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Recommended Citation

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Berglund Fellowship Report: Web Conferencing as a Means of Enhancing Online Learning in a Hybrid Course Delivery Model

Posted on May 1, 2009 by Editor

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Abstract: This action research study reports the outcomes of using web conferencing technology to enrich the online component of a hybrid educational technology course in a Master’s teacher preparation program. Participant blogs, transcripts of online sessions, and an exit questionnaire were analyzed to gain insights into the participants’ experiences and perceptions of the hybrid model, and to elicit suggestions for improvement. Results indicate that even with some initial technical hurdles, the web conferencing technology was well received and participants stated overwhelmingly that they would want to participate in a future hybrid course. Instructor and students alike felt the technology was most effective when used for demonstrations and virtual tours [i.e. in Second Life] as well as for student presentations. Web conferencing is relatively easy to use but requires proper orientation especially for novice users. Future study should implement more of the tool’s collaborative features to encourage more active student engagement.

Context

As the demand for distance education programs increases, so too does the challenge to provide effective technology solutions for learning and collaborating at a distance. A criticism of online learning is its inability to recreate the intimate presence and rich interaction that generally exists in
real-time, face-to-face contexts. In the corporate world, web conferencing emerged to address this challenge and has been used effectively for conducting meetings, webinars and informational sessions internationally since the late 1990’s. In higher education, however, it has progressed more slowly, lending credence to the common perception that educational institutions have been sluggish to transition into a Knowledge Society and continue to perpetuate outdated learning models (Richardson, 2007; Bates, 2002).

This study is part of a work-in-progress involving the use of web conferencing technology to enrich the online component of a hybrid or blended course delivery model – i.e. face-to-face + online classes. The following reports the results of the first implementation of the model in an educational technology course in a Master’s level teacher education program for candidates who work full time during the day. This course has typically been delivered at four seven-hour classes. The goal of this work was to test a hybrid model comprised of eight shorter sessions – four face-to-face and four online – as well as evaluate the possibilities of web conferencing for future development of flexible, innovative online program delivery offerings in the program.

**Web Conferencing**

Web conferencing is a computer or web-based application that allows individuals at their personal computers to attend real-time (synchronous) presentations or meetings via the Internet. A presenter, or host, initiates the web conference by streaming live video (using a web cam or digital camera), live audio communication using VOIP (Voice over Internet Protocol), and presentational information to remote participants. The technology supports application sharing, web browsing as well as other interactive features such as polls or surveys, and the ability for participants to manipulate the presenter’s screen, for example: to write on a whiteboard. Also, the live sessions can also be recorded and made into archives.

This research builds on several years of collaborative work investigating the role of interactive technologies in supporting geographically distributed communities of practice. Baecker et al. (2003) proposes that interactive web conferencing technology provides the opportunity to reinvent rich collaboration within virtual space through allowing participants to engage in real-time direct interactions online. It is further suggested that the technology’s capacity to capture archives of live events for post, asynchronous review, makes it an effective tool for enhancing learning, establishing a web-accessible knowledge base, and cultivating ground for the germination of communities of practice (Zijdemans, 2005). The power of this technology, then, is that it not only simulates synchronous face-to-face interactions across distance, but can also generate an infrastructure that serves to sustain cooperative work and group learning asynchronously over time and space (Zijdemans et al, 2005).

**Research Design**

The research design integrates elements of action research, design experiments and the Technology, Pedagogy, and Content Knowledge (TPACK) model developed by Mishra & Koehler (2006). As discussed elsewhere (see Zijdemans-Boudreau (2008)), the goal of action or
experimental research is to improve practice or an area of concern, using an iterative research- implement-evaluate cycle, in order to focus the researcher’s direct actions of practice within a participatory community. Similarly, design experiments—of the one-on-one or teacher-experimenter and student type—are theoretically grounded research activities that conduct “…a series of teaching sessions with a small number of students to create a small-scale version of a learning ecologym—a complex interactive system involving multiple elements of different types and levels—so that it can be studied in depth and detail” (Cobb et al. 2003 p.9).

Bannan-Ritland’s (2003) integrative learning design (ILD) framework further situates design experiments within a “…socially constructed, contextualized process for producing educationally effective interventions with a high likelihood of being used in practice.” (p.22). As this project eventually seeks to implement a delivery model over several courses for the purpose of improving teaching, learning, and online program delivery, and entails documenting the process on the part of both teacher-researcher and students, these themes of theoretical and practical relevance, iterative design, and study of authentic complex learning and teaching contexts are pertinent and applicable as an integrated construct for this investigation.

The Technology, Pedagogy, and Content Knowledge (TPACK) model reminds researchers and practitioners that effective program design acknowledges the complex interplay between technology (T), pedagogy (P) and content knowledge (CK). Applied to this research, our goal is to evaluate the affordance of the web conferencing application (T) to support enriched experiential and collaborative learning (P) for an educational technology course (CK). Experiential learning, as developed by Kolb, refers to the richness of learning that occurs when one is emotionally involved in authentic experiences (Smith, 2001). This technology-pedagogy-content knowledge interconnection embodies a strategy for using web conferencing to simulate a rich interactive environment and support the pedagogical goals while also allowing students to explore the applications of Web 2.0 to teaching and learning. To this end, each element of TPACK is fully represented and integrated in this work.

The Hybrid Course Delivery Model Study

A hybrid course delivery model as it is defined in this study is a blend of traditional face-to-face and online classes. In this case, online sessions were conducted in real-time using the web conferencing technology. The study was guided by the following questions:

1. How easy was it to learn and use the technology?
2. What were the participants’ perceptions of the level of engagement in online sessions in comparison to face-to-face sessions?
3. How did the online sessions using the web conferencing impact on the participants’ learning experience?
4. What were the perceived strengths and weaknesses of the technology?
5. What were the participants’ responses to the hybrid delivery model?

Of the total of eight study participants, five were Masters students and three were practicing
teachers who were taking the course for professional development credit. A brief entry survey was conducted to ascertain the technology skill level of the students. The students used the web conferencing technology as part of their regular course activities for the online component of the hybrid model. These online sessions were interspersed with the face-to-face classes and an orientation to the web conferencing application was provided before the first online class. The online sessions were recorded and transcribed. Students were also assigned the task of keeping individual blogs to document their learning experiences as they engaged in a variety of activities and developed a final action research project related to Web 2.0 technologies and educational practice. At the end of the course, all participants completed an anonymous exit survey as well as a self-evaluation of their progress in the course in relation to the National Education Technology Standards for Teachers (NETS*T). As this paper looks specifically at the impact of the web conferencing technology and hybrid model, only a subset of the data has been analyzed and reported here. This data includes an analysis of the blog postings related to the online sessions in which the web conferencing technology was used, the transcripts of the online sessions, and the exit questionnaire which included rating scales and open-ended questions to collect rich information on the participants’ experiences, their perceptions of the technology, hybrid model, and suggestions for improvement.

Findings

The course was delivered as four face-to-face and three online sessions – plus an orientation – over the fall semester from September to December 2009. The entry survey indicated that the level of technology skill was varied but generally at the low to average range. The following summarizes the emergent themes that arose from the individual blogs and online sessions as well as the results from the exit questionnaire.

Blog Posting & Online Sessions: Each participant was required to create a blog and post a minimum of one entry after each class. The emergent themes from these postings as well as the transcripts of the online sessions are discussed and illustrated with examples.

As is to be expected the first online session data reveal a high number of postings related to the theme of technical glitches and learning curve: “The first on-line session was a good reminder not to assume anything with regards to technology.” “Technology can be intimidating at the beginning, but with the support given in the classroom, one feels brave to use and try new tools.” In the second session there were still technical issues but they were more related to the course assignment which involved uploading their video projects and creating the wiki pages for their action research projects: “Our second online meeting went fine. There were less technological breakdowns, so most of us felt more confident working online.” and “I enjoyed Saturday’s class a great deal. I was more comfortable using the chat, which made it more engaging. The class session went by so quickly that I had hardly realized I had been sitting at my computer for two hours, which is unusual for me.” The final online session was the smoothest; the technical issues were minimal and participants had mastered basic troubleshooting strategies as illustrated in this blog posting: “I thought this class went well. Everyone was able to get in just fine and seemed to be in the flow of things. I had one moment when I couldn’t see the shared window, but by
logging out and back in again I was able to see just fine. I suppose with technology we just have
to be prepared for kinks and hiccups and roll with it."

A review of the session transcripts of all the online sessions confirms that technology-related
comments significantly decreased while content-related commentary increased by the last
session. The following chat excerpt taken from the final class indicates the on-task engagement
as students viewed a virtual tour of Second Life:

Ann: Anita, how do you find out about all of this stuff?
Ann: such a good resource, especially if you're enrolled in distance learning
Kall: yes
Ann: special ed too if the technology is available
[5 other students concur]
Fer: this is way crazy... cool but crazy!
Ann: I can see how this will be important for future students who have grown up with this
technology
Tan: I can see my son and his imagination going crazy with this!
Fer: I think that is a good point... this is so foreign to me but I get it
Kri: me too...kind of crazy to think about doing it myself though
Cook: I can see it being a creative way to teach kids about different habitats etc for animals,
forest, sea, etc.
Ann: good point
Tan: I was thinking social studies and history. I think this would be really engaging for HS
students
Cook: this is the first time that I have ever seen this.
Kall: could be useful when teaching about culture when teaching foreign languages
Cook: oh or maybe even pen pals in other countries etc.
Tan: looks like video games to me
Cook: you could meet with another class room
Ann: how about to connect soldiers in the field to their families?
Pri: that is a great idea
Kri: that would be cool!
Ann: what a trip
Kall: or connect students in study abroad programs with families
Ann: thanks for drawing my thought back to education... is there ever sound in second life?
Fer: it looks like there is a sound control on the right lower part of her screen. i think she said
you could talk...

What is interesting to note here is that all this was occurring while the instructor was engaging
with a resident in Second Life. In a face-to-face classroom this kind of chatter would have
interrupted the lesson. In this context, however, it was completely unobtrusive and allowed
participants to share their thoughts on what they were witnessing.
In summary, the postings and session transcripts indicated that students’ confidence increased with practice but that they felt more comfortable using the chat rather than voice feature – which in fact was most used during the third session when students presented their project ideas. Even with this limited interaction, students did help each other out with technical problems and in one instance when the instructor’s connection was dropped, continued to talk with each other about course related issues until she returned.

**Exit Survey:** The exit survey was comprised of 6 questions. The following chart summarizes the results of questions 1 – 4. On a rating scale where 1 = Strongly Agree and 5 = Strongly Disagree, the lowest average score was 1.5 while the highest average rating was 2.75.

![Web Conferencing Exit Survey](image)

**Chart 1.** Results from Web Conferencing Exit Survey

Though the majority of participants’ answers for Q1 ranged from strongly agree to neutral, one participant indicated that the technology was difficult to use, thus the average response rate result shows 2.5. Some representative responses were: “I think that it was fairly easy to use WC however it was challenging for some of the participants. At that point it became a little bit difficult to move on.”;“I wasn’t sure about it going in, but I really like it in the end. It was easy to use.” and “There was some frustration the first session when I was kicked out several times and then it also dropped my audio for ½ of the session.”

Most stated that online learning cannot replace face-to-face interaction, however the consensus in Q2 at 2.75 was that the technology was engaging. “I think that the way the material was presented was easy to follow and interesting.”; “The opportunity of participating either privately or
Questions 3 and 4 drew the most favourable responses averaging 1.5 and 1.75 respectively. In addition to the obvious benefits of convenience working from home and not having to pay for childcare, the following comments were given in response to the question of the technology’s positive impact: “It gave me lots of good ideas. I learned a lot and I was able to explore more on my own after using the Web Conferencing technology.”, “I loved getting to explore through it.”, “[it] gave me some new ideas on how to use technology to teach.” and “Yes because I got to try something new.”

All participants, except one who did not respond, agreed in Q4 that they would be interested in using the technology again in a future online course: “I believe it is a useful tool and when used in balance to f2f can greatly strengthen a program.”, “Yes I would use this technology in future online courses; through I would hope that I would become more savvy with it.”, “It is very convenient. Much easier to meet on the web than f2f.”, “I see potential for using this technology and I would look forward to another class using it.”, “It depends on the class content.” and “I feel like there was more freedom with this approach as a students.”

Question 5 asked, “How often did you access the archives?” Six out of eight participants stated “Never”, one stated “Seldom” and one stated “Occasionally”. Some reasons stated for these answers were: “The information presented didn’t require that I return. I was able to remember the important info and also took notes on what I wanted to remember”; “Kinda forgot that was available”; “Didn’t really know where it was, but really didn’t need to access it either.”; “I have not had time but would like to.”; “Only if I had a question regarding how to complete an assignment.” and “Haven’t needed to yet – can I in the future?”

Finally, question 6 asked participants to comment on the strengths, limitations of the technology and to make any suggestions for future improvement. The following table shows the participants’ written responses:

<table>
<thead>
<tr>
<th>Strengths</th>
<th>7/8 responded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work from home. Saves time and resources; Accessibility; I could be at home and it helped in my schedule; Forcing us to get in there and experience it and learn on our own and even help each other when we were stuck; Again, first hand experience, with the technology itself; We could attend class from the leisure of home. We could cover some material without using most of a day to drive to school; Less stress for me – could do it in my PJs!</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Limitations</th>
<th>7/8 responded</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is limiting in that receiving one-on-one help is difficult; Time to practice; I don’t know – I really liked it; More difficult for each of us to communicate. I think its easier f2f. Online I was afraid I may interrupt; Obviously the technology itself – microphones, internet connections; Little or no peer</td>
<td></td>
</tr>
</tbody>
</table>
interactions. Limited ability to ask questions; Technology doesn’t always do what it is supposed to do.

Suggestions

<table>
<thead>
<tr>
<th>6/8 responded</th>
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</thead>
<tbody>
<tr>
<td>Offer a continuation; I just needed to take more time on this class. I really think it went well overall. I would not want the 7 hour classes and though this format was great; It was good. I really enjoyed the f2f though; I would look forward to meeting more often with WC. Each online session went over time so it’s obvious that you have a lot to share! Show examples of past projects in class to help students jump-start their own projects.; It would be helpful to set some things up ahead of time in a f2f meeting.</td>
</tr>
</tbody>
</table>

Table 1: Participant Input on the Strengths and Limitations of the Technology and Suggestions for Improvement.

When asked to give their feedback on participating in the hybrid course, responses included: “I think this is a great model. I think students get the best of both worlds by using it.”; ”Totally liked it;” ”It was a good variety f2f + online”; ”I liked the hybrid style of this class; would definitely do it the same.” and ”I really liked it!! I liked the freedom of the online classes and would definitely do an online class again!”

Implications

The overall findings indicate that despite some initial technical hurdles, the web conferencing technology was well received and the participants were responsive to the hybrid model. It should be noted, however, that participants also stated that this worked best in combination with face-to-face sessions. It would be interesting to do a separate study using web conferencing for online-only distance course to see if this result would transfer across delivery models. It should also be noted that the instructor was in the process of learning how to implement the technology along with the students. As a result, all of the features were not fully implemented or encouraged – such as the poll feature, the break-out group function, and voice. Due to the timing of the course, the first day was at a technology conference and although the class met afterwards to talk, there was not the usual sense of the first day face-to-face orientation that students and instructors are typically accustomed to.

There were three orientation sessions before the first online class and these were relatively successful in getting students set up. There were however two students who were not able to get their microphones working and they were only able to talk in the sessions using the chat feature. The first class also used a conference call and this was initially helpful when users were still getting used to the technology. Participants used the chat feature – often to help each other with user issues or make comments – but unless they were required to give a presentation, it was easy for them not to speak up during the online sessions and few used the voice feature.

Both the instructor and the students felt that the web conferencing tool was most effective when it was used to demonstrate applications, provide virtual tours to places that students might not be able to navigate on their own (i.e. Second Life) and have students conduct presentations (vs.
listening to a lecture).

**Action Plan**

1. Ensure that a face-to-face session is devoted to introducing the technology in the first class in addition to the online orientation sessions.

2. Further develop a more comprehensive back-up plan in the eventuality that there are technological difficulties and use the entry survey to better anticipate end users needs and technology.

3. Rather than make the online sessions longer—two 50-minute sessions with a break worked well—hold four online sessions as originally conceived (i.e. not including the online orientation) in order to be able to cover all the content. Also offer one-on-one office hours online to encourage students to practice the technology.

4. Require students to be more actively involved—such as giving presentations—and try using more of the collaborative features such as the break-out group feature.

5. Minimize lectures and increase demonstrations and virtual tours – especially those like Second Life which are more challenging. This should also increase the use of the archives as review materials.

6. Have an assistant to help troubleshoot users who are having problems. It is really hard for the instructor to do this while teaching and it slows down the class for everyone.

**Current Update**

Since the completion of this study, the action plan has been used to set up a follow-up study to continue using the web conferencing technology to support hybrid course delivery. Another study is also in development to use the web conferencing for an online-only distance education course.

**References:**


Redfern, S. & Naughton, N. (2002) Collaborative Virtual Environments to Support Communication and Community in Internet-Based Distance Education Journal of Information Technology in Education V1 No3, 201-211


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