

## Students' confidence and perceived value for participating in cross-cultural wiki-based collaborations

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**Abstract** An international wiki-based collaboration was integrated into a large introductory educational technology course enrolling 346 students, divided into 43 teams. Student teams participated in a 5-week project in which they created wiki chapters about the educational uses of specific Web 2.0 tools. Two to four international students, located in their home countries, participated on each team, collaborating via the evolving wiki, as well as other Web 2.0 tools. Using expectancy-value as our motivational framework, we gathered pre- and post-survey data, triangulated with focus group interview data, to examine changes in students' confidence and perceived value for using these tools to facilitate international collaborations. Survey results showed significant changes in confidence and perceived value, while qualitative results provided insights into students' perceptions of critical project components. We discuss students' perceptions of project barriers as well as the strategies they implemented to achieve success.

**Keywords** Web 2.0 · Motivation · Pre-service teachers · International collaboration

In college classrooms around the world, Web 2.0 technologies/tools are being introduced as an effective way to both “energize” and “modernize” existing teaching and learning activities (Dohn 2009; Project Tomorrow 2010). While there are many reasons for using these tools, chief among them is the belief that students have the motivation and technical expertise needed to use them effectively. In addition, because Web 2.0 technologies comprise *participatory* technologies aimed at knowledge sharing and knowledge construction, they are viewed as having tremendous potential for learning (Larrison and Alterman 2009).

Among the many available Web 2.0 tools, wikis seem particularly well suited to collaborative knowledge building; as web documents that are automatically published, they are easy to both edit and share. According to Bonk et al. (2009), wikis have the

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potential to convert learning environments from traditional knowledge-transmission models into knowledge-transformative ones where students generate, share, and reshape knowledge. Yet, despite increased use of wiki-based collaborations in college classrooms today (Vratulis and Dobson 2008), their full potential has not been realized. Given students' relatively low levels of participation (Judd et al. 2010), particularly in comparison to reported uses of Wikipedia (Head and Eisenberg 2010) and other social networking sites (Project Tomorrow 2010), we were prompted to explore students' perceptions and motivations related to participating in wiki-based collaborations. Do students value the affordances provided by a wiki (i.e., the ability to add and edit content)? Do they have the confidence needed to fully participate, particularly with others whom they do not know?

This study was framed by an expectancy-value model of motivation (Wigfield and Eccles 2000). Expectancy-value models stress that in order to predict future academic behaviors such as engagement, persistence, and achievement, we need to understand *both* students' expectancies for success ("Am I *able* to do this task?"), as well as their perceived value ("Do I *want* to do this task?") for the given task (Pintrich and Schunk 2002). Even when a task is valued, students may stop investing effort if they don't believe they can succeed or if they repeatedly fail at the task. Conversely, even if students believe they can successfully complete the task, they may not engage in it or to persist at it if they don't find value in it. Reasons for valuing a task can be based on both intrinsic (interest, relevance) as well as extrinsic (rewards, pleasing others) factors.

Due to students' relative familiarity with Wikipedia and other social networking tools (Dohn 2009), we may be tempted to assume that students will assign both high expectancy (i.e., believe they can use these tools successfully) and high value (i.e., believe these tools are interesting and fun to use) to using new Web 2.0 tools and to participating in wiki-based collaborations. However, this is not supported by the literature. Rather, there seems to be a general disconnect between students' uses of social networking sites and their contributions to blogs and wikis. Furthermore, their knowledge and use of less common Web 2.0 tools (e.g., Twitter, Second Life, podcasts) are comparatively low (Project Tomorrow 2010).

For example, according to survey data collected from almost 300,000 K-12 students by the *Speak Up National Research Project* (Project Tomorrow 2010), 72% of high school students reported using social networking tools (instant messaging, Facebook, etc.), outside of school to communicate with others. However, only 18% of the responding students indicated they *contributed* to wikis, and only 12% reported posting to a blog. Similarly, approximately 85% ( $n = 1,675$ ) of college students responding to a nationwide survey reported that they used Wikipedia as an information source for course-related research. However, only 16% of these students selected "shared authorship" as a reason to use it (Head and Eisenberg 2010).

How can we explain these relatively big differences in use? Are students differentially motivated to use one type of tool over another, and if so, why? How do levels of confidence (expectancy) and perceived value compare across the different tools? Evidence suggests that students have different motivations for contributing to different virtual communities (Moore and Serva 2007); as such, contributing to wikis might be more intimidating than posting to a profile on Facebook. In a study by Dutta et al. (2008), 53% of the respondents selected "lack of knowledge" as a barrier to wiki contribution. In terms of expectancy-value theory, perceptions of being judged can decrease both confidence and expectancies for success.

This hesitation to make comments or edits on a wiki is not surprising. For a number of years, researchers have described the relative unevenness in wiki contributions. For instance, Ortega et al. (2008) reported that 90% of the articles on Wikipedia are contributed by only 10% of editors. Similarly, Carr et al. (2007) noted that, even when participation on a wiki is relatively high, much of the work still falls to a relatively small proportion of contributors.

Currently, little is known about the best way to structure wiki-based collaborations so that students will both value active participation and have high confidence in their ability to succeed (Bonk et al. 2009). In order to be successful, wiki participants must effectively coordinate a large number of tasks including (1) *communicating* a shared understanding of the purpose of the product (e.g., wiki chapter), and (2) *coordinating* the activities, roles, and responsibilities required to create it (Larusson and Alterman 2009). Unfortunately, these functions are difficult to accomplish in online communities, particularly among students who are relatively new to wikis and/or who lack the confidence to fully participate. Will students see the potential value of a cross-cultural wiki development project and feel confident enough to finish the necessary tasks?

To explore these ideas, a cross-cultural Web 2.0 project was developed as a 5-week unit within a required undergraduate educational technology course. The primary goal was to involve students in the design and creation of a wiki repository, focused on Web 2.0 technologies for teaching and learning. A secondary goal was to engage students in international collaborations, via the wiki. Students were divided into project teams and assigned a specific Web 2.0 tool to investigate. In addition, each team was joined by two to four international partners (IPs) from one of four participating universities. Thus, successful completion of the project required effective collaboration among local peers as well as geographically distant and culturally diverse partners.

## Purpose

This research examined changes in students' motivation (confidence and perceived value) after participating in the creation of a wiki chapter, specifically related to new and emerging Web 2.0 technologies. Specifically, we asked: *How does participation on cross-cultural wiki design teams impact students' confidence and perceived value for using Web 2.0 tools: 1) for teaching and learning and 2) to engage with peers from other cultures? What are students' perceptions of the intrinsic and extrinsic factors affecting their motivation to succeed? What barriers do students encounter and what strategies enable them to be successful?*

## Method

### Overview of research design

We used a mixed methods design to examine the impact of this project on 346 students enrolled in an introductory educational technology course at a large mid-western university. To address our research questions, survey and interview data were collected during Spring 2009. Project reflections and end-of-course evaluations triangulated survey and interview findings.

## Participants

The majority of students were first- (44%) and second-year (29%) pre-service teachers, studying to be elementary (62%) or secondary teachers (24%). Students met weekly for a 1-h whole-class lecture and a 2-h lab, with 18–24 students assigned to each of 17 lab sections. Teaching assistants (TAs) for each lab divided students into smaller teams of seven or eight members (approximately three teams/lab for a total of 43 teams). In addition, each team included two to four students from similar courses at one of four universities around the globe. Students from China ( $n = 47$ ), Singapore ( $n = 6$ ), Taiwan ( $n = 4$ ), and Australia ( $n = 78$ ) participated from their home countries, using asynchronous (e.g., email) or synchronous (e.g., Skype, Facebook chat) communication technologies.

## Procedures

Prior to the start of the project, lab TAs selected one member from each team to serve as the project manager (PM) who was responsible for coordinating team efforts, attending weekly meetings, and disseminating information to other team members. At the beginning of the project, team members divided up the various roles (e.g., researchers, designers, writers) needed to complete the project. Although everyone was encouraged to assume a primary role for one task, students often played several roles to ensure all tasks were completed successfully. International partners volunteered for roles they preferred and/or contributed to any required tasks.

Each team investigated a specific Web 2.0 application and created a wiki chapter (using Confluence wiki software, published by Atlassian) describing the application and its potential educational uses.<sup>1</sup> Confluence was introduced to the PMs during a project meeting; PMs were responsible for helping their team members understand its basic functionality. As a cumulating experience, teams presented posters of their Web 2.0 applications at a Showcase Event, which was attended by their peers, local teachers, college faculty, and the general public.

## Data collection and analysis

At the beginning and end of the semester, students completed pre- and post-surveys to assess changes in confidence ( $n = 9$  items), perceived importance ( $n = 9$  items), and perceptions and experiences using various Web 2.0 tools (91 items, divided evenly among seven Web 2.0 technologies—blogs, wikis, instant messaging, social networking, video sharing, virtual worlds, and online games). The *confidence* items asked students to rate their levels of confidence for completing nine different computer-related tasks (e.g., “Create and use a wiki about a selected topic”; “Create a blog about a specific topic and make posts to the blog on a regular basis”) on a scale from 1 to 4 with 1 being ‘no confidence’ and 4 being ‘strong confidence.’ The *perceived importance* items asked students to rate from 1 to 4 (1 being ‘not important’ and 4 being ‘very important’) how important it was to be able to complete the same nine computer tasks. The *Web 2.0 perception and experience survey* asked students to indicate how often they used the various Web 2.0 technologies (from never to more than 5 times a week) and to indicate their levels of agreement, on a 5-point Likert scale, regarding how valuable/useful the

<sup>1</sup> The Web 2.0 repository can be viewed at <https://wiki.itap.purdue.edu/display/INSITE>.

various technologies were to their learning (e.g., "I find blogs useful in completing learning tasks"; "It is a good idea to use a blog for learning.").

Following the showcase, focus group interviews were conducted with 25 team leaders, as well as 11 project teams, in order to understand the successes (enablers) and difficulties (barriers) encountered while working with the wiki, their assigned Web 2.0 tool, and their local and international group members. Sample questions included, "What is the most important thing you will take from this project? For example, what was most surprising? What was most disappointing? What were some of the things you struggled with throughout the project as an individual or as a group? If you had a chance to do the project again, what would you do differently? Teams were selected purposefully based on their showcase presentations (i.e., more or less organized; greater cohesion, etc.).

Paired *t*-tests were used to examine changes in confidence and perceived value for using Web 2.0 tools. Focus group interviews were analyzed using a simple pattern-seeking method to identify commonalities among students' responses, specifically related to confidence, perceived value, and barriers and enablers to project success.

## Results

A two-tailed paired *t*-test indicated a significant increase, from pre- to post-semester, in *confidence* for using Web 2.0 tools to complete learning tasks ( $df = 293$ ;  $t = 31.11$ ;  $p < .001$ ), as well as in *perceived value* for completing these tasks ( $t = 7.5$ ;  $p < .001$ ). A significant increase occurred in students' perceptions of the benefits to using wikis ( $t = 7.57$ ;  $p < .001$ ), social networking ( $t = 2.74$ ;  $p = .007$ ), and video sharing tools ( $t = 2.66$ ;  $p = .008$ ) for learning, while perceptions for using blogs, instant messaging, online games, and virtual worlds showed no significant differences from pre to post-semester (see Table 1). This is not surprising given that students' wiki development efforts often depended on the use of Facebook (social networking) and Skype (video sharing) to interact, synchronously, with IPs. In contrast, the other Web 2.0 tools surveyed (blogs, online games, etc.) were rarely, if ever, used as part of this project.

Qualitative trends supported quantitative results, specifically in terms of (1) students' increased confidence for using the wiki and other Web 2.0 technologies and (2) their

**Table 1** Changes in students' perceptions (confidence, value, benefits) for using Web 2.0 tools

Variable	Mean difference (Pre–Post)	Standard error	<i>t</i> -value	<i>p</i> -value
Confidence for using Web 2.0	−10.88	.33	−31.11	<.0001
Perceived Value for using Web 2.0	−2.07	.28	−7.50	<.0001
Perceived benefits to using				
Blogs	.12	.99	.12	.904
Wikis	−8.14	1.07	−7.57	<.0001
Instant messenger	−.16	.93	−.17	.867
Social network	−2.70	.99	−2.74	.007
Video sharing	−2.43	.91	−2.66	.008
Online games	−1.18	1.13	−1.05	.297
Virtual worlds	1.21	1.06	1.14	.253

perceptions of the current and future value of the tools to their careers as teachers. We discuss these trends in more detail, followed by a discussion of the perceived barriers and enablers.

### Theme 1: Increased confidence

At the beginning of the course, the majority of students reported they had never used blogs or wikis (54% and 62%, respectively). This may help explain some of the initial concerns mentioned in the interviews: they didn't have a clear understanding of project requirements or of what the final product should look like, they were unfamiliar with most Web 2.0 tools, and they had never worked cross-culturally. Adding to students' frustration, it was fairly clear that the IPs had different instructional requirements for the project, which were often not explained or clarified. A member of the FriendFeed group noted, "It definitely was a struggle in that they weren't in class with the same requirements that we had. And we didn't know how much they were expected to contribute." Another member of the same group explained, "We were told we were supposed to work with them but we weren't told how much they were actually going to do or *what* they were going to do."

Initially, students expressed concerns about their own lack of experiences working with Web 2.0 technologies (the wiki, Skype, as well as their assigned applications), designing lesson plans, and/or making formal presentations. Many of the students who were interviewed stated that they struggled, at least initially, trying to figure out what they needed to do. For example:

- "Everyone was confused at the beginning." (TokBox)
- "...We didn't actually know what we were doing. I had no idea what a wiki or Web 2.0 was or what the showcase was going to be like." (Edublogs)
- "We are generally not used to...working with foreign people (sic)...we don't really interact with them like we had to for this project." (Scribd)

However, by the end of the project, as expected, wiki use had noticeably increased: 34% of the students reported using wikis 2–3 times per week with an additional 12% reporting wiki use of more than 5 times a week. This then may account, at least partially, for students' growing confidence related to both understanding the pedagogical uses of Web 2.0 tools and collaborating cross-culturally, as described in the next two sections.

### *Web 2.0 technologies*

At the beginning of the semester, a majority of the students in the course reported being both familiar with and frequent users of various social networking tools. For example, 64% of students ( $n = 222$ ) reported using instant messaging at least twice a week; 87% ( $n = 302$ ) reported using social networking sites (e.g., Facebook) at least that much, with 69% ( $n = 239$ ) indicating more than 5 times a week. Approximately 40% of the students ( $n = 134$ ) reported using video sharing sites (e.g., YouTube). Yet, despite personal familiarity with social networking tools, students had no previous experiences using them as teaching tools. To address this need, students created subject-specific lesson plans that integrated the use of their assigned Web 2.0 tools. This, then, forced students to consider how to use the tools in meaningful ways.

As noted by Wigfield and Eccles (2000), expectancies for success (which they describe as being highly similar to Bandura's construct of self-efficacy, 1997) can be increased by providing students with meaningful and challenging learning opportunities and by enabling

a sense of personal control over their learning experiences. In this study, an increase in participants' confidence appeared to be influenced by their engagement in successful project experiences that resulted in a product of which they were proud. Furthermore, after completing the project, students believed that they could transfer this knowledge to using other Web 2.0 technologies for teaching and learning.

### *International collaboration*

During the 5-week project, students collaborated across cultures to understand how Web 2.0 tools could be applied in a range of settings and with a variety of learners. As noted earlier, students initially felt challenged to co-write wiki content with their international partners. One way they addressed this was by engaging in regular synchronous communication, using a variety of Web 2.0 tools (e.g. Facebook Chat, Google Talk, Skype). Once international partners began to contribute to the team effort, students increased their expectations for success. In other words, despite experiencing initial constraints, students made concerted efforts to complete the task. Thus, confidence increased as they attributed their successes to their own efforts (Keller 1987). As noted by one student:

A lot of the stuff, we really did have to take the time and think of it for ourselves....  
You really did have to sit and think about if it's available in those [other] languages, and how do I make this accessible to students around the world? (FriendFeed)

### Theme 2: Perceived value

Perceived value relates to both the current value of the project as well as its anticipated future value (Keller 1987). In this study, participants described using their assigned Web 2.0 applications for communication purposes. Students also described how they would use the knowledge gained from the project either in future coursework or in their future classrooms.

### *Current value*

Students reported using Web 2.0 technologies to connect with their international partners. Approximately half of the groups ( $n = 27$ ) reported connecting synchronously at least once. To make these connections they used a variety of tools: Facebook Chat, Adobe Connect, Elluminate Live!, Skype, AIM, Gmail chat, TokBox, and Google Talk. Six of the teams interviewed indicated that they used their assigned Web 2.0 applications to communicate and to complete project tasks with their partners. A group member from TokBox explained: "...it gave us a chance to actually use TokBox because we could communicate with them using that. That was our only means of communication and I thought that was really good."

In addition, students used Web 2.0 applications that were not assigned to their groups. The PM from WordPress.com noted, "I loved working with my IPs (from Beijing). I have never done a project where I worked internationally with other students. Actually, I have never even used Skype before. It was just an awesome experience." In their project reflections, students also noted how their assigned applications could interface with tools they currently used: "It [Prezi] can be used with programs like Facebook, Picasa, Photobucket, and Flickr also. Which most people use anyway, so it makes it more fun and exciting!" (Prezi)

### *Future value*

The majority of participants interviewed anticipated being able to use the Web 2.0 applications in their future classrooms. For example, a MindMeister member commented: “I will use many of the tools I saw at the showcase,” while a Scribd team member stated, “I think that these applications could be very beneficial in the classroom.”

In their final reflections, 50% ( $n = 173$ ) of the students described how they could use Web 2.0 tools demonstrated at the showcase. “Google Writer has value in an education situation. For instance, students no longer have to worry about whether or not their document is compatible with other people’s word processing programs; all sorts of formats can be opened by Google Writer” (Team member, Scribd). A Prezi team member commented: “I could see this [Gliffy] being used in a future classroom of mine, through a very useful feature called group chat.”

Students also believed they would use these applications for personal uses, such as to communicate with individuals at local, national, and international locations. A participant from FriendFeed commented: “... There are so many things that can connect you and your friends,” while a team member from ZohoSheets commented: “The most important things [about the project] were Web 2.0 [tools] and what they can do for us.” Generally, students responded positively to the usefulness of the applications and expressed their desire to use them in the future. This, then, suggests that students’ initial hesitations regarding “public” collaborations had changed, most likely due to their positive experiences using these tools to interact with others whom they initially did not know.

As noted earlier, a few students ( $n = 3$ ) also made comments regarding the intention to incorporate international partners into their future classrooms. As their confidence for engaging with international partners increased, these students described their intentions to integrate similar experiences into their future classrooms.

This project really encourages me to consider partnering with international students in the future because I had such a good experience. This project showed me how easy [it is] to communicate with people we don’t know, thousands of miles away. (BubbleShare)

These comments are supported by students’ showcase reflections, in which 31% mentioned ways in which Web 2.0 tools could be used internationally. “Zotero is also multilingual. It can be used with over 30 languages worldwide ...” (Team member, Scribd). Another Scribd member commented: “Google Writer makes it possible for international students to work on a group project with students here in the United States.”

According to Wigfield and Eccles (2000), students’ value beliefs include perceptions that the task is valuable to either present or future needs, or both. Students in this study described how they could use the knowledge gained from this project in their future classrooms or in future coursework. Additionally, they noted how they could use many of these applications for current personal uses, such as to communicate with parents or friends located at a distance.

### *Additional factors impacting perceived value*

The majority of students interviewed expressed satisfaction with the project and described a sense of achievement. These feelings of satisfaction were based upon both *intrinsic reinforcement* and *extrinsic rewards*. Intrinsic reinforcement came from a sense of



enjoyment from the learning experience, while extrinsic rewards related to project incentives offered by the instructor.

### *Intrinsic reinforcement*

In general, students described getting involved in the project because it was inherently enjoyable and provided new opportunities. A student from FriendFeed explained, "I think it was an exciting project. It wasn't something that we would ever do for another class. It's kind of cool to be able to say that we generated that much information and were able to present at a conference [showcase]."

Students also described how they enjoyed collaborating with the IPs. As noted by one student, "It was definitely interesting to see how our IP integrated the technology into her classroom. I don't see how it's very different from how an American teacher would integrate it in [his/her] classroom" (FriendFeed). The students felt a sense of satisfaction being able to connect with someone halfway around the world. One student commented, "I mean, it wasn't about the [project] points or anything like that. It was just about connecting with somebody from across the world." (Scribd). These comments are supported by course evaluation data: 141/196 students (72%) agreed, "This course broadened my understanding of people from different cultural and ethical backgrounds," and 85% ( $n = 167/196$ ) agreed, "I have learned to value new viewpoints."

Intrinsic reinforcement also refers to an internal, intangible feeling of accomplishment, such as the pride we feel after successfully completing a difficult task (Keller 1983). As noted by one student from ScribLink, "The most important thing to me was to do well in this class." For some students, motivation related to producing an impressive final product. "I think that it's just real rewarding just finishing it and how nice everything turned out; how we just started from scratch and created everything in the last few weeks" (FriendFeed).

### *Extrinsic rewards*

For some students, the opportunity to earn a good score or a superior rating provided motivation to work extra hard. An additional incentive offered by the instructor [not having to take the final exam if a high enough score was earned] provided even more motivation. One student from Bubbleshare said, "[earning a] superior rating is a pretty big incentive for us, especially [because] the day of the final is on Saturday."

Positive reinforcement from IPs also gave students a great sense of satisfaction. One student stated, "I learned a lot. I definitely think that having the Beijing students gave us a lot of insights" (Edublogs). Similarly, a student from Scribd stated, "IPs just had a different view on things, like a different take. And, having that different opinion, a different voice, a different set of eyes, I just think it added a lot to our presentation. It was beneficial to have our IPs."

The feedback that students received, from a variety of sources, also heightened their satisfaction with the project. In some cases, feedback came from the PMs: "I think our team leader did a lot of good things to keep us motivated by telling us that we were doing good work" (FriendFeed). In other cases, positive feedback came from the IPs: "They (IPs) were so excited to do the project. They showed how much they were engaged in this project" (Zoho Sheet). Another student reflected, "And as far as working internationally, this is one of those projects that really shows you how big and small the world is at the same time" (Google Sheets). Finally, students received feedback from those who came to

the final showcase presentation. For example, a student from Zoho Notebook said, “A woman who started her own business said our application worked perfectly for her. And that was exciting. We actually got to see someone in the real world being able to use our application.”

In summary, the results of this study demonstrated the potential influence of both *intrinsic reinforcement* and *extrinsic rewards* in motivating students to participate and to expend the needed effort to succeed. Students described a sense of satisfaction and pride when observing the results of their efforts and noted that the use of extrinsic rewards (not having to take the final) put an “extra hitch in their giddy-up” (FriendFeed). Students described satisfaction from learning to use the wiki, and other Web 2.0 tools, to collaborate with their local and international partners.

### Theme 3: Barriers and enablers to success

As noted earlier, effective wiki collaborations depend on successful communication and coordination strategies (Larruson and Alterman 2009). It is not surprising, then, that barriers to success related, primarily, to students’ difficulties managing these two aspects of the project. In general, communication was impacted by language differences; differences in semester, class, and work schedules; as well as time zone differences. In addition, cultural and instructional differences surrounding the project (e.g., requirements, quantity and quality of feedback and guidance provided by instructors) seemed to cause difficulties. Finally, organizing and coordinating team members posed additional challenges for students, particularly because groups were large and included members from two different countries.

Despite these barriers, specific project components and participation incentives, termed *enablers*, allowed students to effectively address project challenges. In addition, students employed a variety of personal communication and coordination strategies to overcome barriers faced by their particular teams.

#### *Communication barriers and enablers*

Trying to coordinate collaborative efforts when working with students halfway around the world posed a number of communication challenges. Not only were many of the students in time zones that were 12–15 h apart, but in many cases, the IPs were not native English speakers. Additionally, students in Australia had just started their semesters and weren’t prepared to begin the project immediately. Although students experienced some communication difficulties trying to coordinate the relatively large number of *local* students, the majority of frustrations occurred trying to communicate with *international* partners. As noted by one project manager, “I struggled with communicating with the IPs mainly, but also to keep everyone in the group as updated as possible” (Ta-da List). Seven of the 11 focus groups described difficulties communicating with their IPs. For example, a Mind-Meister member stated, “The international collaboration did not go very well. We attempted numerous times to contact them with no answer. On the last 2 days, they decided to contribute, which was frustrating because we already had the page the way we wanted it.”

One of the main strategies used by students, particularly project managers, to address these communication issues was to provide IPs with a continual stream of information about the project. For example, the project manager of Picnik explained, “I found that it helped to [provide] weekly updates, just to them. Like, asking them how it’s going.

And then they e-mailed me asking for more notice of due dates and to summarize what we talked about in lab.”

In addition, as noted earlier, team members quickly turned to available Web 2.0 technologies to communicate with their IPs. Although the time differences made scheduling difficult, students enjoyed being able to connect synchronously, and many made the extra effort to do so: “...we were able to connect with them [the Australians] through Skype and I think that ... brought a lot of people to the table because it's not every day that you get to talk to somebody from another country. I think that was a big turn-on for a lot of people” (Team member, Scribd).

### *Coordination barriers and enablers*

Students recognized that group work can be challenging, yet this barrier was mentioned by only four of the groups interviewed. The Edublogs group noted, “It was really hard to keep organized and know exactly what we were supposed to do...there are lots of people and lots of confusion.” However, many groups thought that having project managers helped address some of the typical issues that occur within teams. For example, the Wikia PM stated, “I've been in a project where there have been eight people before and that didn't work out real well. But, I really like the fact there was an assigned PM.”

Another enabler that facilitated effective group work, according to the students, was having well-defined roles. Students knew what they were supposed to do, as well as what others were doing, which simplified their work and enabled them to help each other. One student stated:

Everyone went above and beyond to make every part of the project go smoothly. There were primary roles that everyone took to without hesitation and the roles seemed to work because everyone knew what they were supposed to do and had great ideas on how to improve what was already done. (Ta-da List)

At the beginning of the project, a few of the PMs asked their team members to complete a short survey about their interests and areas of expertise. Students who responded by the deadline were judged to be most reliable and assigned some of the more important tasks. As described by the Yammer PM: “You kind of make judgments at the very beginning of who's going to do the most work. So, the more difficult tasks or the more time-consuming things ... you find the people that are going to get that done and try to get them to do that part of the project.”

In addition, students were assigned critical roles and responsibilities based on their areas of expertise. For example, a team member from Scribd described how one of their members, an art education major, was able to use her knowledge and skills to create an effective poster for the final showcase: “Cindy (a pseudonym) was a major contributor to our work. She is an art major. She just did a really good job with the poster and the poster board. I thought that the setup was one of the best there.” In addition, the IPs brought important skill sets to the project that the local students didn't have. For example, the WordPress.com PM described how his team benefitted from the technical knowledge of their IPs “My IPs were majoring in education technology and just knew everything. Like, they even knew the coding.”

This division of labor also allowed the IPs to contribute relatively easily to the wiki. In some cases IPs volunteered to complete those tasks that they felt most confident doing (e.g., making the brochure for the showcase; creating a video describing how the

application was used in their context; creating lesson plans). In other cases, they just pitched in wherever help was needed. As a Scribd team member explained:

Once we started going, the whole team really just got involved. We gelled very easily and we all just kind of got along. The team just complemented each other well and worked together as a team very well. (Scribd)

## Discussion

This project was designed to help students understand the pedagogical possibilities of wikis and other Web 2.0 tools as well as the potential for using these tools to facilitate international collaborations. Although Web 2.0 tools are heralded as supporting “participatory” functions (Rowbotham 2008), previous applications in educational settings have uncovered a number of challenges (Dohn 2009). Specifically, in the context of this study, participants needed to determine how to handle the myriad of communication and collaboration functions necessary to co-develop a wiki chapter with international partners. Furthermore, students needed to develop confidence in their abilities to address these components effectively and to understand how the various components of the project were relevant to their futures as classroom teachers.

Findings from this study demonstrated that engaging in a five-week cross-cultural wiki-development project increased students’ confidence as well as their perceived value for using wikis and other Web 2.0 tools for teaching and learning. Although students began the course with some personal familiarity with a few social networking tools (Facebook, IM chat), they had few, if any, previous experiences considering how these tools might be used in the classroom. In addition, students were generally unaware of the vast variety of tools available (e.g., graphic organizers, diagramming tools, quiz makers). This project opened students’ eyes to the great variety and number of tools available. More importantly, by using these tools themselves, students gained both the confidence and knowledge needed to explore other tools in the future.

This project engaged pre-service teachers in the co-design and co-development of a wiki chapter—that is, students learned about Web 2.0 technologies by using Web 2.0 technologies. Current educational reform efforts (e.g., Huary 2002) have emphasized the need for K-12 teachers to engage in design activities to facilitate higher forms of thinking. By successfully completing a variety of design tasks during this project, students gained both a sense of satisfaction and increased confidence. Additionally, it is important to note that through this project students learned about more than a single Web 2.0 tool. Rather, students learned about the potential of Web 2.0 tools, in general; learned how to research new ones; and recognized that a single function (graphing, brainstorming, etc.) typically could be addressed using multiple available tools. In general, this project opened students’ eyes to the overall potential of Web 2.0 tools and provided them with the confidence needed to explore additional tools in the future. Thus, as students experienced success using these tools in meaningful ways (i.e., to interact with local and international peers, to create an effective wiki chapter), both perceived value and confidence increased.

Another goal of this project was to expand students’ views of working with international partners. Mestenhauser (2003) noted that although efforts have increased to engage students in study abroad programs, especially since September 11, 2001, little effort has been devoted to helping students acquire the knowledge and skills needed to work cross-culturally in a global environment. In the context of this project, this also was addressed

through the use of Web 2.0 tools. That is, for our students to function as effective global citizens, they must be comfortable using available technologies for virtual collaborations (West 2010). This project provided students with a unique opportunity to connect with international peers, using the types of tools they are likely to use in the future.

For the most part, the students in this project embraced the international component of their work and implemented effective strategies to work successfully with others at a distance. Again, confidence was shown in their abilities to contact and work with individuals at a distance. However, some teams experienced difficulties related to working with international partners. In response, many of the teams utilized specific communication and collaboration strategies to help mitigate these difficulties (e.g., continual updates, use of synchronous networking tools). Others have described the use of similar strategies to address communication and collaboration barriers experienced during cross-institutional or cross-cultural collaborations (Bonk et al. 2009).

While students were generally positive about their experiences working with international students, we have little information about the impact of these experiences on attitudes or future behaviors. Given students' positive perceptions, however, it will be important to examine more closely *what* students learn from these experiences. For example, do these experiences prompt students to explore and participate in future study abroad programs? Do they change their attitudes or behaviors toward participating in local international events (food fairs, cultural celebrations, etc.)? These questions provide the foundation for future research.

Finally, this study allowed students to explore several strategies for team management. Project managers, specifically, learned how to assign roles and responsibilities, increase team motivation, involve IPs as partners, and use technologies to coordinate and monitor group efforts. Future research and teaching efforts should build on these initial outcomes and explore ways to allow other team members to realize these same benefits.

## Implications

The results of this study have implications for educators at many levels. First, the results of this project demonstrated that in a relatively short period of time, students' confidence and perceived value for using wikis, social networking, and video sharing tools for teaching and learning increased significantly. By asking students to develop a wiki chapter that could help *others* understand how to use Web 2.0 tools, students increased both their knowledge and confidence for future use. Instructors of other teacher education courses might readily incorporate similar Web 2.0 projects into their curricula. Given that these are the tools students are likely to use in their future jobs, this type of project offers an effective and efficient way to bring students up to speed.

Second, this project demonstrated how teams of students from a large (300+) undergraduate lecture course can collaborate with international partners to effectively create instructional materials. A description of the effective communication and collaboration strategies implemented by the instructor and the PMs during this project provide useful information for others who wish to implement similar cross-cultural collaborations.

Another practical implication from this study relates to the resultant repository (<https://wiki.itap.purdue.edu/display/INSITE>), which can now be used by teachers around the world, providing easy access to a large number of Web 2.0 applications. In addition, chapters can be updated and adjusted as needed. An added motivational factor, mentioned by participants, was the fact that they were contributing to a resource that others could

actually use. This was also an important incentive for securing IPs' commitment to the project.

A final implication focuses on the potential use of both Web 2.0 technologies and international collaborations within student's future teaching experiences. Group members discovered the ease and utility of various Web 2.0 technologies. At the same time, they found that using those technologies could enable the integration of other individuals from around the world. Students who were once leery attempting to use such technologies and who had never considered partnering with international colleagues became more open to these ideas. Students were able to see both the costs and the benefits to such integration and recognized that the benefits often outweighed the costs.

### Limitations and Suggestions for future research

This study involved a large number of students in a 5-week project embedded within an introductory educational technology course. Thus, generalizability is limited to similar students in similar courses. Further, survey instruments were not pilot-tested for validity and reliability and changes in pre-post survey data may have been influenced by other projects or assignments in the course in addition to the Web 2.0 project. It is also possible that students' confidence and perceptions were influenced by the specific tools they explored and/or the specific IPs with whom they partnered. Additional survey items could be included that query students' confidence for working with *other* Web 2.0 tools or *future* international partners. Finally, due to human subjects concerns, we did not gather data from the international partners. It will be important to include their voices in future research efforts.

### Conclusion

According to Bonk et al. (2009), "wiki-related projects provide opportunities for learning transformation when they expose learners to new points of view or perspectives" (p. 126). Crucial to this transformative, deeper learning, however, is the collaboration that occurs among participants to facilitate development of the wiki product. Furthermore, if students are going to benefit from these collaborations, they need to both believe in their value and be reasonably confident that they can complete the required tasks successfully.

As universities heed the call to expand pathways to global education, integrative course experiences offer a cost-effective alternative to traditional study abroad programs. Particularly in the current economy, infusing international experiences into on-campus courses offers a means by which every student can participate. According to Larrison and Alterman (2009), "using collaborative technology to extend the physical borders of the classroom can be of significant value" (p. 397). However, given the limited research in this area, it is unclear how to structure these collaborations so students obtain the intended benefits. It is important to recognize and address students' potential hesitations to participating in cross-cultural wiki collaborations, particularly if initial confidence is low or if they are not yet convinced of the current or future value of the required tasks. This study offers preliminary results that can guide future course integrations of Web 2.0 tools, wiki development, and cross-cultural experiences. In addition, it provides specific insights into the motivational impacts of such projects on participating students, including the intrinsic and extrinsic factors that may help mitigate initial concerns.

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