

## WEB 2.0 TOOLS IMPROVE TEACHING AND COLLABORATION IN ENGLISH LANGUAGE CLASSES

Mahmud M. Shihab  
International College, Beirut, Lebanon.  
mshihab@ic.edu.lb

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### Abstract

Web 2.0 tools, namely blogs, wikis, podcasts, and RSS were introduced to change teaching practices of in-service high school teachers to improve the collaboration of today's students in the English language classroom. Two high school teachers of English language and their classes participated. The teachers were interviewed about their current teaching practices and provided with training to develop teaching units that use Web 2.0 to engage students as active collaborators in their learning. They integrated blogs, podcasts, wikis, and RSS into their teaching. Additional interviews were conducted during and after the implementation stage. Implementation strategies, changes in teaching practices, challenges encountered, and the impact on student interaction and collaboration were closely examined. Students were surveyed at the conclusion. Teachers found that Web 2.0 tools made them *more efficient* in teaching. Blogging was the most powerful tool for *journal writing and sharing ideas*. Wikis were more difficult to use but were useful to *facilitate group planning* and collaborative construction of knowledge. Podcasts were useful for publishing audio recordings of interviews, speeches, and poetry recitals. RSS feeds made easy for teachers and students to track updates on websites, posts on blogs, collaborations on wikis, and audio recordings on podcasts. Both teachers and students enjoyed the interactions and collaboration that took place in the English classroom using Web 2.0 tools.

### Purpose & Objectives

Current teaching practices lack the interactive technologies that engage today's students and allow them to be active contributors in collaborative activities. According to Hardman and Carpenter (2007) many schools are *out of sync* with the technology available to students in the real world outside their schools. The current generation of high school students possesses a superior level of familiarity with interactive web applications than that of the current generation of *digital immigrant* teachers (Oblinger & Oblinger, 2005). Teachers need to modify their teaching practices to integrate critical thinking and authentic literacy skills using 21<sup>st</sup> century technology tools in an effort to develop challenging and interactive learning environments that meet the digital lifestyle of the millennial generation of high school students (Warlick, 2005a).

Current Web 2.0 technologies, including blogs, wikis, RSS, and podcasts, pose a major challenge to education. With our students' access to these collaboration tools of the *Read/Write* web, teachers have to revisit the strategies used in teaching. Teachers have to

rethink the way information is processed and evaluated, the way the curriculum is delivered, and the scope of learning outcomes now that students have the ability to reach audiences outside of their school community. Teachers should evaluate the effect of these tools on our notion of *literacy* especially that current students are not only readers, but also writers, collaborators, and editors of online information (Richardson, 2006).

### **Review of the Literature**

This literature review explores the developments that led to the Knowledge Age we live in today. A widening gap has been forming between the current teaching methodologies and the technological competencies and interests of today's high school students. These students have superior computer skills; they are native speakers of the digital language. Newly emerging educational technology standards that are designed to meet the needs of today's students will be identified. O'Reilly (2005) considers that Web 2.0 offers the platform for creating collaborative learning environments that foster meaningful learning. Research about the potential of using Web 2.0 tools, like blogs, wikis, podcasts, and RSS, in teaching and learning will be explored.

Recent developments in computing in the last quarter of the 20<sup>th</sup> century have made computers widely available. The Internet has provided a worldwide network that allows for ubiquitous sharing of information (Richardson, 2006). These fast developments have moved us from an industrial age to a knowledge age (Warlick, 2005b), and have created a wide gap between current teaching practices and the technological competencies and interests of today's *digital native* generation of high school students (Prensky, 2001a). Web 2.0 tools including blogs, wikis, podcasts, and RSS have created a read/write web that allows users around the globe to contribute to a rich body of knowledge (Richardson, 2006). New educational technology standards for students, teachers and administrators have been emerging to prepare our community for the 21<sup>st</sup> century (ISTE, 2007a). As a result, a continued effort to enhance teaching practices using technology has become a major challenge for educators.

### **A Widening Gap in Teaching and Learning**

A wide gap has been forming between current teaching methodologies and the technological competencies and interests of high school students. Students who are currently in high schools have been using the Internet for over 10 years. These millennial students were described by Prensky (2001a) as *digital natives* since they are native speakers of the digital language used in computers, video games, cell phones, email, and the web. On the other hand, current teachers were described as *digital immigrants* who have invested in adopting digital technologies into their teaching practices. They used the Internet to provide resources to students and learned to build WebQuests to provide students with rich inquiry activities (Warlick, 2005a).

Today's students are representatives of the *Net Generation*. They use computers for doing class work while enjoying their favorite hobbies. They can be described as the cut-and-paste generation. They learn by doing and get bored from reading instruction manuals or listening to lectures. They use cell phones, laptops, desktop computers, PDAs, wireless connections, portable digital music players, and digital cameras. They expect

things to work properly and work fast. They get bored if not challenged properly. These learners need teachers' attention and help (McNeely, 2005).

### *Millennial Students*

The knowledge age allows students and teachers to bypass the limits of the classroom and collaborate interactively through the internet with peers, scientists, experts, and researchers throughout the globe. Students have the potential to establish authentic real-time experiences by publishing their work using a variety of compelling media formats and receiving immediate feedback (Warlick, 2005b). Today's students use the Internet to collaborate using email, discussion boards, blogs, wikis, podcasts, social networking, tagging, and bookmarking. Each type of input, whether it is a message that is posted to a discussion board, an entry or a comment in a blog, a reply to a message, a photo that is tagged, or a friend who is added to a social networking site, is an opening avenue to collaboration. Students seem to rely on the web as a native environment for collaboration.

In Pew Internet & American Life Project, Lenhart (2006) found that 57% of teenagers have created their own online content including text, photos, audio and video. Twenty two percent have created personal web page and 19% have blogs. Two thirds of teenage bloggers read the blogs of people they know while one third read the blogs of friends and strangers. Eighty seven percent of bloggers allow comments from others. Teenagers blog as a hobby to express themselves creatively and to share their personal experiences. Social networking websites are creating amazing relational networks. Readers of a certain article can collaborate with other like-minded readers and get to learn about the authors of similar articles (Warlick, 2005b). In evenings today's students IM (Instant Message) their friends in places that span the globe. Even these students purchase virtual gifts in the form of digital greetings to display on the page of their favorite friends as is the case on Facebook, an actively growing social network.

The need for collaboration of students of the 21<sup>st</sup> century is substantiated by the soaring traffic to sites built around user participation and in which young people are major participants. According to Walker (2006), from February 2005 to February 2006 *Blogger.com* has grown by a factor of 528%, *MySpace.com* by a factor of 318%, and *Wikipedia* by a factor of 275%. Seventy five thousand new blogs are created every day at an average of one blog per second. Technorati, a blog tracking service, logged over 57 million blogs between March 2003 and October 2006. In February 2008, Hogan reported that 114 million blogs have been published at the rate of 175,000 new blogs per day.

According to Solomon and Schrum (2007) today's students come to school familiar with the internet and expect to be in charge of their own learning. Utecht (2006) explains that today's students like to customize their own digital devices and work environments. Any device or application that is not customizable is of no use to them. Students like to customize their desktop background, operating system settings, colors, and visual themes. Learning technologies need to be customizable if we are to engage today's students. Students need to enjoy technology at school in order to learn. McNeely (2005) explains that although these students are very good in communicating and using online interaction tools, they might not know how to best use these communication

technologies for an educational benefit. More research is needed to find the tools in which today's students are interested.

### *Teacher's Use of Technology*

Savvy teachers built their own websites to share materials with their students. Some schools are using learning management systems (LMS) to extend classrooms with online modules for managing announcements, assignments, shared calendars, shared files, links to online resources, class-related messaging, and bulletin board discussions. Yet, the online interaction skills of today's 21<sup>st</sup> century students are way beyond those of their teachers (Oblinger & Oblinger, 2005; Losinski, 2007). These millennial students have been exposed to computers at a very young age and have been raised in environments that are rich with technology and digital media. Unlike previous generations, these students have an information technology mindset and are capable of multitasking and fast switching from one activity to another (Frاند, 2000; Oblinger & Oblinger, 2005).

According to Geck (2006), most of today's students start with a Google search when solving homework assignments even if an internet search is not the most efficient way to find the answer. The over-reliance on Google indicates that these students are becoming unaware of the importance of books and other print materials that might be better suited for finding more appropriate answers for certain questions. The fact that Google returns tens of thousands of results makes students confident to adopt the search engine as their primary tool to search for information. It makes them feel self-sufficient and powerful when retrieving many results. Unfortunately, most often these students do not have the metacognitive skills to judge the collected information. The abundance of results makes students careless about determining the authenticity of information resulting in faulty conclusions.

### **Twenty-First Century Skills**

The North Central Regional Educational Laboratory (NCREL) (2003) classified 21<sup>st</sup> century skills under four main categories: Digital-age literacy, inventive thinking, effective communication, and high productivity. *Digital-age literacy* includes basic, scientific, visual, technological, economic, multicultural, and global awareness literacy skills. *Inventive thinking* includes self direction, adaptability, managing complexity, curiosity, creativity, higher order thinking, sound reasoning, and risk taking skills. *Effective communication* includes interactive communication, teaming, collaboration, civic responsibility, social responsibility, personal responsibility, and interpersonal skills. *High productivity* includes effective use of real-world tools, planning, prioritizing, managing results, and producing high quality products. A group representing business and education in the US called the *Partnership for the 21<sup>st</sup> Century Skills* explains that education is changing (2004). Twenty first century skills need to be taught to students to be able to compete and succeed in today's rapidly growing global economy. On the other hand, the report explains that today's teachers need new tools to be able to teach these skills.

## National Educational Technology Standards

The Preparing Tomorrow's Teachers to use Technology (PT3) initiative, that started in 1999 and has become a major reference for educational technology institutions, has played a major role in changing teaching practices for integrating technology in teaching. In addition, the National Educational Technology Standards (NETS) set by the International Society for Technology in Education (ISTE) have provided teachers, students, and administrators with standards to help them acquire 21<sup>st</sup> century skills to meet the challenges of a technology rich society. On the other hand, the National Council on Accreditation of Teacher Education's (NCATE) adoption of ISTE's NETS *have pushed schools to introduce reform projects* to meet the technology skills and teaching practices required by these standards. Implementing these standards in meaningful ways, however, is a major challenge (Stuve & Cassady, 2005; Kelly & Haber, 2006). Although introducing a change in teaching practices is difficult, meeting technology standards have been the main motive for teachers to innovate in their use of technology in teaching to cater for the needs of their technology-savvy students and the challenges of an information-driven age (Brooks-Young, 2007). In addition, schools and teachers are held accountable by students, parents, and accreditation agencies for meeting these challenges. NETS offered the guidelines needed for ensuring proper implementation of information and communication technology in the curriculum (Kelly & Haber, 2006).

*Standard 4* of the current version of NETS for students (NETS-S) expects today's students to use telecommunication tools to interact with peers and experts and collaborate with them on projects. Students are also expected to use a variety of media and formats in their communications to effectively express their ideas to multiple audiences (ISTE, 2005). On the other hand, *standard 2*, in the newly released draft of the "next generation NETS-S", students are required to contribute to project teams to create original works and solve problems (ISTE, 2007b). The emphasis on collaboration is clear in this new revision of the standards as more internet-based interaction and collaboration tools have become available to students. A continued effort to enhance students' education using 21<sup>st</sup> century skills in technology has become a major priority for all schools.

## Web 2.0 and Education

In 1993, the development of the Mosaic web browser allowed millions of people around the globe to gain access to information published on the World Wide Web. People went online in search for new information and answers to their questions. Others learned web design and publishing skills and published content to the web to make their views and information available to a world wide audience. By the end of the twentieth century, the Internet had become an essential research and communication resource that was adapted by most schools, universities and research centers. Even with this immense growth, sharing information on the web was limited to those who invested in learning the essential skills needed for web publishing. Building collaboration modules on these published sites was another challenge for website publishers. Although there were newsgroups that allowed users to share their ideas, access to such resources remained limited to a few savvy users who know how to access them. For most users, the ability to create and share web content was not as easy as accessing it (Richardson, 2006).

### *Web 2.0: The Read/Write Web*

Today, a new set of easy to use tools represented by a new concept in programming called *Web 2.0* has allowed millions of users to publish their ideas and collaborate with an audience that spans the globe (O'Reilly, 2005). These tools gave rise to a *Read/Write* web. *Blogs*, short for web logs, were the easiest of Web 2.0 tools that allowed users to create personal journals and resource sites to share with their colleagues, students, and community. *Wikis* allowed for collective editing of online documents. They were most popular in teams and collectively authored works. Wikipedia was the most famous product that was based on this technology. *Podcasts*, on the other hand, allowed users to broadcast their audio recordings to a world wide audience. Narrated stories, poetry, and lectures quickly found their way on podcasting sites and blogs. Updates on blogs and podcasts can be easily tracked by registered users using *RSS* (Rich Site Summary) feeds. New Web 2.0 tools are continuously produced by enthusiastic programmers around the globe (Purmensky, 2006; Richardson, 2006). Blogs, wikis, podcasts, and RSS are also considered as powerful tools for managing virtual teams (Brown, Huettnner, & James-Tanny, 2007). The read/write nature, ease of use, and customizability of the Web 2.0 tools have made them very popular for today's generation of Internet users. According to O'Reilly (2005), Web 2.0 is participatory, scalable, and cost effective. It is a platform of services that is built on collective intelligence. In Web 2.0, users customize and control their own data. Software applications are server based and developed, shared, and maintained collectively by programmers from around the globe.

Web 2.0 tools entice students to create, communicate, and publish online content. Supported by an open-source community of developers, many Web 2.0 tools are becoming increasingly adopted by virtual communities. Although these tools are new to education, many teachers have developed innovative ways to use them with their students through creating collaborative subject-specific projects, literature circles, math solutions, and guidebooks (Solomon, & Schrum, 2007). Web 2.0 tools foster engaged learning principles in which students build their own understandings by working on extended collaborative investigations that require creativity and higher order thinking (Johnston & Cooley, 2001).

### *Web 2.0 Technologies*

Web 2.0 is based on programming efforts of open source developers who enjoy sharing their programs with other programmers on the web. Web 2.0 tools are mostly programmed with Asynchronous JavaScript and XML (AJAX) (Solomon & Schrum, 2007). AJAX was favored by programmers because it allows the user to pull pieces of data from the server without reloading the whole page. It speeded up interaction on a web page and allowed users to access a lot of data and interact with content on a single page. Many of the programmers work from many locations around the world, and the applications are hosted on the web directly which led to the creation of many web top applications on a large number of sites (Brooks-Young, 2007; Warlick, 2006). Based on the collaborative nature of Web 2.0 programming, Web 2.0 tools are works in progress that are open for continuous feature updates (Solomon & Schrum, 2007). The recent rise of cloud computing with online operating systems like the Internet Operating System/3

(XIOS/3) from Xcerion ([www.xcerion.com](http://www.xcerion.com)), Web 2.0 developers are demonstrating that applications and operating systems can ultimately reside on web servers. In such an environment, users do not need to be bound to one device to run their applications; any Internet-enabled device is enough to access the online operating system and all needed applications. Although this new method of computing necessitates full dependence on internet connectivity, it reduces the time and skills needed for a user to maintain, update, and secure computers, software applications, and operating systems (Xcerion, 2008).

### *Blogs*

According to Warlick (2005), blogging is the main tool for building literacy skills in the twenty-first century since it is revolutionizing reading, writing, self expression, and publishing over the internet. When preparing students as life-long learners, teachers realize that self reflection is a key skill that students should develop (Purmensky, 2006). When sharing reflections online, students become members of a learning community in which content and meaningful experiences are created by the students themselves. This can be done successfully in blogs. Successful reflections include *ongoing critical reflection* and *shared reflection* allowing for reactions to other students' work and creating a learning community.

According to Solomon and Schrum (2007), blogs are “natural tools for writing instruction” (p. 81). In a blog students can write, revise, review the writings of peers, and get feedback from their teachers. These skills are at the heart of the writing process. English language teachers have started experimenting with blogs in their classes. By sharing what they write on a global level, students see a permanency of their words that usually can never happen when a paper is submitted in a traditional class. At Gunston Middle School in Arlington, VA, an English language teacher created a blog on Shakespeare, Dickinson, and Frost to teach poetry. The students wrote what they learned and how they felt about the studied poems. They were happy to receive comments on what they wrote. Other schools are allowing their students to post their own poems and illustrated stories on blogs.

Penrod (2007) considers that blogs are new tools for teaching composition since writing is a core skill for bloggers. In addition to offering ease of use and publishing, blogs empower students who are often marginalized in the classroom. The power of saying words in writing is achieved in blogs. Students who are shy or who have specific learning styles might prefer to express themselves on blogs rather than open discussions. Blogging is very helpful for deaf students to communicate with others. Based on the collaborative nature of blogs, Penrod explains that blogging encourages fluency in writing, cooperative learning, critical thinking, and performance-based learning.

### *Wikis*

Wikis are pages that can be created and edited by any web user. The idea started with Wikipedia, the online encyclopedia that contains content that is collaboratively created and constantly edited by users. Researchers around the globe contribute to this constantly growing body of knowledge. Since wikis can be edited multiple times, they can provide a medium for collaborative construction of knowledge. Wikis are easy to edit and allow users to create non-linear documents using hyperlinks. Edits of a wiki can be

tracked and reviewed which creates an environment for reflection and metacognition. With wikis, teachers can track individual and group progress while students are collaborating on the creation of full documents. The potentials of wikis as instructional tools are still to be researched (Achterman, 2006).

As in most Web 2.0 activities, the more autonomy teachers give to students, the better it is for creating an inviting environment for students in which they take responsibility and ownership of their projects. Although it is a challenge for teachers to control the content of wikis since students have editing rights at any given time, students need to be taught to become good editors in the era of the Read/Write web. Teachers have started creating wikis for a variety of projects. At East Side Community School in Manhattan, teachers created wikis for community members to share information about school news, art shows, and sports teams. When students attempt to edit a wiki with certain ideas in mind, they have to read critically what has been written by others and build on it even though the original writing is not their own. This is a huge shift in the way students usually work. A history of all edits on a wiki is kept for the teacher to evaluate each student's level of contribution to the collectively created document. On another level, some teachers have created wikis to share lesson plans that can be fine tuned by the collective expertise of contributing teachers. Other teachers have created wiki-based projects like Planet Math (<http://planetmath.org>) to develop a math encyclopedia through a virtual community of math educators. Wikis are ideal for brainstorming activities, book reports, poetry, topic-based wikis for subjects studied in class, problem solving wikis, and most projects that lend themselves to the collaborative creation of content (Richardson, 2006).

### *Podcasts*

Podcasts allowed users to publish their audio and video recordings to the web. The first popular educational use of podcasts was the sharing of audio and video recordings of lectures, class discussions, and audio books. This technology became widely popular because of portable audio and video players; mainly the iPod from Apple. Richardson (2006) explains that podcasts allow teachers to record their class sessions in mp3 audio format and broadcast them to their students. Students can always go back to the recorded sessions to fix their notes or verify what they have learned in class. Today's students use portable digital players frequently, and they may find it useful to transfer class recordings to their players and listen to them at their convenience. With blogs, wikis, and podcasts available, internet users became writers who share their experiences, ideas, views, insights, resources, and research. Also, reacting to others' publications and collaborating on collective written articles became widely possible.

According to Williams (2007), there are various ways in which podcasts can be integrated into the curriculum. Teachers can either use ready-made podcasts or produce their own during their sessions with students or while preparing for their classes. Students may also create their own podcasts for poetry and plays. Podcasts can be located with regular search engines and thus they can be considered as resources that students can listen to and use in their research. Schools can use podcasts to broadcast school news and announcements. Teachers could use podcasts to archive their lectures for future reference and for offering remedial help to students who miss classes because of illness. Students

will just need to use their computer or portable media players to listen to lectures and review lesson content. Slow students can benefit a lot from podcasts of archived lectures especially if instructors speak faster than students can understand at one time.

#### *Rich Site Summary (RSS)*

According to Warlick (2005a), Rich Site Summary (RSS) feeds help students to *expose information* by subscribing to updates of websites, blogs, and podcasts that are relevant to their research. RSS uses push technology to send new entries to subscribed users. In addition, enhanced search engines like Google allow users to setup email alerts for certain search criteria in order to be notified when new search results become available. Wikis, blogs, and podcasts allow students to manipulate, analyze, and express newly constructed knowledge for a world wide audience. Web 2.0 tools offer a promise to allow 21<sup>st</sup> century students to teach themselves as they become lifelong learners. Teachers need to guide these students to learn how to use information responsibly and ethically in this information age where ubiquitous access of information is shared with a global community.

#### **Hidden Potentials of Web 2.0**

According to Solomon and Schrum (2007), technology alone does not necessarily enhance education, yet a mix of teaching strategies and technology innovations can create unique and successful learning environments. Web 2.0 tools offer promising tools to enhance education, yet they also offer disruptive technologies that offer an unprecedented form of freedom of speech that may threaten traditional methods of publication which may ultimately affect schools. While the outcomes of using technology in education are largely debatable, Fadel and Lemke (2006) explained that effective use of technology in the classroom can lead to higher levels of learning.

#### **Conclusion**

Teachers need to address student needs by changing their teaching practices to train students on how to control information in a positive, productive, and personally meaningful way using critical evaluation skills. An information code of ethics for both teachers and students need to be followed to guarantee the authenticity and credibility of the constructed knowledge (Warlick, 2004). New teaching methods are needed to develop a new literacy for the 21<sup>st</sup> century. According to Warlick (2005a), students need to learn to expose information, employ information, and express their ideas compellingly. Exposing information requires them to find, decode, and evaluate relevant information. Employing information requires them to process, manipulate, analyze, and add value to newly constructed knowledge. Finally students need to learn how to express their ideas compellingly using text, graphics, sound, video, virtual reality, and various types of media that they find relevant to them and their society. This vision of literacy is a *learning literacy* that is needed for personal growth of students living in the learning-centered 21<sup>st</sup> century. According to Richardson (2006), Web 2.0 technologies including wikis, blogs, podcasts, and RSS feeds offer powerful tools for students and teachers to achieve this vision of a *learning literacy* for the 21<sup>st</sup> century. Web 2.0, a continuously improving concept that is based on the collective intelligence of its users (O'Reilly, 2005), provides the platform for creating collaborative learning environments that foster meaningful learning since it allows for establishing collaborative learning relationships.

With Web 2.0, students are invited to weave information and collective intelligence in a way that was not possible in traditional learning environments (Jonassen, Howland, Marra, & Crismond, 2008).

## **Methodology**

This qualitative, descriptive case study investigated a specific phenomenon by examining several particular instances in depth and in a holistic manner to answer specific research questions using a variety of data collection methods over a specified period of time (Gay & Airasian, 2003; TESOL, 2007). It explored the experiences of two in-service English language teachers and their 37 students of two high school classes in which Web 2.0 was implemented in the teaching a full Language Arts unit during the academic year 2007-2008 academic year and upon IRB approval. The duration of the study was 2 months that took place between the 28<sup>th</sup> of February and the 24<sup>th</sup> of April, 2008. Yin (2003b) explains that the *logic model*, in which the trail of cause and effect that link interventions with expected outcomes, is best to be used in a case study involving a community-based collaborative initiative. The logic model is intended to identify hypotheses about how collaboration is taking place; then these hypotheses will be tested using the collected qualitative data. Unlike experimental or quasi-experimental designs which measure outcomes and process variables, this qualitative case study model may identify the dynamics of collaboration in the educational environment being studied. It will allow the investigation of phenomena in their real-life context in order to identify how outcomes are linked to interventions.

Qualitative research is based on various types of positivist, post-positivist, constructivist, critical, and post- structuralist paradigms (Hatch, 2002; Merriam, 2002). These paradigms help in defining the core of the research design and allow for the development of a sound research methodology. This study was best supported by a mixture of the post-positivist and constructivist paradigms of qualitative research, and the structure was supported by elements from both paradigms. Ontologically, Web 2.0 is a new phenomenon that is functional yet is not fully apprehended. Epistemologically, the researcher is a data collection instrument, and both the researcher and participants tried to construct new understandings. Methodologically, clearly defined qualitative research methods and low level statistics are needed for the study. The end product was a case study that included descriptive narratives, interpretations, collaboration patterns, and recommendations (Hatch, 2002; Maxwell, 2005).

In conclusion, this case study presented a mix of post-positivist and constructivist qualitative research paradigms in which the researcher was an active data collection instrument. The researcher and participants co-constructed understandings in a natural classroom setting. The next section explores in the detail the development of the approach and procedures that were used to answer the research questions.

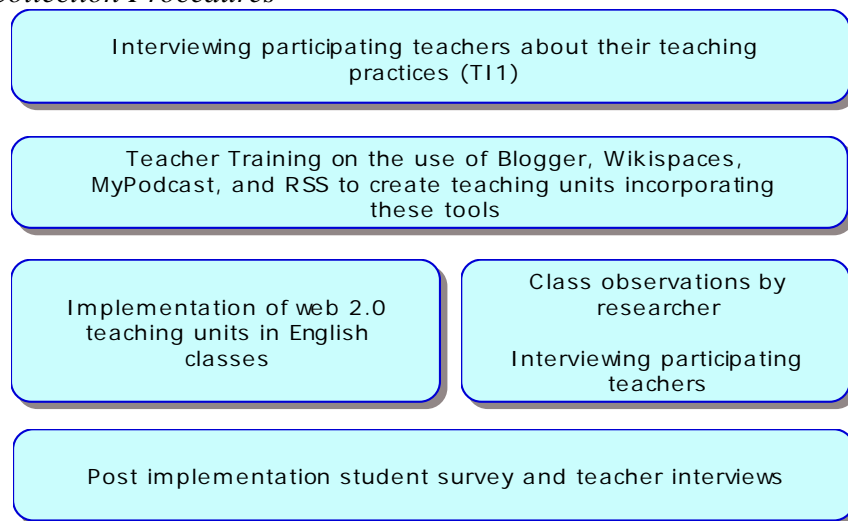
## **Approach and Procedures**

Based on research and descriptions by Yin (2003a), Merriam (2002), and Hatch (2002), this investigation was classified as a descriptive case study that aimed to explain how Web 2.0 tools can improve teaching practices and student collaboration in the English language classroom. Research procedures examined closely various areas

ranging from interviewing the participating English language teachers, training them to use Web 2.0 in their classrooms, observing teaching practices while using Web 2.0, observing the way teachers and students collaborate using these tools, interviewing teachers post the implementation phase, and surveying the students to reflect on their experience in learning English using Web 2.0. In all phases of the implementation of the case study, the researcher was an active instrument collecting data and constructing understandings in a natural classroom setting (Hatch, 2002). The two month period allowed the researcher to control for both effects. Data collection procedures were detailed in Figure 1.

Figure 1

*Data Collection Procedures*



*Interviewing Teachers before Implementation*

The teacher interviews were the formal beginning of the investigation. Teachers were asked about their computer skills and their conventional teaching and assessment methods used in English language classrooms. Teaching practices and student interaction patterns were identified during the interview.

*Teacher Training*

Participating teachers took a full week of training on the technicalities of using Web 2.0 – based websites to learn how to create blogs, wikis, and podcasts and to learn how to manage RSS feeds. Teachers prepared a teaching unit that used Web 2.0 at the core of the teaching practices. The content taught over an academic year is usually divided into several thematic units depending on grade level. The teachers and the researcher cooperatively decided on a set of activities to be used in the participating classes during the implementation phase.

Table 1  
*Web 2.0 Tools and Sites Used in Teacher Training*

| Web 2.0 Tool | Site           | Objectives  |
|--------------|----------------|---|
| Blog         | Blogger.com    | <ul style="list-style-type: none"> <li>- Create a blogger.com account</li> <li>- Create a blog and</li> <li>- Apply a theme</li> <li>- Manage posts, settings, and comments</li> <li>- Manage the design layout</li> <li>- Manage RSS feeds</li> </ul>                                |
| Wiki         | Wikispaces.com | <ul style="list-style-type: none"> <li>- Create a Wikispaces.com account</li> <li>- Create a wiki</li> <li>- Manage the wiki space settings</li> <li>- Upload files and photos on the wiki</li> <li>- Manage Notifications and RSS</li> <li>- Manage changes on the wiki</li> </ul>   |
| Podcast      | MyPodcast.com  | <ul style="list-style-type: none"> <li>- Create a MyPodcast.com account</li> <li>- Record podcasts using MyPodcast Recorder provided by the site</li> <li>- Record podcasts using a portable digital audio recorder</li> <li>- Publish podcasts</li> <li>- Manage podcasts</li> </ul> |
| RSS          | iGoogle        | <ul style="list-style-type: none"> <li>Setup an iGoogle page</li> <li>Add RSS Links from blogs, wikis and podcasts</li> <li>Manage RSS feeds</li> </ul>   |

Teachers were trained to use all features of the Web 2.0 sites including Blogger.com, Wikispaces.com, MyPodcast.com, and Bloglines.com based on the objectives detailed in Table 1. The training used the online tutorials provided by each of the sites. These sites were selected by the researcher based on popularity, built-in tutorials, and ease of use. After sufficient training was given about all the features of each site, teachers participated in a brainstorming activity in order to decide on ways of integrating the Web 2.0 site into their teaching practices. As a result, teaching activities were prepared by the teachers in a collaborative effort using the identified potentials of the Web 2.0 sites. The same unit was taught in both classes.

#### *Classroom Observations and Teacher Interviews during Implementation*

The teachers introduced students to blogs, wikis, and podcasts and gave them the web addresses of the created activities. The researcher was in contact with the teachers when they were teaching the Web 2.0 – based unit to make sure that all technical difficulties were overcome during implementation. It was assumed that there was no, or a very small, learning curve for students in using these tools. In-class student interaction

patterns were identified and recorded by the researcher who monitored closely all online interactions and collaborations taking place in blogs, wikis, and podcasts on a daily basis throughout the implementation phase. Online interaction patterns were identified and documented. Teachers were interviewed about their teaching experience using Web 2.0 in order to identify emergent issues and record changes in teaching practices and student collaboration. According to Hatch (2003) and Merriam (2002), simple descriptions of events are not sufficient to construct meaningful conclusions. The researcher needed to spend most of the data collection phase at the research site to be able to develop insights into what the teachers and students were experiencing. Gay and Airasian (2003) explained that a trust relationship between the researcher and the participants needs to develop in order to collect meaningful data.

### *Post Implementation Student Survey and Teacher Interviews*

Following the implementation of the Web 2.0 unit, participating teachers were interviewed to identify the advantages, benefits, challenges, difficulties, and limitations of using Web 2.0 in the English classroom. Changes in teaching practices and newly developed strategies were discussed in detail. Teachers' reflections helped the researcher identify and analyze all encountered issues. On the other hand, participating students were asked to fill out a survey questionnaire to reflect on their experiences during the study. The researcher coded, summarized, and analyzed all collected information to answer all research questions. According to Yin (2003b), the challenge is in properly identifying why and how research interventions lead to observed outcomes.

## **Results**

This case study investigated how Web 2.0, including blogs, wikis, podcasts, and RSS feeds can change teaching practices of in-service high school teachers to improve the collaboration of today's students in the English language classroom. Data were collected through three teacher interview questionnaires prior, during, and post the implementation of the study. Students were also surveyed after the study about their experiences with Web 2.0 tools. Observations were recorded throughout the implementation phase. The data collected provided comprehensive answers for the research questions in two areas of inquiry:

### *Teaching Practices*

#### *1 How can Web 2.0 (blogs, wikis, podcasts, and RSS) be integrated into teaching practices of English language teachers?*

Traditional instructional practices included lecturing, small group activities, and inquiry. Web 2.0 tools provided teachers with a strategy to avoid the traditional approach of reiteration of content material by creating a student-centered learning environment in which students are provided with sets of skills and tools to interact and collaborate. Blogs were major tools that allowed students to interact and share thoughts and ideas while wikis provided an appropriate environment for collaboration that allowed students to

work in groups to create responses to teachers' questions. Teachers indicated that instead of giving traditional in-class journal writing assignments, they were able to post a journal topic on their course blogs and have students respond to the topic on their own blogs. A sample activity was "Is Byron's poetry good poetry? Why or why not?" Students were required to post their reflections on their own blogs and to comment on each other's blogs. Using Podcasts, teachers shared audio recordings with their students, yet listening to podcasts was a bit problematic to students and some students complained that they did not have the appropriate bandwidth to download big audio files. Teachers checked student contributions regularly. They evaluated the level and the quality of contributions. They used RSS feeds of student blogs in order to track changes to blogs and get notified about new posts.

Assessment in the English class was done through a variety of ways including formal and informal methods. Teachers used holistic and analytical rubrics to assess student writing. Teachers assigned projects and had students write reflections and journals. Teacher sometimes used traditional paper tests for comprehension and basic checks for reading. The central vein of their assessment was broad and dependent on engagement. Web 2.0 tools were integrated within classroom activities and teachers did not find a need to change their formal assessment practices.

## 2 *How must teaching practices change to accommodate Web 2.0?*

Teachers found blogger.com, wikispaces.com, mypodcast.com, and iGoogle-based RSS feeds adequate for their classes and created an opportunity for growth and development. Teachers found many benefits in using these tools in their classes by allowing them to easily engage their students in interactive and collaborative activities. Blogging was considered an easy tool for all students. Collaborating through wikis and listening to podcasts was considered not too difficult by half of the students. RSS feeds were easy for almost half the students. It can be concluded that wikis, podcasts, and RSS feeds required students to go through a learning curve in order to use them properly. Teachers needed help in introducing the tools to students and found that short hands-on sessions with the students at the start of each activity were very useful.

Teachers explained that the Web 2.0 tools prompt more efficient student to student interaction than what was traditionally possible to achieve in a regular face-to-face classroom. Thus, teaching must be changed to allow for more of these activities to be included in teaching practices. Teachers also noticed that posting reflections, thoughts, comments, and ideas formalized the process of contribution and has increased the level of collaboration. This process helped teachers become more efficient. One of the teachers confirmed that he would definitely give up paper journals. The other said: "there is no turning back".

Teachers tended to set more strict deadlines than what they used to set in the past. Teachers gave clear instructions online, and no student had an excuse for not knowing what the homework was as is usually the case in traditional classes. The recordkeeping features of Web 2.0 tools helped controlling deadlines and helped students stay on track. All students were obliged to use computers and the Internet to complete projects which benefited those who avoid using computers for school work. Web 2.0 tools provided a connection between school work and students' capabilities in using the Internet. For teachers, Web 2.0 tools created a virtual space that extended closed face-to-face class

periods with online interactions. The online learning environment created by these tools expanded the possibilities of interaction and collaboration in the English classroom. Teachers need to create and manage such virtual spaces to increase the potentials of their classes and meet the needs of their students.

PW graded the quality of posts and comments on posts of others while RJ chose only to grade the quality of posts and encouraged students to comment on each others' posts. PW had an average of 10 posts per student while RJ had only 4 posts per student. Consequently, the average number of received comments, the average number of unique peers who commented on posts, and the average number of comments on blogs of peers in PW's classes were significantly higher than RJ's.

### 3 *Which Web 2.0 tools offer greatest academic potential? Why?*

Most students did not need computer training to participate in the Web 2.0 activities. Teachers introduced the activities and students managed to continue on their own. Five out of 37 students had difficulties at the start of each Web 2.0 activity, then they received help from their savvy peers.

Blogger allowed students to create their own blogs on which they posted their responses to teacher's prompts. Students were asked to comment on other students' posts. Blogs were the easiest to create and use. For students, blogs were good for learning about each others' opinions and points of view. Wikispaces allowed students to engage in collaborative group work and brain storming activities. The wiki was identified by teachers as the "most powerful tool for collaboration". It was not difficult to create and manage. Teachers had the flexibility to carefully track edits in order to be able to assess contributions accurately. MyPodcast allowed students to listen to poetry recitals posted by the teacher. Students posted comments on published podcasts analyzing the poetry. Podcasts allowed students to respond to audio prompts in a way that is similar to blogs. Sometimes, teachers considered podcasts time consuming to create and to listen to. RSS feeds, through iGoogle, allowed students to create a personalized page where they incorporated RSS feeds of blogs and wikis of classmates in addition to feeds of news, weather, sports, SAT question of the day, and GRE word of the day. Feeds helped reinforcing English language literacy. The teacher used RSS feeds to track students work and progress on blogs and wikis. One teacher identified RSS as a "brilliant" tool that made her life much easier and saved browsing time tremendously.

### 4 *What modifications must be introduced to improve the process?*

Teachers involved in this case study were never engaged in creating any Web 2.0 activities before. Presenting a framework for students using blogs, wikis, podcasts, and RSS combined was thought to be a new and exciting challenge for the teachers, yet learning how to use Web 2.0 tools wasn't difficult for them. It was a matter of exploration and following a guided process. Teachers used the tutorials embedded in blogger.com, wikispaces.com, mypodcast.com, and iGoogle.

Five out of 37 students considered Web 2.0 tools complicated and required a high learning curve. This was acknowledged by teachers who encouraged peer support. Teachers reported that support from peers was very helpful and adequate. One student was not comfortable with the fact that blogger and wikispaces exposed his assignments to readers and contributors around the world. A closed environment where only the class

community has access to class blogs, wikis, and podcasts could have been better to use with students. A technology-challenged student complained that more effort, time, and technical skills were needed in addition to thinking about the assignment. More training for students can help eliminate this issue. Certain students had some difficulties in keeping track of URLs of their classmates' blogs. A web page was made available to teachers and students with all URLs needed for all activities. Teachers continuously updated the content of this webpage.

Teachers preferred to use one account to access all tools. That was not possible since not all tools can be found in one site. It was considered a challenge to ask students to memorize different usernames and password for each of the tools. Fortunately, students were acquainted with online account creation which facilitated this task a lot. A system that offers all tools in a single account could have been better for both students and teachers.

Teachers involved in this study were interested in networking and sharing ideas with other English teachers about the use of Web 2.0 in the curriculum. Teachers can support each others and learn from each others' experiences. English teachers suggested that they can benefit a lot by exploring more ways of implementing Web 2.0 into their teaching.

#### *Student Collaboration Behavior*

##### *5 What are the collaboration patterns of student use of Web 2.0 tools outside of the classroom?*

Web 2.0 tools allowed students and teachers to communicate and easily exchange ideas and opinions better than before. Blogs allowed students to post their poetry and analyses of texts and benefit from each others' writings. Everyone's opinion was shared openly and was not limited to the number of students interacting in face-to-face class discussions. Comments on blogs allowed students to see what others thought about their own writing. Wikis were efficient for they allowed dividing the workload among group members in a better way than what is traditionally done. Wikis saved a lot of time for managing group work. No emails, attachments, or papers were needed for group work; all information is shared on the wiki space. Less time was needed for face-to-face class meetings and information was easily shared on wikis and blogs. While commenting on each others' blogs, students developed their commentary skills and learned from each others. Students were able to work in their preferred environment at their preferred time.

Of 37 students, 33 reported that Web 2.0 tools improved the way they communicate and collaborate with each others. Only four students out of 37 reported no increase in collaboration. Students with difficulties were helped by their classmates and managed to complete all activities on time. Customized training for specific students with difficulties in using technology could remedy this issue.

##### *6 How would student use of Web 2.0 tools within the classroom affect their attitude towards learning and engagement in class activities?*

In class, students worked on assigning responsibilities for project work then used Web 2.0 tools outside the school for interaction and collaboration. Web 2.0 tools created virtual spaces on which students collaborated and shared ideas. Students learned a lot about each others' opinions and analytical capacities. The open time and ubiquitous

Internet access enabled students to collaborate while at home. Students became less intimidated to participate in online discussions than in regular class discussions. Many technologically oriented students got excited about sharing their ideas digitally. Technologically challenged students received help from their peers to overcome their fears and collaborate online. Teachers noticed that *shy* and *at-risk* students became more comfortable in sharing their opinions and responding to each others' comments.

Of 37 students, only 3 reported no change in attitude towards their English classes. Thirty four reported a positive change for various reasons. Web 2.0 tools allowed students to experience an effective use of modern technology, a more interactive way of learning, a better learning experience, and a global learning environment. Students enjoyed an interactive and collaborative environment when the Web 2.0 tools allowed for better sharing of thoughts and ideas, higher feedback rate from classmates, more collaborative learning, more group work, and more sharing of opinions. Sharing thoughts and ideas broadened their perspectives and allowed them to develop their critical thinking skills. Posted assignments allowed students to use the materials posted collaboratively by all students as revision materials for tests. Web 2.0 tools helped teachers and students stay on track, focused, and organized. They gave students more freedom. This environment allowed students to become more involved in class and do more work. According to students, the English class became more interesting, more fun, and much easier than before and allowed them to go deeper in analyzing the studied topics.

#### 7 *What are the observable outcomes of student use of Web 2.0 tools?*

Teachers explained that Web 2.0 tools allowed them to achieve exceptional levels of student engagement. There was a huge learning curve accompanying this case study, but teachers accomplished multiple goals including improved language literacy, organizational skills, student engagement, and research skills.

Professionally, Web 2.0 tools enabled teachers to develop stronger organization skills and differentiation in the teaching approach. It also helped teachers implement an environmentally conscious learning environment by using much less paper trails. Students were proud that they were saving trees since they did not have to print their assignments. Web 2.0 tools created a virtual space that lessened the gap between home and school, and allowed for differentiated instruction. Web 2.0 tools allowed teachers to manage a larger number of students in collaborative activities than what was previously possible, and that was the “biggest surprise” to them.

All student contributions on wikis and blogs created a set of online notes that became very useful for reviewing for English exams. The setup allowed students to have less restrictions, hence making room for self expression. Web 2.0 tools made the English class more fun. Students managed to stay in touch with their teacher even during holidays. One teacher indicated that there is “no turning back” now that she implemented blogs, wikis, RSS feeds and podcasts in her classes.

#### 8 *What future potential could be identified from this study?*

Teachers found that Web 2.0 tools were very useful for their classes and they will use blogs, wikis, podcasts, and RSS feeds in future classes. Teachers used blogs to post weekly prompts that allowed students to respond on their own blogs. Requiring students to post on their blogs and comment on posts of others was important to create an

interactive environment. Teachers divided students into small groups and assigned to each group a topic and a set of questions related to the book being read in class. Students collaborated on creating their responses and reflections on their wiki space. Teachers enjoyed podcasting and made good use of it and will be using it in future classes for publishing poetry, recitals, and interviews. One teacher expressed a need to improve his own understanding of the use of RSS feeds for learning.

Teachers realized that with Web 2.0 tools learning became more effective than before. The classroom was expanded with virtual spaces where students can learn, interact, and collaborate. They also found that educators in all other subjects can benefit from this technology. Many students reported that they would like to continue using Web 2.0 tools in their English classes as well as other subjects including theory of knowledge, history, languages, humanities, economics, biology, chemistry, and information technology.

## **Conclusions and Recommendations**

### **Conclusions**

Today's students live in a media-rich environment. They are engaged in electronic communications using a variety of technologies such as email, instant messaging, chatting, personal blogs, and short text messages. Today's students expect learning to take place using modern digital communication tools (Oblinger & Oblinger, 2005; Chen, 2005). The recent development of Web 2.0 tools including blogs, wikis, podcasts, and RSS have created a new generation of websites that are centered around user participation. Web 2.0 tools allowed users around the globe to contribute to the creation of online content (Richardson, 2006). Using these tools in teaching has become a major challenge for educators. This case study examined how Web 2.0, including blogs, wikis, podcasts, and RSS can affect teaching practices of in-service high school teachers to improve the collaboration of today's students in the English language classroom.

#### *Integrating Web 2.0 Tools in Teaching*

Web 2.0 tools allowed teachers to avoid the reiteration of content material and helped them create a student-centered learning environment. Teachers replaced old methods of assigning paper-based journal writing assignments with blogs on which students write their thoughts and poetry and exchange comments with all classmates. The wiki was the tool of choice for managing group work. Students in small groups were assigned wiki spaces on which they contributed their knowledge to complete the assigned task. Teachers evaluated the level and quality of contributions. Blogs and wikis allowed teachers to extend class discussions with online discussions on which all communications are appropriately documented and tracked. Teachers used their regular formal assessment techniques using rubrics and paper tests. Requiring student participation is important to enhance learning (Smaldino, Russell, Heinich, & Molenda, 2008). Cognitive learning theorists including Gagné (1985) supported the principle that active user participation and manipulation of information are needed to satisfy effective conditions for student learning. Teachers achieved higher levels of participation when posting was required and graded.

The study used four Web 2.0 websites: Blogger.com, Wikispaces.com, MyPodcast.com, and iGoogle. Teachers created their own blogs as well as students. Teachers created class wikis and invited their students to edit their group pages. Teachers

also created a podcasting page on MyPodcast. Therefore, there were many URLs to be shared with students. This necessitated the creation of a web page that contained all links for the convenience of students and teachers. It is recommended that a portal or a teacher's website accompany the introduction of Web 2.0 tools with students because there is a big amount of links to be shared. On the other hand, teachers were worried about the many various usernames that needed to be remembered by students in this study. They preferred to have one account to access all Web 2.0 tools. A system that offers all tools in a single account would be recommended to be used in future classes.

### **Recommendations**

The analysis of the findings of this case study highlighted several recommendations for educators and researchers to improve the implementation of Web 2.0 tools in the English classroom.

- 1 The interactive nature of blogs allowed students to share their responses with all classmates. Any classmate could comment and react to the posts. Cross interactions could lead to discussions and more posts. Blogs allowed a very large number of students to interact with one another in a way that was never possible in traditional teaching methods. Writings that used to be addressed to the teacher are now addressed to everyone. This gave the opportunity to all students to express themselves creatively on their blogs. Teachers have realized the great benefit for student learning when using blogs instead of paper-based journal writing. It is therefore recommended to use blogs instead of paper based journal writing activities in the English classroom.
- 2 Most students recommended the use of Web 2.0 tools in all other subjects. Teachers can benefit from the interactive nature of blogs and the collaborative use of wikis for group work. They can publish their lectures, readings, and announcements using podcasts, and can benefit from the information tracking capabilities of RSS feeds. It is recommended that more studies need to be done to confirm the usefulness of Web 2.0 in all Subjects.
- 3 Most current Web 2.0 tools are disconnected from each other and are offered for free from various companies including Google Blogger, Wikispaces, Mypodcast, and many others. Based on the educational value that these applications offer to educators at various levels, it is recommended to develop systems that support these applications through one interface and one login account. Google, for example, currently offers blogging and RSS tools. It is recommended that podcasts and wikis be added to unify user log in.
- 4 It is recommended to develop Learning Management Systems for schools and universities that offer all the teaching and learning tools in addition to Web 2.0 tools in one integrated interface.
- 5 Teachers involved in this study were interested in networking and sharing ideas with other English teachers about the use of Web 2.0 in the curriculum. Teachers can support each others and learn from each others' experiences and benefit from exploring more ways of implementing Web 2.0 into their teaching. It is recommended that teachers establish links with other teachers to share experiences and set best practices.
- 6 Students who faced technical difficulties were helped by their classmates and

managed to complete all activities on time. Customized training for specific students with difficulties in using technology could remedy this issue. It is recommended that introductory tutorials be offered to such students prior to the implementation of Web 2.0 tools in the classroom.

- 7 Other than tracking students' blogs and wikis, and adding feeds like word of the day, weather, news, and email, there are limited curriculum-based resources that are directly related to teaching and learning. It is recommended to develop customized content created for students and teachers based on curriculum standards. Most of the RSS feeds currently available are designed for news and special interests and do not offer content that is of considerable value for teaching and learning.
- 8 Web 2.0 tools are many and come from various providers. Teachers in this study needed to share a lot of links with all students at various stages of the implementation phase. In the absence of a learning management system, it is recommended that a web page be created to share links to the needed Web 2.0 tools.

### Summary

Today's students have access to global, interactive, and multimedia rich electronic resources. They are the "Net Generation" (McNeely, 2005). These students rarely had the opportunity to experience the latest in interactive web technologies in a teaching and learning context (Oblinger & Oblinger, 2005; Warlick, 2005b; Richardson, 2006; Losinski, 2007). The current teaching practices lack the interactive technologies that engage today's students and allow them to be active contributors in collaborative activities. Current Web 2.0 technologies, including blogs, wikis, podcasts, and RSS have created a *Read/Write* web that is ideal for student collaboration. The goal of this study was to examine how Web 2.0, including blogs, wikis, RSS, and podcasts, can change teaching practices of in-service high school teachers to improve the collaboration of today's students in the English language classroom. Two months were needed to implement the case study. Two grade 11 English classes with a total of 37 students and 2 experienced teachers were involved. Teachers received training sessions over one week in which they explored the technicalities of using blogs, wikis, podcasts, and RSS in their classes. Teachers filled three questionnaires: beginning of the study, during the implementation phase, and post the implementation phase. Students filled one questionnaire after the implementation phase was completed. The findings are presented in a descriptive narrative format.

Teachers found that Web 2.0 tools made them *more efficient* and *paperless*. Blogging was the *most powerful tool* for expressing and sharing ideas. Blogs formalized interaction through a published format. Teachers developed questions and students posted their responses on their own blogs. Students read each others' blogs and posted comments. This act triggered more interactions and cross posting of poetry, academic responses, and personal opinions. Students were never provided with a similar opportunity in a regular classroom that used conventional methods of teaching and learning. Students were actively interacting and sharing thoughts and ideas. Students were very interested in seeing what others think of their writing. Some students decorated

their posts with graphics and added on their blogs news links, slideshows, and personal profiles. Both teachers and students enjoyed the interactions that took place on Blogs.

Wikis were more difficult to use but were useful to facilitate group planning and the collaborative construction of knowledge. Wikis provided a collaboration environment in which students were assigned to small groups and were asked to edit wikis in order to construct a collaborative response to prompts of their teachers. The result was that students had a chance to collaboratively construct knowledge with their classmates. Students learned a lot from each others and completed group projects. Podcasts are more technical than wikis and required a high bandwidth. They were useful for creating interviews, speeches, and poetry recitals. Students enjoyed listening to the podcasts and some students created their own podcasts for the school magazine. Tracking updates on websites, posts on blogs, collaborations on wikis, and audio recordings on podcasts was made possible with RSS feeds. They helped students and teachers organize their Web 2.0 experience by adding feeds on their iGoogle page. RSS feeds allowed students to have access to various sites that offer dynamic content including weather, news, and sports.

In this case study, teachers considered Web 2.0 tools “extremely useful” and of “great potential” for teaching and learning in the English classroom. This case study was an eye opener for teachers who will be exploring more uses of Web 2.0 tools in their classes. Students were naturally engaged when working with Web 2.0 tools. They were described by their teachers as “a generation of online learners”. All students needed to experiment with these tools and have a chance to learn about new technologies used in teaching and learning. Web 2.0 tools were useful for sharing ideas and connecting to the world. This case study offered a professional development opportunity for teachers through which they learned about applications that promote better student learning.

## References

- Achterman, D. (2006). Beyond "Wikipedia". *Teacher Librarian*, 34 (2), pp. 19-22.
- Brooks-Young, S. (2007). *Digital-age literacy for teachers: Applying technology standards to everyday practice*. Eugene, OR: International Society for Technology in Education.
- Brown, M. K., Huettnner, B, & James-Tanny, C. (2007). *Managing virtual teams: Getting the most from wikis, blogs, and other collaborative tools*. Plano, TX: Wordware Publishing, Inc.
- Chen, H. (2005). *Reflection in an always-on learning environment: Has it been turned off?*. Retrieved May 5, 2008, from <http://campustechnology.com/articles/40512/>
- Fadel, C., & Lemke, C. (2006). *Technology in Schools: What the research says*. Retrieved January 10, 2008, from <http://www.cisco.com/web/strategy/docs/education/TechnologyinSchoolsReport.pdf>
- Frاند, J. (2000). The information age mindset: Changes in students and implications for higher education. *EDUCAUSE Review*, 35(5), 15-24.
- Gagné, R. M. (1985). *The conditions of learning* (4th ed.). New York, NY: Holt, Rinehart & Winston.
- Gay, L., & Airasian, P. (2003). *Educational Research: Competencies for analysis and application*. Upper Saddle River, NJ: Merrill Prentice Hall.

- Hardman, J. & Carpenter, D. (2007). Breathing fire into Web 2.0. *Learning & Leading with Technology*, 34(5), pp. 18-21.
- Hatch, J. (2002). *Doing qualitative research in education settings*. Albany, NY: State University of New York Press.
- ISTE. (2005). *National Educational Technology Standards for Students (NETS•S)*. Retrieved May 12, 2007, from [http://cnets.iste.org/students/s\\_stands.html](http://cnets.iste.org/students/s_stands.html)
- ISTE. (2007a). *National Educational Technology Standards*. Retrieved August 15, 2007, from <http://www.iste.org/Template.cfm?Section=NETS>
- ISTE. (2007b). *The next generation of NETS for students*. Retrieved July 10, 2007, from <http://www.iste.org/Content/NavigationMenu/NETS/NETSforStudentsStandards2007.doc>
- Johnston, M, & Cooley, N. (2001). *Supporting new models of teaching and learning through technology*. Arlington, VA: Educational Research Service.
- Jonassen, D., Howland, J., Marra, R., & Crismond, D. (2008). *Meaningful learning with technology* (3rd ed.). Upper Saddle River, NJ: Pearson Education, Inc.
- Kelly, M. G, & Haber, J. (2006). *National educational technology standards NETS•S: Resources for student assessment*. Eugene, OR: International Society for Technology in Education.
- Losinski, R. (2007). Patrolling Web 2.0. *T.H.E. Journal*, 34 (3), pp. 50-52.
- Lenhart, A. (2006, November 6). *Online activities & pursuits*. Retrieved April 25, 2007, from [http://www.pewinternet.org/PPF/r/76/presentation\\_display.asp](http://www.pewinternet.org/PPF/r/76/presentation_display.asp)
- Maxwell, J. A. (2005). *Qualitative research design: an interactive approach*. Newbury Park, CA: Sage Publications.
- McNeely, B. (2005). Using technology as a learning tool, not just the cool new thing. In D. Oblinger & J. Oblinger (Eds.), *Educating the Net Generation*. Boulder, CO: EDUCAUSE.
- Merriam, S. B. (2002). *Qualitative research in practice: Examples for discussion and analysis*. San Francisco, CA: Jossey-Bass.
- North Central Regional Educational Laboratory (NCREL). (2003). *21<sup>st</sup> century skills: Literacy in the digital age*. Retrieved February 5, 2008, from <http://www.ncrel.org/engage/skills/engage21st.pdf>
- Oblinger, D. G., & Oblinger, J. L. (2005). *Educating the net generation*. Retrieved February 5, 2007, from <http://www.educause.edu/educatingthenetgen>
- O'Reilly, T. (2005, September 30). *What is Web 2.0: Design patterns and business models for the next generation of software*. Retrieved February 8, 2007, from <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>
- Partnership for 21<sup>st</sup> Century Skills. (2004). *Learning for the 21<sup>st</sup> century*. Retrieved February 5, 2008, from [http://www.21stcenturyskills.org/images/stories/otherdocs/P21\\_Report.pdf](http://www.21stcenturyskills.org/images/stories/otherdocs/P21_Report.pdf)
- Penrod, D. (2007). *Using blogs to enhance literacy: The next powerful step in 21<sup>st</sup> century learning*. Lanham, MD: Rowman & Littlefield Education.
- Prensky, M. (2001a). Digital natives, digital immigrants: Part I. *On the Horizon*, 9(5), pp. 1-6.
- Purmensky, K. (2006). Weblogs transform service-learning reflection. *Academic Exchange Quarterly*, 10(1), p.13-5.

- Richardson, W. (2006). *Blogs, wikis, podcasts, and other powerful web tools for classrooms*. Thousand Oaks, CA: Corwin Press.
- Smaldino, S. E., Russell, J. D., Heinich, R., & Molenda, M. (2008). *Instructional technology and media for learning* (9th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
- Solomon, G., & Schrum, L. (2007). *Web 2.0: New tools, new schools*. Eugene, OR: International Society for Technology in Education.
- Stuve, M., & Cassady, J. (2005). A factor analysis of the NETS performance profiles: Searching for constructs of self-concept and technology professionalism. *Journal of Technology and Teacher Education*, 13(2), pp. 303-24.
- TESOL. (2007). *Qualitative research: Case study guidelines*. Retrieved July 5, 2007, from [http://www.tesol.org/s\\_tesol/sec\\_document.asp?CID=476&DID=2153](http://www.tesol.org/s_tesol/sec_document.asp?CID=476&DID=2153)
- Utecht, J. (2006). *Customization generation*. Retrieved January 20, 2008, from <http://www.thethinkingstick.com/?p=283>
- Walker, L. (2006, April 4). New trends in online traffic; visits to sites for blogging, local information and social networks drive web growth. *The Washington Post*, pp. D.01. Retrieved September 5, 2007, from ProQuest LLC.
- Warlick, D. F. (2004). *Redefining literacy for the 21<sup>st</sup> century*. Worthington, OH: Linworth Publishing, Inc.
- Warlick, D. F. (2005a). *Classroom blogging: A teacher's guide to the Blogosphere*. Raleigh, NC: The Landmark Project.
- Warlick, D. F. (2005b). *Raw materials for the mind: A teacher's guide to digital literacy* (4th ed.). Raleigh, NC: The Landmark Project.
- Williams, B. (2007). *Educator's podcast guide*. Eugene, OR: International Society for Technology in Education.
- Xcerion. (2008). *Xcerion frequently asked questions*. Retrieved January 20, 2008, from <http://xcerion.com/faq>
- Yin, R. K. (2003a). *Applications of case study research* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Yin, R. K. (2003b). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.