

Perceptions, Interest, and Use: Teachers and Web 2.0 Tools in Education

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This study examined teachers' use of Web 2.0 tools in education, assessed teachers' awareness and perceptions of the pedagogical benefits of Web 2.0 technologies, and investigated teachers' willingness to adopt Web 2.0 tools to support and supplement classroom instruction. Responses indicated that social networking sites and social video tools are currently the Web 2.0 tools most utilized by instructors. Additionally, teachers reported positive experiences using social video, social networking, and podcasts. Teachers indicated positive perceptions of the pedagogical benefits and importance of Web 2.0 tools for teaching and learning, and expressed interest in gaining further skill and understanding in order to more effectively and seamlessly integrate Web 2.0 tools to support and supplement classroom instruction.

Keywords: perceptions, interest, use, Web 2.0, teaching, teachers.

INTRODUCTION

As the prevalence of online communication tools has increased, the availability of freely accessible, user-generated, online information has simultaneously expanded. These two trends have combined to change the way teachers and students interact. Today the Web has become more than an information repository or a place to search for resources. The advent of Web 2.0 has transformed the internet into a global network of interconnected learning communities. Rather than a medium through which information is transmitted and consumed, the Web is becoming a platform where content is created,

shared, remixed, repurposed, and exchanged. A unique and defining feature of many Web 2.0 applications is the ability to harness the collective intelligence of users. With Web 2.0 applications, every user is invited to create content. Learners become part of a global human network in which they can harness the collective knowledge, intelligence, and skills of others, all over the world, in a way that has never before been possible. Through Web 2.0 applications, students can interact with other learners, gain from shared experiences, and continuously construct their own knowledge. For teachers, this is an exciting time. The advent of Web 2.0 technologies gives teachers the opportunity to empower their students as never before, through an array of exciting new learning tools and mediums.

However, to harness the power and opportunity offered by Web 2.0 applications, teachers must be comfortable integrating new technologies into their classrooms. Currently, a gap exists between the potential offered by modern internet technologies and actual pedagogy and practice (Conole, 2010; Conole & Alevizou, 2010). Despite the apparent potential and general enthusiasm among instructors, researchers have found that teachers seldom incorporate Web 2.0 technologies extensively in their classrooms (Bertolo, 2008; Conole & Alevizou, 2010; Davis, Duval, Muramatsu, White, & Van Assche, 2007). The reasons for this may be complicated. For example, Carr (2008) reports that “while virtual worlds may invite experimental pedagogy, students’ familiarity with the interface and in-world social practices still need to be considered, as do their expectations of what constitutes learning and teaching” (p. 15). Addressing this issue, a majority of the studies examining Web 2.0 applications in education have focused on college students’ perceptions and experiences (Conole & Alevizou, 2010). However, teachers’ confidence and familiarity with a new technology has been shown to be a factor which can impact student perceptions of Web 2.0 applications, both positively and negatively (Yaoyuneyong & Burgess, 2010). Instructors serve an important role, both in bringing Web 2.0 applications into their classrooms and in guiding students to value and optimally utilize the opportunities made available through technology. For these reasons, this study investigates teachers’ perceptions, experiences, interest, and willingness to learn about, adopt, and integrate Web 2.0 technologies into their classrooms.

WEB 2.0 IN EDUCATION

In addition to creating new teaching and learning opportunities, Web 2.0 has the potential to forever alter the way human knowledge is constructed and disseminated. Due to their ease of use, their open nature, and their support for collaboration and communication, the applications associated with Web 2.0 have profound potential to transform education. Teachers can use Web 2.0 tools to captivate students, to hold their attention, and to enhance their learning experiences. Many scholars such as Frankline and Harmelen (2007) predict that the evolution of Web 2.0 will transform the way colleges and universities go about the business of education. Beyond aiding learning, teaching, and assessment, Web 2.0 technologies have the potential to enhance and interconnect school communities, to widen participation and help keep alumni in contact, and to expand education’s ability to symbiotically coexist with industry (Franklin & Harmelen, 2007).

Through Web 2.0 technologies, students can become creators of content and not just consumers. As they participate in learning activities facilitated by Web 2.0 tools, students gain the opportunity to innovate and create in a collaborative multimedia environment. Today, thousands of Web 2.0 applications with potential in teaching and learning are available for students and educators. These tools include, but are not limited to: podcasts (e.g., iTunes), blogs (e.g., Blogger, Wordpress), wikis (e.g., PBWiki, Wikispaces), social

bookmarking tools (e.g., del.icio.us, Diigo) , social networking tools (e.g., EduSpace, Facebook, Ning), social media sharing tools (e.g., Flickr, SlideShare, YouTube), collaborative writing tools (e.g., Google docs, Zoho), virtual 3D community platform (e.g., Second Life), and social library tools (e.g., LibraryThing).

For educators, alongside the exciting potential of Web 2.0 technologies, there is also the knowledge that students have been changing, whether or not we can keep up. Modern students, who are often “digital native” learners, have already found and integrated many Web 2.0 tools into their daily lives. As summarized by Prensky (2001), “Our students have changed radically. Today’s students are no longer the people our educational system was designed to teach” (p. 1). Teaching and learning should be moved away from conventional methods in which students are told what to learn, as well as when, where, and how. Instead, knowledge should be actively constructed and students should be made responsible for their own learning. The opportunity to publish information online, through platforms that are both instantaneous and global, is something that “digital native” students take for granted as commonplace. Modern learners are used to the ability to publish and share their thoughts, opinions, and ideas, as well as their knowledge, in open and interactive digital environments. For these and many other reasons, teachers should consider the array of Web 2.0 tools available, and work to integrate some of them into their teaching and learning.

WEB 2.0 IN THE CLASSROOM

Using a Web 2.0 technology or tool in the classroom without considering pedagogical theory could be compared to using power tools to construct a house without first consulting an architect. Web 2.0 applications have tremendous potential to empower individual learners and to build and interconnect learning communities; however, teachers must have a plan for each tool utilized in order for the technology to achieve a positive effect. For this reason, researchers and educators (e.g., Bles & Rittberger, 2009; Grant & Mims, 2009; Laurillard, 1995; McLoughlin & Oliver, 1998; Pieters, 2004; Rogers, Liddle, Isom, Chan, & Doxey, 2007; Siemens, 2005; Smith & MacGregor, 1992) have suggested a number of theoretical frameworks to guide instructors integrating Web 2.0 tools into their curricular design (e.g., Constructionism/Constructivism, Connectivism, Collaborative/Cooperative Learning; Communicative Learning). Collectively, these theories and associated pedagogies can be described as Participatory Learning or Contribution-Oriented Learning, since they focus on student participation and on student-generated content (Collis & Moonen, 2008).

BENEFITS

Ajjan and Hartshorne (2008) surveyed 136 university instructors in order to determine their perceptions of the pedagogical benefits of Web 2.0 technologies. Instructors reported that, in addition to a) being easy to integrate into the classroom, both blogs and wikis were perceived to b) improve students’ overall learning, c) improve students’ writing skills, and d) increase student-faculty interaction (Ajjan & Hartshorne, 2008). Additionally, both social networks and wikis were perceived to be useful for a) increasing student-student interactions, and b) increasing students’ satisfaction with the course (Ajjan & Hartshorne, 2008).

In a more recent study, An and Williams (2010) surveyed fourteen instructors who, due to their extensive use of Web 2.0 tools in the classroom, were deemed “Web 2.0 experts” (p. 41). These instructors reported four primary advantages of integrating Web 2.0 technologies into their instruction and learning environments. The first benefit,

reported by the majority of the participating instructors, was that use of Web 2.0 tools increased students' feeling of being members of a learning community by increasing interaction, communication, and collaboration (An & Williams, 2010). Approximately half of the participating teachers also noted that use of Web 2.0 tools helped create an environment where the teacher could act as a facilitator of student knowledge creation, rather than a distributor of content (An & Williams, 2010). A third benefit reported by instructors related to the flexibility and ease-of-use of Web 2.0 technologies, which made them suitable for students and instructors who did not necessarily have advanced technical skills (An & Williams, 2010). A fourth major benefit observed by the surveyed instructors was improvement of the students' writing skills, and similarly improvement in the students' ability to apply and use technology (An & Williams, 2010).

BARRIERS

While Ajjan & Hartshorne (2008) found that teachers had high perceptions regarding the benefits of Web 2.0 technologies, only 10-20% of responding faculty actually used blogs, wikis, social networks, or social bookmarks. An additional small percentage (8-18%) of surveyed teachers did not currently use, but planned to use, one or more Web 2.0 tools in their courses (Ajjan & Hartshorne, 2008). The majority of responding faculty (60-80%) did not use any Web 2.0 applications in their classes and had no plans to in the future (Ajjan & Hartshorne, 2008).

An and William (2010) found that teachers reported encountering three barriers when introducing Web 2.0 tools into the classroom environment: a) student uneasiness with openness and public discourse and interaction, b) technical difficulties related to students' lack of new computers, glitches due to the in-progress nature of many Web 2.0 tools, and lack of adequate technical support, and c) the extra time necessary to initially learn and then manage new Web 2.0 technologies, both for the instructor and for the students.

This supports prior findings by Crook *et al.* (2008) who report that "More than a third (37.4%) of teachers believe that adopting Web 2.0 resources would be time-consuming for them, and teachers frequently (18.7%) and occasionally (47.0%) find that student use of the internet in class can be hard for them to manage" (p.51). Similarly, Burke, Snyder, and Rager (2009) found that health education faculty perceived YouTube to be an effective tool for teaching health education, with the addendum that finding appropriate resources (videos) was a time-intensive task. Crook *et al.* (2008) identified other staff perceptions with the potential to act as barriers to the adaptation of Web 2.0 tools; these included: a) fear that Web 2.0 tools would act as a time burden impacting their already crowded schedule, b) fear of becoming overly reliant on technologies that may not remain available (due to budgetary restrictions within the university, policy change in the service provider, financial collapse of the service provider, or due to technical failures that are beyond the instructors' control), c) fear that students with access to the internet would not stay on task, d) and fear that technology in general will have a negative impact on education or society.

PERCEPTIONS

Ajjan and Hartshorne (2008) found that three factors (usefulness, ease of use, and compatibility with current practice), and three social groups (peers, superiors, and students) influenced teachers' attitudes towards utilizing Web 2.0 technologies in their classrooms. Furthermore, Ajjan & Hartshorne (2008) found that teachers' attitudes towards Web 2.0 technologies strongly affected their intention to use Web 2.0 tools in their classrooms, which in turn strongly predicted their actual use of Web 2.0

applications. Crook *et al.* (2008) found that intention to use and use of Web 2.0 tools was impacted by beliefs about how students learn, as well as by familiarity with the potential of different technologies.

Even though the pedagogical benefits of integrating Web 2.0 in the classroom are widely acknowledged, teacher attitudes towards Web 2.0 tools remain mixed (Bertolo, 2008). In a 2008 report, Crook *et al.* (2008) found that secondary school teachers in the UK reported both positive (53.9%) and negative perceptions of using Web 2.0 applications in the classroom, and that nearly one-fourth (24.3%) reported having no opinion one way or the other. Researchers (Ajjan & Hartshorne, 2008; Crook *et al.*, 2008) hypothesize that null opinions of this sort, as well as the low reported usage of Web 2.0 technologies by teachers, is related to teachers' lack of experience with and knowledge about Web 2.0 tools.

Chen, Wan, and Son (2008) state that "to bridge the gap between the new generation of learners and their school experience, it is important for educators to have a better understanding of the participatory Web and be able to view the new learning ecology from broader perspective" (p. 2,555). Supporting this view, Ajjan and Hartshorne (2008) found that teachers' self-efficacy, or their familiarity and self-confidence with Web 2.0 applications, influenced their decisions to deploy Web 2.0 technologies in their classrooms. Similarly, Crook *et al.* (2008) reported that both experience using particular technologies and familiarity with the potential benefits of the technologies shaped teachers' perceptions about the usefulness and applicability of adapting Web 2.0 tools for the classroom. Because it has been found that many teachers may need expert guidance in utilizing Web 2.0 applications, researchers (Ajjan & Hartshorne, 2008; Crook *et al.*, 2008; Sanders & Schroter, 2007), as well as several international reports (CERI, 2009; Ipsos MORI, 2008; JISC, 2009), recommended that institutions supply teachers with training and/or expert guidance in utilizing Web 2.0 tools in the classroom. Chen, Wan, and Son (2008) note that teachers' attitudes towards Web 2.0 technologies become more positive as they experience or use the applications in training and/or classroom settings. Similarly, teachers' confidence in using Web 2.0 technologies increases with training and experience (Chen, Wan, & Son, 2008). Simon (2008) argues that Web 2.0 training not only increases good practice among teachers and faculty, it helps prepare graduate students to be on the cutting edge, in terms of competitive job markets and their future careers.

PURPOSES AND RESEARCH QUESTIONS

It is important to realize that teachers' perceptions and opinions shape their actions. Many researchers have found that perceived usefulness, or the extent to which an instructor believes that use of a specific technology will enhance classroom performance, has a positive influence on teachers' behavioral intention towards applying given technologies (Ajjan & Hartshorne, 2008; Davis, 1989; Hartshorne, Ajjan, & Ferdig, 2010; Roger 2003; Taylor & Todd, 1995). Additionally, the higher the perceived usefulness of a technology, the more likely it becomes that an individual will use the new technology (Ajjan & Hartshorne, 2008; Hartshorne, Ajjan, & Ferdig, 2010; Rogers, 2003). Thus, two interrelated measures, teachers' perceptions of Web 2.0 tools, and teachers' use of Web 2.0 tools, can indicate instructors' willingness to integrate Web 2.0 technologies into their classrooms. For these reasons, studies of teachers' perceptions and opinions of Web 2.0 technologies are critical because teachers' willingness to utilize Web 2.0 tools is directly significant in their actual implementation of technology-based innovation in teaching and learning.

The purposes of this study were to investigate teachers' perceptions of, interest in, experiences with, and willingness to learn about, adopt, and integrate Web 2.0 technologies into their classrooms. With that basis, the following specific questions guided this study:

1. What Web 2.0 tools are used by teachers? What are teachers' experiences using Web 2.0 tools in teaching and learning?
2. What are teachers' perceptions of the pedagogical benefits of Web 2.0 technologies in teaching and learning?
3. To what extent are teachers interested in and willing to adopt Web 2.0 tools to supplement and support classroom instruction?
4. Considering teaching level and length of teaching experience, are there differences in teachers' experiences with, perceptions of, or interest in using Web 2.0 tools in teaching and learning?

METHODS

PILOT STUDY

A pilot study was conducted in the summer of 2009. Participants ($n = 35$) were members of two graduate classes in a public university in Taiwan. Most of the participating graduate students were also K-12 teachers. Participants reported positive perceptions of the benefits of Web 2.0 tools in teaching and learning. Respondents also indicated positive experiences using blogs, social videos, social networking sites, wikis, and podcasts. The Web 2.0 tools most often used by teachers were blogs, social videos, social networking sites, and wikis. Teachers felt that Web 2.0 tools were important and were interested in learning these tools to support and supplement classroom instruction (Yuen & Yuen, 2010).

PARTICIPANTS

The target population of this study consisted of teachers at all levels in Mississippi. Educators attending the 2010 Mississippi Educational Computing Association (MECA) Conference (Jackson, MS) and the 2010 Creating Futures Through Technology Conference (CFTTC) (Biloxi, MS) were invited to participate. Approximately 800 teachers attended the 2010 MECA conference and around 400 teachers participated in 2010 CFTTC conference.

INSTRUMENT

An online questionnaire was developed to examine teachers' perceptions of, experiences with, interest in, and willingness to learn about, adopt, and integrate Web 2.0 technologies into their classrooms. The 65-item survey was comprised of three sections. Part A consisted of 13 items to collect background information such as age, gender, years of teaching, computing experience, and general attitudes towards using technology in education. Part B consisted of 20 items to explore teachers' use of Web 2.0 tools or services. Part C consisted of 32 items which were designed to examine teachers' perceptions of (20 items) and interest in (12 items) using Web 2.0 tools in teaching and learning. The items investigating teachers' perceptions of Web 2.0 tools were 5-point Likert questions (5 = strong agreement; 1 = strong disagreement). To ensure appropriateness, content validity, and reliability, parts B and C of the instrument were

refined after feedback from a jury of experts. For part C, a Cronbach's coefficient α of 0.98 indicated excellent reliability.

PROCEDURE

Participants at the 2010 MECA and the 2010 CFTTC Conferences were invited to participate in the study. The questionnaire was administered online and data were collected in spring of 2010. Flyers inviting participation, explaining the purpose of the study, and giving the Web address of the online questionnaire were distributed in all sessions held at both conferences. In addition, a link to the questionnaire was provided on the researchers' Web site as well as the Web sites of the MECA 2010 Conference and the CFTTC 2010 Conference. A cover letter describing the aims of the study preceded the online questionnaire and was provided to the teachers before they took the questionnaire. The questionnaire was open online for 40 days and data was collected anonymously. No personal information was collected or identified.

RESULTS

Table 1 shows the demographic profile of respondents ($n = 368$) who completed the online survey. Most respondents were over 40 (64%), with the remainder (35%) somewhat equally distributed through the 25-30 (14%), the 31-34 (8%), and the 35-39 (13%) age groups. More respondents were female (81%) than male (18%). Thirty-nine percent of respondents were secondary school teachers, followed by elementary school teachers (26%), college/university instructors (23%), and others (13%). Many of the respondents had over 15 years of teaching experience (41%), with the remainder having 11-15 years of experience (19%), 6-10 years of experience (19%), and 1-5 years of experience (21%), respectively.

In terms of their technology preferences when learning, 56% of respondents preferred to take courses that utilized technology exclusively or very extensively. In terms of their teaching and daily lives, 39% of respondents fell in the middle, reporting that they utilized new technologies around the same time as all their acquaintances. Many respondents had higher levels of enthusiasm for new Web technologies: 31% reported that they liked new Web technologies and adopted them earlier than most people, and 19% reported that they were always among the first to experiment with new Web tools and applications.

Table 1. *Frequency distributions of demographic variables*

	Number of Participants ($n=368$)	Percentage %
Gender		
Female	300	81.5%
Male	68	18.5 %
Age		
Under 20	0	0.0 %
20 ~ 24	6	1.6 %
25 ~ 30	50	13.6 %
31 ~ 34	28	7.6 %
35 ~ 39	49	13.4%
40 and above	234	63.8%

Computing experience		
Less than 2 years	0	0.0%
2 ~ 4 years	1	0.3%
5 ~ 7 years	14	3.8%
More than 7 years	350	95.9%
Accessing the Internet		
Many times a day	352	95.7%
About one a day	11	3.0%
3 ~ 5 days a week	5	1.4%
1 ~ 2 days a week	0	0.0%
Every few weeks	0	0.0%
Once a month or less	0	0.0%
Teaching Level		
Elementary	95	26.0%
Secondary	142	38.8%
College/University	83	22.7%
Other	46	12.6%
Length of Teaching Experience		
5 years or less	77	21.0%
6 ~10 years	69	19.0%
11 ~15 years	69	19.0%
16 ~20 years	43	12.0%
21 ~25 years	38	10.0%
26 years or more	70	19.0%
Preferences in taking courses		
use no Info Tech	2	0.6%
use limited Info Tech	33	9.1%
use moderate Info Tech	124	34.2%
use Info Tech extensively	146	40.2%
use Info Tech exclusively	58	16.0%
Self-Description		
I am skeptical of new Web technologies and use them only when I have to.	14	3.8%
I am usually one of the last people I know to use new Web technologies.	22	6.0%
I usually use new Web technologies when most people I know do.	144	39.2%
I like new Web technologies and use them before most people I know.	116	31.6%
I love new Web technologies and am among the first to experiment with and use them.	71	19.3%

TEACHERS' USE AND EXPERIENCE WITH WEB 2.0 TOOLS

Table 2 shows teachers' reported use of Web 2.0 tools. Of the applications considered, social networking sites were the Web 2.0 technology most commonly used by teachers (66% of teachers reported daily or weekly use), followed by social video tools (52% of teachers reported daily or weekly use). The majority of teachers did not utilize other Web 2.0 services (blogs, collaborative writing tools, podcasts, social

bookmarking or tagging tools, social photo tools, thinking tools, virtual worlds, or wikis). On the other hand, most teachers reported either positive or very positive experiences using social video tools (69%), social networking sites (65%) and podcasting tools or sites (56%). Table 3 summarizes teachers' overall reported experiences using different Web 2.0 tools in teaching and learning.

Table 2. *Use of Web 2.0 Tools*

How often do you use or contribute content to the following:	Never %	Yearly %	Monthly %	Weekly %	Daily %
Blogs	56.3	11.2	15.8	2.6	4.1
Collaborative writing tools	42.6	11.7	14.2	15.8	15.6
Podcasts	46.2	12.6	20.3	15.1	5.8
Social bookmarking/Tagging	58.5	5.8	9.6	14.3	11.8
Social photo tools	44.1	12.3	23.0	14.0	6.6
Social networking sites	21.8	2.7	9.5	19.9	46.0
Social video tools	18.8	3.9	25.7	33.4	18.2
Thinking tools	66.3	8.8	13.4	8.8	2.7
Virtual worlds	77.7	9.8	6.5	2.7	3.3
Wikis	46.6	10.9	17.7	17.4	7.4

Table 3. *Overall Experience with Web 2.0 Tools*

	Very Negative %	Negative %	Neutral %	Positive %	Very Positive %
Blogs	2.6	0.9	54.8	28.1	13.6
Collaborative writing tools	1.7	0.9	49.9	28.0	19.6
Podcasts	1.2	0.9	42.0	34.5	21.4
Social bookmarking/Tagging	1.4	0.9	62.6	20.1	14.9
Social photo tools	1.4	0.3	51.0	29.1	18.2
Social networking sites	2.0	4.5	28.3	36.1	29.1
Social video tools	1.4	1.1	28.7	39.2	29.6
Thinking tools	1.7	0.3	72.5	17.4	8.1
Virtual worlds	2.9	4.9	74.8	10.7	6.7
Wikis	1.7	1.7	50.7	32.1	13.8

TEACHERS' PERCEPTIONS OF WEB 2.0 TECHNOLOGIES IN EDUCATION

Part C of the survey instrument asked teachers to indicate their level of agreement or disagreement with twenty 5-point Likert statements regarding the use of Web 2.0 tools for teaching and learning. Table 4 displays teachers' mean scores for each item, as well as the percentage of teachers indicating each level of agreement. The mean scores for individual statements ranged from 3.9 to 4.3, with an overall mean response of 4.1, which

indicated that teachers strongly agreed that most Web 2.0 tools were useful and applicable for education. For most statements, over 80% of teachers strongly agreed or agreed with the expressed benefit of Web 2.0 technologies. For items 1, 2, 4, 5, and 15, responses were somewhat lower, with only 72% to 79% of teachers indicating strong agreement or agreement. In response to a direct query, 90% of teachers strongly agreed or agreed that Web 2.0 tools offered important pedagogical benefits for teaching and learning.

Table 4. *Perceptions of Web 2.0 Tools*

	Item	Percentage in a 5-point Likert scale					Mean & SD (<i>n</i> =368)	
		<i>SD</i>	<i>D</i>	<i>U</i>	<i>A</i>	<i>SA</i>	<i>M</i>	<i>SD</i>
1	Web 2.0 tools help learners develop communication and language skills.	0.6	2.8	24.9	54.1	17.7	3.9	0.8
2	Web 2.0 tools allow learners to work through their ideas and promote critical reflection.	0.0	2.2	24.0	55.2	18.5	3.9	0.7
3	Web 2.0 tools bring learners' work to an authentic and wider audience.	0.0	1.4	17.7	52.4	28.5	4.1	0.7
4	Web 2.0 tools facilitate communication and feedback between learners and teachers.	0.0	0.8	20.6	51.6	26.9	4.1	0.7
5	Web 2.0 tools help learners develop a sense of ownership.	0.0	2.2	22.8	48.6	25.3	4.0	0.8
6	Web 2.0 tools develop skills needed in today's modern, technological world.	0.0	0.3	14.1	44.0	41.5	4.3	0.7
7	Web 2.0 tools promote learners to interact and build a learning community.	0.3	0.8	17.0	52.0	29.6	4.1	0.7
8	Web 2.0 tools allow learners to express individuality and creativity.	0.0	0.6	14.7	51.9	32.8	4.2	0.7
9	Web 2.0 tools allow learners to pose questions to the community.	0.0	0.3	17.0	55.0	27.7	4.1	0.7
10	Web 2.0 tools allow learners and/or teachers to share photos, music, and videos.	0.0	0.3	12.2	46.5	41.0	4.3	0.7
11	Web 2.0 tools allow learners and/or teachers to hold forums to discuss topics of interest.	0.3	0.3	12.4	53.0	34.0	4.2	0.7
12	Web 2.0 tools allow learners and/or teachers to find and share educational resources.	0.0	0.6	10.5	48.8	40.2	4.3	0.7
13	Web 2.0 tools provide collaborative learning opportunities.	0.0	0.3	11.9	51.7	36.1	4.2	0.7
14	Web 2.0 tools promote knowledge sharing.	0.0	0.3	11.7	52.4	35.7	4.2	0.7
15	Web 2.0 tools encourage learners to add value to the applications as they use it.	0.0	0.6	22.8	50.4	26.2	4.0	0.7

16	Web 2.0 tools allow learners to share their opinions, experiences, and perspectives.	0.0	0.6	11.4	53.8	34.3	4.2	0.7
17	Web 2.0 tools open classroom walls.	0.0	0.8	19.0	40.2	39.9	4.2	0.8
18	Web 2.0 tools appeal to digital native learners.	0.6	0.6	18.2	44.4	36.3	4.2	0.8
19	Web 2.0 tools allow learners to become content producers and not just receivers.	0.0	0.3	16.4	51.6	31.7	4.2	0.7
20	Web 2.0 tools allow learners to connect content, people, ideas, and conversations.	0.0	0.6	13.7	50.3	35.5	4.2	0.7

TEACHERS' INTEREST IN AND WILLINGNESS TO ADOPT WEB 2.0 TOOLS

Eighty-two percent of respondents indicated that they were very likely or likely to take a course or workshop to learn about Web 2.0 tools in order to support and supplement their classroom instruction. Table 5 shows teachers' interest in learning various Web 2.0 tools.

Table 5. *Interest in Learning Web 2.0 Tools*

	Yes %	No %	Don't Know %
Blogs	70.1	18.6	11.3
Collaborative writing tools	80.2	10.6	9.2
Podcasts	74.4	16.3	9.3
Social bookmarking/Tagging	69.3	19.2	11.5
Social photo tools	71.1	20.2	8.7
Social networking sites	61.6	31.4	7.1
Social video tools	77.9	15.9	6.2
Thinking tools	77.9	9.8	12.3
Virtual worlds	65.0	20.2	14.8
Wikis	76.3	13.0	10.7

OVERALL DIFFERENCES

To examine differences in teachers' perceptions of, interest in, and overall experiences with Web 2.0 tools in teaching and learning, a one-way analysis of variance (ANOVA) was performed to compare teachers' responses by teaching level and length of teaching experience (See Table 6). Teaching level and length of teaching experience were found to have no significant effect on teachers' perceptions of the usefulness of Web 2.0 tools in teaching and learning, or on teachers' interest in learning interactive

Web 2.0 tools. Similarly, teaching level was found to have no significant effect on teachers' overall experiences with Web 2.0 tools in teaching and learning. However, years of teaching experience was found to significantly predict ($p < 0.05$) teachers' overall experience with Web 2.0 tools in teaching and learning. The results of a post hoc analysis (LSD) indicated that 4 pairs were found to be significantly different ($p < 0.05$): 5 years or less vs. 26 years or more; 6 -10 years vs. 26 years or more; 11-15 years vs. 16-20 years; and 16-20 years vs. 26 years or more.

Table 6. *Summary of ANOVA for Teaching Level and Length of Teaching Experience*

Source	SS	df	F	p
Teaching Level				
Perceptions of the Usefulness of Web 2.0 Tools	109.14	3	0.67	0.571
Interest in Learning Web 2.0 Tools	213.71	3	0.36	0.785
Overall Experiences with Web 2.0 Tools	113.12	3	0.86	0.464
Length of Teaching Experience				
Perceptions of the Usefulness of Web 2.0 Tools	108.30	5	0.86	0.511
Interest in Learning Web 2.0 Tools	214.77	5	0.56	0.730
Overall Experiences with Web 2.0 Tools	112.91	5	2.66	0.023*

* $p < 0.05$

DISCUSSION

This study's results show that teachers report using social networking and social video tools more than any other Web 2.0 applications. Also, teachers reported positive experiences with podcasts as well as social video and social networking applications. These results paralleled those of the pilot study. However, teachers in the pilot study reported using Web 2.0 tools more often than the teachers in the current study, overall, and similarly reported better experiences using Web 2.0 tools. A possible explanation for this may lie in differences in the populations of the pilot and actual study. Teachers in the pilot study were graduate students currently taking a course on the educational applications of emerging technologies. The pilot study teachers' graduate study experience, combined with their simultaneous deployment of Web 2.0 tools in their classrooms, may have provided cushioned and supported exposure to using Web 2.0 tools in teaching and learning, leading to higher reported use and more positive attitudes.

Beyond that detail, this study supports the findings of prior research (Ajjan & Hartshorne, 2008; Crook *et al.*, 2008) confirming that teachers have high perceptions regarding the usefulness and applicability of Web 2.0 tools in teaching and learning, and simultaneously, that there exists a gap between teachers' positive perceptions and their actual integration of Web 2.0 technologies in classrooms. Essentially, though teachers viewed Web 2.0 applications as being useful and promoting students' learning in a number of positive dimensions, their actual use of Web 2.0 tools for teaching and learning did not parallel their indicated perceptions.

Despite teachers' limited experience deploying Web 2.0 tools, it is encouraging to learn that their perceptions of the pedagogical benefits of Web 2.0 tools remain high. Furthermore, it is encouraging to know that teachers are interested in learning Web 2.0 applications to support and supplement classroom instruction. Ajjan and Hartshorne (2008) have demonstrated that faculty attitude towards new technologies is a strong predictor of intention to use the technologies, which in turn predicts actual eventual use.

Thus, teachers' positive perceptions of and attitudes towards Web 2.0 technologies mean they will likely utilize them more often in the future.

However, it is worth noting that several teachers' reported feelings towards specific Web 2.0 tools, such as Thinking Tools and Virtual Worlds, were far more neutral than positive. These findings are similar to those reported by both Ajjan and Hartshorn (2008) and Crook *et al.* (2008). A possible explanation, perhaps supported by the higher use of Web 2.0 tools and more positive experiences reported by the teachers in the pilot study, is that additional experience with given tools improves teachers' experience using the tools for teaching and learning. In other words, teachers' lower enthusiasm for certain Web 2.0 applications may be due to their limited experience with those particular technologies.

This, as well as teachers' reported desire to learn more about Web 2.0 applications, should lead institutions to consider providing more training and workshops for teachers, focused on the use of Web 2.0 tools in the classroom. A number of other studies and reports have offered similar suggestions, that teachers are in need of expert guidance and training if they are to integrate Web 2.0 tools into their pedagogy, (Ajjan & Hartshorne, 2008; CERI, 2009; Crook *et al.*, 2008; Ipsos MORI, 2008; JISC, 2009; Sandars & Schroter, 2007). Increased training opportunities and workshops may result in more extensive adoption of Web 2.0 applications in the classroom, since experience and guidance will give teachers more confidence to lead their students to explore and use new technologies.

It is hoped that this study provides useful information, allowing administrators and those educators who teach teachers to gain a better understanding of teachers' current use of and perceptions regarding the application of Web 2.0 technologies in teaching and learning. It is the authors' hope that, since the need and desire is evident, more courses and training programs focused on the integration of Web 2.0 technologies into education can be designed, developed, and implemented for pre- and in-service teachers.

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