various stages. The research team met regularly to reflect on the work on the project. Semistructured interviews were conducted with 13 students and their teachers at the end of the project. The researchers concluded that podcasts as digital literacy projects can create classroom learning opportunities that critically engage and respond to the social worlds of ELLs (Smythe and Neufeld, 2010).

RSS feeds allow for users to subscribe to feeds or content online. RSS is an acronym for "really simple syndication."

Social bookmarking allows Internet users to categorize or tag sites of interest. Social bookmarking allows students to "find and create new learning communities of users based around a certain topic [and] share access to categorized resources in an efficient way" (Gooding, 2010). Social bookmarking also allows users to access their bookmarks "online rather than on their browsers" (Rosenfeld, 2008). A commonly used social bookmarking site is Del.icio.us (<http://del.icio.us>).

Wikis are online collaborative communities that allow for constant editing and revision of the content. Wikis depend on shared knowledge. The most commonly known wiki is Wikipedia. Teachers can implement wikis within their classrooms by publishing their own wikis at sites like www.wikispaces.com or pbwiki. Glassman and Kang state, "Studies on the use of Wikis in educational settings encapsulate both the promise and the difficulties of using this new technology" (2011).

While these six categories include a large group of the Web 2.0 population, there are a vast number of tools available that do not fall under any of these categories. These additional

tools include video sharing (Mullen and Wedwick, 2008), photo sharing and slideshow creation and sharing (Rosenfeld, 2008), and social networking.

Throughout the analysis of each study or article, a running list of each web tool used or mentioned was created in order to determine, overall, the amount of Internet tools available. The following are the web tools that were included on the list: Blogger, blogging, Bookr, Bubble Share, BzzAgent, CamStudio, CiteULike, Club Penguin, Craigslist, Delicious, digital storytelling, Diigo, Edublogger, Facebook, Flickr, folksonomies, Friendster, Glogster, Google, Hi5, I Keep Bookmarking, iEarn, image galleries, instant messaging, Internet telephony, Jing, LinkedIn, linklogs, mask ups, media sharing, message boards, MSN Soapbox, MySpace, Nexopia, Ning, One True Media, OneWorldTV, online chatting, photo sharing, podcasting, RSS feeds, SchoolTube, Scrapblog, screencasting, Seedwiki, Show Beyond, Skype, Slide, social bookmarking, social networking, social tagging, Stickam, Storybird, Tagging, TeacherTube, Thinkquest, Toondoo, Twitter, United Streaming, U-Stream, video conferencing, video logs, video sharing, Vodcasting, VoiceThread, Voki, Wikipedia, wikis, Wordpress, work sharing, Yahoo Video, YouTube, and Zoho. The most frequently discussed Web 2.0 tools were, in order of frequency, blogging, wikis, social networking, and social bookmarking.

How does the implementation of web tools affect educators and teaching?

This section presents findings from students that focused on the effect of web tool implementation on educators and teaching. According to Atkinson and Swaggerty (2011), “teachers are expected to not only understand, but also meaningfully incorporate and intergrate multiple technology-intensive standards frameworks into their classroom teaching and learning” (p. 100). In order to effectively implement web tools in an educational setting, teachers must have well developed TPACK. TPACK is a framework designed to “illustrate the characteristics

of teacher knowledge and technology integration in education” (Nelson, Christopher, & Mims, 2009). Teachers need to design lesson plans that promote creative solutions and problems when implementing Web 2.0. According to Nelson, Christopher, & Mims (2009), teachers need to rise to the challenge to “learn new technology and design authentic, curriculum-based lessons that make the most of Internet learning opportunities” (p. 84). McLoughlin and Lee reference “The Three P’s of Pedagogy for the Networked Society” – personalization, participation, and productivity (2008). First, teachers need to place more emphasis on the student utilizing a more engaging, socially-based model; therefore, allowing the collaborative nature of Internet tools to take the forefront in the classroom. Second, the teacher needs to allow the students to have self-direction and control over their learning process. Third, teachers must allow and encourage creativity and productivity (McLoughlin and Lee, 2008).

In a study of Internet influences on literacy and literacy instruction in K-12 classrooms in Richmond, Virginia, thirteen teachers participated in a survey-based study that lasted three months (Karchmer, 2001). The primary goal of this study was to gain a sense of teachers’ perspectives. The researcher collected various types of self-report data including interviews and reflective journals. A majority of the data was collected over e-mail. Roughly 700 pages of interview transcripts and journal entries were collected and organized for data analysis. The researcher categorized his data into three major themes: (a) appropriateness of Internet materials, (b) evaluating the accuracy of Internet material, and (c) publishing student work on the Internet. The researchers concluded that “teaching students to use [Internet tools] was neither easier nor more difficult than teaching print-based textual aids” (Karchmer, 2011, p. 460).

Furthermore, Levin and Wadmany researched teachers’ beliefs and practices in technology-based classrooms. The three-year longitudinal study was conducted in one school in

a city in central Israel (Levin and Wadmany, 2006). Six teachers and 164 students participated in the study. Teacher experience varied and the students were in fourth and fifth grade. Various research tools were used to complete the study including questionnaires, interviews, and observations. There were a total of 73 observations and questionnaires were administered annually for three years. Teachers were also asked to write two metaphors on the concepts of teaching. The researchers concluded that teachers, after three years of experience in a technology-rich classroom, teachers focused more on student understanding. Also, it was determined that technology use means different things to different teachers (Levin and Wadmany, 2006).

In summary, the implementation of Web 2.0 tools requires that teachers have well developed TPACK (Nelson, Christopher, and Mims, 2009). Lesson plans should move away from more traditional practices and, instead, promote creativity and authenticity (Nelson, Christopher, and Mims, 2009). McLoughlin and Lee emphasis participation, personalization, and productivity (2008). Based on Karchmer's research, teaching of Internet tools in the classroom was no easier and no harder than the implementation of print-based materials. Finally, after gaining experience in a technology-rich classroom, teachers were more likely to focus on student understanding, but it was determined that technology means different things to different teachers (Levin and Wadmany, 2006).

How can web tools be effectively implemented with students?

The first steps towards effectively implement web tools are developing a safe online environment. Students need to be aware of online safety protocols. Safety protocols should be set up before any web tool implementation (Kist, Doyle, Hayes, Horwitz, and Kuzior, 2010).

According to Hartshone and Ajjan (2009):

An effective learning environment fosters collaboration among students and faculty; allows the student to create and share new knowledge; and supports the connection of different pieces of information. These learning environments can be more easily facilitated by Web 2.0 tools (p. 194).

Additionally, teachers can turn to NCTE's Framework for 21st Century Literacies for recommendations on effective implementation of technology (including Web 2.0 tools) in the classroom (Atkinson and Swaggerty, 2011):

- Use technology to extend understandings.
- Technology should serve as a tool to learn and not as the focus for the lesson.
- Assessment should reflect the task.
- Integrate tools and strategies meant to provide structure with a student-centered environment.
- Be prepared with secondary plans if technical difficulties occur.
- Teachers should empower students as “expert colleagues.”

Finally, Frye et al. reminds all teachers that implementation of web tools should be authentic and relevant in order to gain meaningful learning (2010).

How does the implementation of web tools effect student learning?

Web 2.0 digital tools have “the power to engage students in meaningful learning as well as social interactions” (Atkinson and Swaggerty, 2011, p. 99)). Researchers say that Web 2.0 can be characterized by: “the ability to support active and social learning, provide opportunities and venues for student publication, provide opportunities to provide effective and efficient feedback to learners, and provide opportunities to scaffold learning the student’s Zone of Proximal Development (as cited in Hartshone and Ajjan, 2009). Additionally, the implementation of web

tools empowers students by providing opportunities to gain skills that are necessary for survival in the 21st century and, ultimately, the workforce.

In a study of examining student decisions to adopt Web 2.0 technologies at a large University in the Southeastern United States, 423 students participated in a voluntary survey (Hartshone and Ajjan, 2009). Students were administered a survey instrument using the DTPB as the framework. The survey consisted of 12 items and four sections. The survey items focused on comfort level of Web 2.0 tools, usage of Web 2.0 tools, and attitudes towards Web 2.0 tools. The researchers concluded that most students feel that integrating Web 2.0 technologies into the classroom learning environment can be affective at increasing satisfaction with the course, improve their learning, and increase student interaction with other students and faculty. The student role shifts “from a passive to an active learner” (Hartshone and Ajjan, 2009). Students were better able to create and retain knowledge (Hartshone and Ajjan, 2009).

Additionally, a study of the effect of the Internet on the teacher-student relationship was conducted in 150 California high schools to develop a list of teachers who use the Internet during classroom instruction. Follow up phone interviews were conducted with 25 teachers. One teacher said, “Students are highly, highly, highly engaged” when using Internet tools in the classroom (Hemenway, 2000). Another teacher stated, “Students have become teacher to the teacher” (Hemenway, 2000). One teacher determined that students need structure in completing assignments using the Internet and another teacher reported no significant difference in the classroom since using the Internet (Hemenway, 2000).

In summary, web tool implementation can affect students positively by providing necessary skills for survival in this digital society. Student learning often changes from passive to active as they are getting more opportunities to learn real world lessons. Students are given

the opportunity to take ownership and control over their work. Student learning improves because students are given the opportunity for social interaction. Overall, students feel more satisfied with their courses.

Discussion

The research highlighted in this review examined four critical areas related to Web 2.0 tools in an educational setting. First, a vast array of Read/Write Web tools are available. There are six main categories of Web tools including audio and video conferencing, blogs, podcast, RSS feeds, social bookmarking, and wikis. Video and imaging sharing, social networking, and slideshow creation are also Web 2.0 tools that can be implemented in classroom instruction (Gooding, 2008). The most frequently discussed Web tools throughout the articles reviewed for this literature review are: blogging, wikis, social networking, and social bookmarking.

Second, research states the implementation of Web 2.0 tools requires that teachers have developed TPACK and promote creativity and authenticity in their lesson plans (Nelson, Christopher, and Mims, 2009). In a study completed by Karchmer, the implementation of Internet tools in the classroom was not found to be any harder or easier than the implementation of traditional print-based materials (2011). This implies that teachers can transition their current teaching practices to better meet the digital needs of their students with little change in level of difficulty of implementation. Levin and Wadmany found that, while teachers have different definitions of the effective use of technology, implementation of web tools positively effected student learning because teachers were more likely to focus on student understanding (2006).

Third, effective implementation of Web 2.0 tools depends on the development of a safe online protocols, collaboration between students and teachers, and the creation and sharing of new knowledge (Hartshone and Ajjan, 2009) as well authenticity and relevance of the tool to the

learning (Frye et al, 2010). Teachers can additionally turn to the NCTE's Framework for 21st Century Literacies for additional recommendations on effective implementation of technology, including Web 2.0 tools in the classroom (Atkinson and Swaggerty, 2011).

Fourth, the implementation of web tools effects student learning by providing meaningful, engaging learning, social interaction, and skills required for 21st century citizens. Hartshone and Ajjan found that implementing Web 2.0 technologies can increase student satisfaction in course work as well as improve student learning and interaction (2009). In a study completed by Hemenway, a majority of teachers relied that implementation of Web tools had positively affected their students (2000).

Throughout the studies and articles written about the implementation of Web 2.0 tools, most data was collected through the use of interviews, observations, and surveys. Overwhelmingly, the implementation of Web tools produces positive results in the classroom based on this data analysis. Further research should determine the effectiveness of the implementation of Web 2.0 by collecting quantitative data. Research questions could include (a) How does the implementation of Web 2.0 tools affect students' test scores? (b) Does the implementation of Web 2.0 tools increase overall student achievement?

Implications for Practice

Strong technology experiences, specifically Web 2.0 tools, in the classroom can be infused in the curriculum to develop stronger understanding, but it can also be used for long term purpose of preparing our students for their future endeavors. For example, "using technology within the curriculum framework can enhance important skills that will be valued in the workplace, such as locating and accessing information, organizing and displaying data, and

creating persuasive arguments (Ringstaff & Kelley, 2002, p. 27). Ultimately, Internet tool use in the classroom will lead to well-prepared individuals in the real world.

In our current reality, the use of Web 2.0 can allow for educators to creating engaging and real-world based classrooms. In order to create these ideal environments, teachers need to be willing to take technology use to the next level to create higher-order learning opportunities. The best educators will create a student-centered classroom that seamlessly blends effective technology practices within the instruction. Ultimately, these learning experiences will create leaders and critical thinkers who are prepared to succeed in the 21st century.

To initiate and implement Internet tools within the classroom, educators need to begin by reviewing the types of Web tools that are available. Further research may need to be conducted to determine how to effectively implement Web tools with in your curriculum standards.

Richardson suggests that, in order to seamlessly transfer the classroom to a place that cultivates student learning by implementing Web 2.0, a series of “*big shifts*” needs to take place. The research gleamed from this literature review could be applied to the following “*big shifts*” and, ultimately, make a significant impact on student learning within a school or classroom: provide open-source-type classrooms, access expertise outside of the teacher, allow students to work collaboratively, move from lecture to conversation, know *where* to find the answer instead of *what* the answer is, readers must learn to be critical consumers, the Web becomes a portfolio, writing moves beyond just text, mastery is the product, not the test, and contribution, not completion, is the goal.

As the digital needs of the students change and evolve, the effective implementation of Web tools and the definition of teaching will as well. Ultimately, teachers need to be able to maintain flexibility and willingness to evolve with our technology.

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