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Trials and Triumphs: Piloting a Web Conference System to Deliver Blended Learning across Multiple Sites

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Abstract

Barriers to classroom-based education such as high gas prices, inclement weather, and job and family requirements often make travel to campus more difficult for people who want to continue their educations (Fletcher, 2008). The promise of synchronous tools such as Wimba LiveClassroom can provide a cost-effective alternative to a real-time classroom experience by allowing students to attend a class wherever they are, thus allowing a classroom experience despite geographic barriers. Indeed, other reports have also indicated that hybrid learning can result in increased student outcomes when compared to traditional classroom learning (Brunner, 2006; McFarlin, 2008). To attempt to overcome these barriers, a mid-sized public university piloted Wimba LiveClassroom as a platform for a blended class to allow distant students to be able to take advantage of the University's classes via the Internet.

The pilot course, Sociology of Work, was offered at the main campus of a mid-sized public university and simulcast using Wimba LiveClassroom to a student who attended a branch campus about 30 miles away. The nature of the class required that the students be able to view videos simultaneously, participate in discussions, as well as make and react to student presentations.

Despite our early and thorough planning, the pilot identified significant technical and organizational obstacles that needed to be overcome on behalf of the faculty member and the support units at the university and the vendor. This project required the successful interaction of the professor, the instructional technology support staff, the networking staff, and Wimba employees, and the computing equipment of the university (both the classroom and the network backbone), the student's provider, and the student's home system. Any problem with one element meant that other elements would not work, and with so many parties necessary for success, inevitably there were problems.

Video of class sessions and extracts from communications after each class will illustrate successes and frustrations. The paper will conclude with recommendations for future directions of research and suggestions for restructuring technology and organizations to facilitate future success.

Introduction

The concept of blended learning has received increased attention in tandem with online learning. Online learning is considered to be a learning experience managed exclusively with Internet technologies, without requiring any face-to-face meetings among students and professors. Although many of these offerings are described as asynchronous, in that they do not require simultaneous actions for students and the instructor, they may contain synchronous elements.

Blended, or hybrid, learning combines the elements of online learning with face-to-face learning. Hofmann and Miner (2008) argue that the term has been used so often to describe different learning contexts that the term has "begun to lose its meaning." Indeed, they define blended learning as "using the best delivery methodologies available for a specific purpose," but by using this definition, all forms of learning can be considered blended learning. This study prefers a definition of a "blended course" offered by the Sloan consortium as a course that blends online and face-to-face delivery (Allen, Seaman, & Garrett, 2007). In their conception, a blended course has a substantial proportion of the content delivered online, typically uses online discussions, and typically has some face-to-face meetings. This describes the learning strategies used in this project, specifically in regards to accommodating one student who was not able to travel to the main campus and attended class via the Internet-based classroom solution Wimba Classroom.

Hybrid and/or blended learning have been shown as an effective and flexible form of learning. Results of outcomes assessments indicate that there is no significant difference between learners enrolled in blended learning classes and learners in online or face-to-face classes (Johnson, Aragon, Shaik, & Palma-Rivas, 2000). Indeed, in some cases the learners enrolled in blended learning classes outperform the learners in a face-to-face class (Chandra & Lloyd, 2008; see also Brunner 2006, McFarlin 2008). Although it is difficult to determine the causes of these differences, one possible explanation is that learners enrolled in blended learning classes are using a variety of learning strategies to learn the content on a deeper level, resulting in greater learning.

As there has been no significant difference in student outcomes, recent research has dealt with student experiences with blended learning. Student experiences have been mixed, no doubt an effect of the mixed mode of educational delivery. El Mansour (2007) reported that some students felt they missed critical cues from the body language and facial expressions of classmates and professor, a criticism of the online format. Others reported difficulties with "rigid schedules" for the face-to-face portion of the course (p. 246). Both of these concerns may be alleviated by offering students the choice of online course or face-to-face delivery, as we did with this arrangement.

Recent advances in technology have given rise to a new application which differs qualitatively from older conceptions of blended learning. Where older conceptions require all students to complete some course requirements online and some course requirements face-to-face, all students are following the same format. New technologies such as Wimba LiveClassroom, Adobe Connect, and WebEx have expanded the delivery options to allow for more student choice and flexibility. These technologies offer the best of both world, incorporating all the features of a live classroom element (voice, video, hand raising, as well as whole-class, small-group, and one-on-one synchronous interaction).

As a result of this pilot project, we present the results of a pilot study in which a sociology professor at a mid-sized public university with a largely rural student base offered a class on "Sociology of Work" using this new live classroom technology specifically to offer student the choice of attending online or in-class. We selected Wimba LiveClassroom because of its robustness in dealing with multimedia and file sharing, its integration with the Blackboard Vista course management system, and its potential for real-time communication. The nature of the class required that the students be able to view videos simultaneously, participate in discussions, as well as make and react to student presentations. The class had one student, Abby, who lived near a regional campus about thirty miles from the main campus and therefore attended online, at first from the regional campus, and later from her home. The class also had eleven students at the main campus who were given the option of attending in person or to attend on-line in the same way as Abby, and one main campus student did so when she got sick. The professor also used the archive feature to make recordings of each class available to any student who had a schedule conflict or who simply wanted to review the classroom discussions. Data for this paper were taken from the class archives and from emails between the professor and students, administrators, and technical support staff, which include "post-mortem" reports from the professor after each class.

Video of class sessions and extracts from communications after each class will illustrate successes and frustrations. The paper will conclude with recommendations for future directions of research and suggestions for restructuring technology and organizations to facilitate future success.

Trials and Triumphs

While change in general and the implementation of computerized systems in particular can be challenging for the worker and the support staff, implementing technology to augment or replace long-standing work practices can be exceptionally difficult. These difficulties are often magnified if the affected worker occupies a position that has a tradition of organizational power and autonomy. Possibly one of the most extreme examples of this phenomenon is implementing a computerized web-based teaching system for university faculty. Universities are steeped in centuries of tradition, and despite the many waves of teaching methods and technologies, many faculty members are stubbornly wedded to traditional in-classroom chalkboard and lectures.

However, the vast societal changes since the mid-twentieth century that opened higher education to the masses have continued to bring more non-traditional students with needs that cannot be accommodated with traditional chalk-and-talk methods. Some students have to fit course attendance around changing work schedules and work-related travel. Others have to fit attendance around children home for sickness or snow days. Still others live far enough away from campus that the threat of gasoline price spikes, work, or weather events can tip their decisions against pursuing a higher degree.

As non-traditional students have become more important to university revenues, non-traditional teaching methods have expanded beyond such early staples as correspondence courses and Internet-based e-courses. These have met with a mixed response from faculty. One argument from resistant faculty is that while the fixed nature of these formats might work for courses in which the content does not change quickly, these formats are not appropriate for courses in which the content closely tracks current events or for which the classroom dynamic helps to guide which material is given focus in the classroom. Closed-circuit and satellite technology has helped in some cases but requires special classrooms equipped with costly equipment at multiple sites and does not offer flexibility for special circumstances.

One recent technology solution, Wimba LiveClassroom, addresses these concerns by providing live interactive video and course content from standard laptop computers and webcams in a classroom with nothing more than an Internet link over broadband connections accessible to students from their homes. During class time, students can watch lectures and see PowerPoint presentations, watch videos, participate in discussions, and make presentations. If the professor chooses, students who cannot attend or who want to review in preparation for exams can see archives of the class afterward.

The promise of this technology prompted the instructional technology support staff at a mid-sized public university to partner with a sociology professor to conduct a demonstration project, using a class on sociology of the workplace. This was especially interesting given that the course content needed to be responsive to workplace changes prompted by the economic crisis at the end of 2008, and that the demonstration project itself exemplified the interaction between technology and social organization of the university as an economic enterprise.

Early in the semester the two authors, the director of the university's Center for Instructional Technology and an associate professor of sociology decided to document the "trials and triumphs" of the project and co-author this paper in a way that maintained our distinct voices and perspectives when appropriate. We argue that we are uniquely suited for this study. The director, Laura Little, has been involved in research and support of instructional technology for the past ten years. The professor, Marty Laubach, specializes in the sociology of technology and organizations (e.g. Laubach, 2005) and entered academe after a 13-year career as an information technology manager in public, private, and university settings.

In preparation for this research evaluating the pilot project, we examined several data sources: the archives of the classroom sessions, the professor's post-mortem reports, and the email communication among Laura, Marty, the university staff, and personnel from the vendor. We examined these disparate data sources looking for themes that were evident throughout the pilot experience. In the end, five themes emerged that we discuss in the "Lessons for Implementing Technology" section.

The demonstration project itself intentionally pushed the specifications to the limit to attempt to identify all potential issues, even if faculty and students needed to use less-than-optimal equipment. We used two laptop computers to control the classroom, a Dell D620 for instructor tasks and an obsolete Dell D600 to project on a screen everything that remote students would see. These were connected to the university network over two lines in the classroom, though the room also had a wireless router. The class met weekly for 150 minutes and had 12 students attending on the main campus and one student who attended from a regional campus. The class required a mixture of lectures using PowerPoint presentations, videos, discussion, and student presentations of articles from a reader. The university support staff included Jaime, a technician at Regional, and Laura and Melissa who would sometimes be at the University City campus or at Regional. Marty wrote a post-mortem after each class summarizing its trials and triumphs.

Lessons on Implementing Technology

The class started with some technical difficulties but soon developed a routine. However, at mid-semester, a series of unaddressed problems came together in a catastrophic class that cost a third of the class time. The final half of the semester proved much more successful as we all got used to the routines of the new system. In reflection, we found five issues that are in many ways standard to system development and implementation: utilizing theory of mind, overcoming technological gremlins, organizing technical support, aligning policies with production needs, and developing new habits.

1. Utilizing Theory of Mind

One of the most difficult and persistent problems in systems development and implementation involves what social psychologists refer to as the *theory of mind* (see Obiols and Berrios, 2009; Yamaguchi et al. 2009) This theory of mind refers to the way in which workers in different areas of the enterprise see the institutions, their roles within it, and indeed different ways they think about the same activity. Front line workers do not think like computer specialists, and a successful implementation requires a meeting of minds. Front line workers develop routines and practices based around the assumptions and local craft skills required to negotiate their particular circumstances. Systems analysts base designs around generalized and even idealized procedures with an institutional imperative of efficiency. Developing a system around local worker practices sacrifices the tremendous efficiencies offered by computerization, but implementing the most efficient system sacrifices the productivity of the workers as they struggle to learn the language and assumptions of computerization, and has sometimes resulted in worker resistance and even sabotage. Several studies (e.g. Braverman, 1974; Burris, 1993; and Zuboff, 1988) provide examples and discussion of resistance to technology; however, this statement strongly reflects Marty's experience as a data processing manager.

Our confrontation with the issue of theory of mind was not so extreme, but it did show up both with the worker and developers. Despite a previous career in information systems, Marty found it difficult to imagine how to incorporate Wimba into his classroom procedures. His original image was to have two computers, one to control the progression of slides and videos around which he based the class, the second a "student computer" to project the video and audio in the classroom as remote students would see it. The instructor computer would have a tracking camera aimed at the instructor to allow him to move about as he lectured. The student computer would have a second camera aimed at the classroom, and video and audio control would be switched to it during class discussion. This configuration worked reasonably well in the pre-class test, but the practicalities of attending to the class dynamic, the lecture material, and computer equipment proved quite different than his original image. The audio running through the speakers of the student computer proved unfeasible because it created uncontrollable

feedback. (See [Video 1](); 16.4 MB) Transferring control to the student computer for classroom discussion proved impractical because it was easier to physically turn the instructor camera around than to go through the procedure to switch control back and forth between computers. The tracking camera proved problematic as it would fixate on the ceiling lights or on the light of the screen behind the instructor. Consequently, the archive included several presentations by students in which the archives show only see the tops of the presenters' heads.

The theory of mind issue surfaced on the developers' side as well. They designed an elegant solution for remote students contacting the instructor by having them symbolically "raise their hand", selecting a hand icon which then changed color on the instructor's computer. If Marty was teaching a class wholly online, without local students, and focused on his screen, this would allow him to bring the lecture to a break point where he could respond. However, in a mixed class, and admittedly his own style of teaching, he was too focused on the classroom dynamic and lecture to watch the screen. Ultimately, he asked the students in the front row to tell him if they saw the signal on the projected computer, and also told remote students to break in verbally. The Wimba developers are considering adding a chime to notify the professor of hand raises based on the feedback that Marty gave.

A second example became the first serious problem. Marty found that he could not launch his videos from inside the Wimba classroom. The same videos could be launched on his instructor and on the student computers, but not through Wimba as promised. The problem came in the designers' apparent inability to anticipate that faculty would use spaces in the names of video files. He had titled one video on the media server "surviving the good times.wmv," and after considerable consternation, one of the technicians suggested that he substitute %20 for the spaces. Fortunately he was able to launch "surviving%20the%20good%20times.wmv" from the content folder without having to change the name of his files on the server, which would have forced him to change the file name throughout all of his course content.

2. Overcoming Gremlins

Many years of system design and implementation has convinced otherwise rational observers that electronic systems are breeding grounds for gremlins – unexplainable equipment and program failures. A system as complex as Wimba requires the cooperation of many subsystems: the hardware and software of the instructor computer, the university network, the Internet, the Wimba servers, the student's Internet provider, and the student computer. Our original plan called for Abby, the remote student, to use the systems at Regional, but this quickly changed as the practicalities of her life situation prompted her family to install broadband so she could attend from home. Unfortunately, her first class from home proved so disastrous that she had to drive in to Regional, missing part of the live class session.

In the classroom we often faced gremlins. Marty regularly got to the classroom 30 minutes early to set up the equipment and have time to overcome obstacles, but the class so often started 15 minutes late that several students started coming in that late! Marty's own obstinacy contributed to the problem. University's Wimba support group offered him a newer model laptop as the instructor computer, but he insisted on using his slightly obsolete departmental laptop as the projected computer because he wanted to test the system under the very real conditions other faculty might face. After the eighth class, which was catastrophic in that almost an hour was lost to problems, the support staff suggested that he consider a permanent computer in the classroom, but as tempting as that was, he felt that it was more important to work through the problems.

The two persistent and critical problems that we faced were (1) with the security system for the classroom Internet plug-in, and (2) with Wimba locking up if Marty had not accessed it for about ten minutes. The first problem caused the worst delays. The classroom had a slow wireless router and a hardwired Ethernet connection that required the security program Cisco Clean Access (CCA). Marty was told that the security program required that the computer's operating system and antivirus be up-to-date, so he usually logged in to update this computer from his office during the day. However, far too often the

security system would not only stop his login, but would slow his computer almost to a stop and then lock his computer out of the network when he rebooted it to regain control.

The second critical and persistent problem was that Wimba would sometimes lock up if Marty did not access it for approximately ten minutes. This was pernicious in that we could not find any pattern that would offer a clue to the cause or solution. He would find that the course of the class would often involve stopping the PowerPoints for a student presentation or a discussion and that when he would return to the PowerPoints, he could not switch to the next slide. He would leave the archive on, exit the Wimba classroom on the instructor computer, reenter it (which involved resetting the audio and video), and then exit and reenter the classroom on the projected computer, a procedure that could take up to five minutes and certainly ruined the flow of the class.

The eighth class, which Marty described as catastrophic, (See Video 2) seemed to have failures in all of the subsystems happening at once. Here is an excerpt from his post-mortem write up:

> …I hooked the D600 projected computer to the network and CCA locked it into a slow crawl. … After telling me that it was working and happy, it finally came up and told me that I was using an older version and that I was required to install a new version. So I selected the OK to do so, and it again crawled through the installation. When it finally came up for my username and password, it locked me into a loop where it would tell me that I was OK and then come back and require that I again log on. After 35 minutes of messing around with this slow process, I unhooked the system, disabled the network card, and turned on the wireless.
>
> Throughout all of this we were watching Abby, who was complaining about the video and audio going in and out. We lost her before the system came up ... I use PowerPoint slides and have the video window pushed up to the upper right side of the screen so people can see both it and the slides. Well, the video window would regularly go away, and then come back right in the middle of the slide, so I was constantly having to move it. At several points it simply locked up, requiring us to reboot. Laura had contacted networks about our problem, so since it was an hour or so into the class we tried to set it up correctly, but found the same CCA problem. The last time it locked, we closed the D600 down and connected the projector to the instructor computer.
>
> We again ran into the problem that if you do not change slides on the instructor computer during some unknown critical period, it will lock up and not allow you to change. I had to back out and come back in a couple times. Marvin: THIS NEEDS TO BE FIXED! It is not a local computer problem. [Marty Laubach, email]

This summary offers a good introduction to the next two issues, organizing technical support and aligning policies with production needs.

3. Organizing Technical Support

Most people think of technology in terms of things like equipment, material infrastructure, and maybe sequencing of tasks, but sociology's understanding of technology involves intimately the organization or often the reorganization of social relations (see McLoughlin & Clark, 1994; and Zuboff, 1988). The first two issues, that people rarely think alike and that gremlins impede the smooth coordination of complex subsystems, require that successful implementation of technology involves networks of support. In the ideal world of advertisements, these networks are always available, knowledgeable, and empowered to resolve problems. The real world involves rationed resources, conflicting responsibilities, and fragmented authorities – often embedded in a culture of defensiveness.

The pilot class exemplified the real world. To begin with, the class was in the evening, which meant that University's network staff was only available on call. This was problematic in that despite our planning, the CCA security problems (as mentioned above) required that it be reset for the first few classes, a task

reserved for the network coordinator, Manfred. Fortunately, Melissa and Laura, as part of the university's instructional technology staff, often attended the class to help coordinate university support for Wimba, and were able to track Manfred down using his personal cell phone. However, this meant that the class regularly started 15 minutes late until Manfred disabled CCA for that classroom.

Wimba itself advertised a 24/7 support line which included a text and video messaging system that would allow us to link online. Marty's first experience calling it was late on the Saturday before the first test prior to the beginning of classes. Here is his write up of the problem to university administrators and support staff:

> OK, I am testing this from home and have my home computer set up as the Wimba instructor and my laptop set up as a guest access so I can see what this will look like from the student's end. I was able to get in as guest, but when I tried to enter as instructor, the classroom window opens with the message "one moment, please. Loading…" and then locks up. I get a message in the bottom left of the window saying "Done, but with errors on page." This window is locked so that I can't x out of it, though I can move it and even minimize it. When I try to x out, I get a bell and nothing else. I tried calling the Wimba 24x7 service line but after three or four minutes, the service rep was pretty much useless. I asked him about a pronto session and he said he was new and didn't know anything about it. At one point he put me on hold, then after a couple minutes, the connection dropped. My situation is now that the blackboard window is locked as well as the Wimba classroom window. I am going to open the task manager and blow them away and try again. So far Wimba 24x7 is not looking so good. [Marty Laubach, email]

Even though he had sent this out to the critical people at University, he received no follow up and no indication that this had been sent to Wimba.

A second problem with the Wimba support line soon arose when Abby, the student at Regional, had a problem accessing the class using Wimba. Here is an excerpt from Marty's post-mortem of the second class:

> 2. I received a call to my office phone from Abby that she was trying to get in from home, but I didn't get it before leaving for class. I called her this morning and found that she WAS observing the class, but was unable to communicate back. She did NOT show up on the computers here. She also did not see the short video I projected. She said that she called the Wimba hot line and was placed on hold for 45 minutes before she hung up. That is two strikes against the Wimba hot line! I asked her to write this all up and I will send it out. [Marty Laubach, email]

The email was forwarded to our representative, Marvin, who only responded after Abby experienced so many problems in the next class that she had to drive from her house to the regional campus.

> … Instead of packing up and heading to a campus, the student should have contacted 24/7 Support. Laura, I know you and Marty have 2 strikes against us in terms of bad experiences with our support, but please keep in mind that during semester start up, there will be some pain points. This is common with everyone, everywhere. As demand goes up, SupportInc hires additional people. You just got the bad luck of the draw those two times. We can certainly do better. I promise. [Marvin, email]

Marty's experience with technical support staff, even his own when he was a support manager, is characterized by the attitude that *the system is doing what it is supposed to do, the problem must be created by some failure by the user to follow instructions.* He admits that he has both received and made many support calls that were the equivalent to the caller failing to flip a switch or plug something in, but that seems to have become the first assumption made by contemporary technical support staff. Many of the responses to the CCA and Wimba freeze up problems (as described) involved queries as to whether Marty had faithfully updated his computers or had turned off the screen saver. These were either Java,

Vista, or XP problems, not Wimba or CCA problems, depending on the respective support staff. Ordinarily, Marty considers himself diplomatic in his criticisms (especially over email) and maintains the professional calmness required of management, but early in this demonstration project he decided that the support staff needed to hear the (relatively) raw feeling of a faculty member stymied by the technology. His response to Marvin's last email offers a good example:

> Marvin, I just received your email (as I am writing this) about tech support making changes to computer images like installing new java updates or whatever. Please do not insult us with that kind of deflection. Maybe that is what happened? But when I was an IT manager back in the day, if any of my staff blamed a problem on users before they even looked at the system, I gave them serious hell. Wimba needs to be idiot proof because most faculty have less of an understanding of computers than I do. …Forgive me that I am speaking in anger, but I am angry. I don't like looking like an idiot in front of my class. [Marty Laubach, email]

A second example came in response to a Wimba technician responding to the PowerPoint lock up problem:

> Since Marty is able to replicate the issue on a second computer then it appears the issue is related to the slides Marty is using. We had issues in the past when PowerPoint slides that had spaces in their titles causing a similar issue so this can be related. Can you ask Marty to replicate the issue again on his first machine and as soon as he's able to replicate the issue, please let us know which PowerPoint slide did he pushed [sic] last to the content frame and which PowerPoint slide did he tried [sic] to push after to the content frame but didn't work. Knowing how to replicate this issue should help us resolve this issue very quickly. [Wimba techsupport, email]

Marty's response was less diplomatic than to Marvin:

> This is absolutely outrageous! "Since Marty is able to replicate the issue on a second computer then it appears the issue is related to the slides Marty is using." The problem is WIMBA not my slides!!!!!! We were not sold this system with a set of specifications on how to title our PowerPoint slides. The first step in solving this problem is for them to stop pushing it off to me. Given the problems we have experienced with their support already, I am developing some very strong feelings against this system. Not for the technical abilities, but for their inability to support us. [Marty Laubach, email]

These last two points are critical to understanding the viewpoint of the front line worker implementing new technology. Front line workers, especially faculty attempting to establish a rapport and to manage the dynamics of a classroom, do not want to be made to look like ineffective fools in dealing with faulty technology and wasting half of a class. Secondly, while we can accept gremlins in the hardware and software, we cannot accept a preconception from technical support staff that the problem must lie with the user's actions – so our actions must be questioned even before technicians are willing to look at the data they have available to them.

4. Aligning Policies with Production Needs

One of the truisms of any computer-dependent enterprise is that tensions often develop between the requirement for openness to accomplish the enterprise's mission and the requirement for security. There is a natural and beneficial struggle between the general philosophy and orientation of the higher education environment and the environment of network security. Ever since its inception, higher education has been based on the ideals and concepts of open exchange of ideas and, by extension, sharing of data and communication. Not by accident were the first mission-critical Internet applications in higher education, for its system of peer-to-peer communication and rapid exchange of ideas fits well with the higher education paradigm. Network engineers, on the other hand, need a system that is reliable and secure. To make sure that the system is reliable, they need to limit access to authorized users and to

guard continually against network-borne threats such as spyware, viruses, and other forms of malicious activity. Hence, a network in a higher education environment is a balancing act between ensuring access and free exchange of information for authorized users and guarding these same users against the threats inherent in the Internet. At times, this balance breaks down. In some cases, a data breach can occur, with results that can harm the users or the network (McDavis, 2008). Our experience was the opposite: legitimate authorized users were prevented from accessing the Internet in order to access education.

The university uses Cisco Clean Access (CCA) to protect its system from unauthorized access, viruses, and other threats to system integrity. CCA checks each computer that connects to the system for critical Windows updates and updated antivirus signatures. In our case, when everything was working smoothly, CCA offered a seamless interface. However, if there were problems, these problems slowed the entire system to the point that it appeared locked up. Breaking out of the security system by rebooting the computer completely shut down the jack, requiring networks to reset the line. Because the class ran outside normal business hours, the help desk was not staffed. Instead, a staff member was on call for emergencies. The CCA issue required calls to the help desk on several meetings. Although the response time for the call back was always within ten minutes, as a class was always in session this delay took away instructional time from the students and introduced more distractions. Even updating the virus signatures and critical Windows updates were not sufficient to avoid the CCA issues. This problem created the biggest setback of the demonstration project when we experienced a severe lock up that took a total of 50 minutes out of the 150 minute class. The irony was that the subject of this class was the interaction between technology and organizational structure. (See Video 2)

Eventually, the network staff shut off the CCA requirement for that classroom. It is important to note that this would not have been an issue if the computer were stationary in the classroom. However, more and more faculty prefer to use their own laptops, so it is important to keep this option open for them. As this was a pilot project, we wanted to make sure that we would be able to roll it out to the campus seamlessly; thus, we continued to work with the laptops rather than moving the class to a technology-enhanced classroom.

5. Developing New Habits

Probably the most difficult challenge for Marty as the instructor was the need to develop or change classroom habits. The first was to get to class a half hour early to set up and test all of the equipment. He usually tinkers with the lecture notes and slides up to the last minute before class, and that was not possible using Wimba. Secondly, Marty's style of teaching often includes pacing around the front of the room and pointing to the PowerPoint slides. We used a tracking camera to allow him to do that, but he found that the camera tended to fixate on the screen or the room lights above his head if he paced close to the camera. He had to get used to confining his movement. He also had to get used to the many extra procedures involved in using the system, like making sure to start the archive and lock on the audio. When the audio was not locked, silent slides resulted (see Video 3). During class Marty needed to be aware of the camera and to turn it around during extended class discussion and back afterwards when he resumed lecture. Finally, the system allowed students to signal a question or to send the instructor a text message, but when he was in the midst of lecture, he needed to attend to the instructor screen to see it. He did enlist classroom students to help cue him when online students sent signals, but he also invited the online students to use their own microphones and interrupt him when they wanted to ask a question or offer input.

To make full use of a system such as Wimba, students will also have to change or develop habits. They will need to ensure that they get the necessary equipment and learn the system. In class students will need to be flexible when instructors are attending to the equipment and talking with people they can't see. Another issue is reliable Internet access, as evidenced by the difficulties caused by the remote student's Internet access. Since Wimba is an Internet-based application, Internet access is critical to its functionality. Wimba has been tested and works well with dial-up, cable, and DSL access. However, our remote student was accessing the Internet via a satellite-based service. As we were in the project and trying to determine the cause of her dropped connections, we discovered that this system does not do

well with brief, sporadic drops in access such as those that are common with satellite access. We are so accustomed to Internet access being seamless that we almost overlooked it as a source of potential problems, and this hindrance proved to be a major issue.

Discussion

Ultimately, despite its problems we have tremendous hopes for this new form of Internet classroom. Video 4 (2.8 MB) demonstrates the beginning of a successful class near the end of the semester. Marty has continued to use it with classes in the Spring and subsequent Fall semester and finds that students like the flexibility of the archive and the opportunity to attend class when they are sick or when the weather has kept them from coming to campus. One of his goals now is to use this system to develop online sections of classes to run simultaneous to the on-campus section, where online students would have the option of attending online in real-time, but could also watch the archive if they needed the time flexibility offered by more traditional online courses. He feels that this system offers the flavor of the classroom dynamic that is missing in other formats – a dynamic in which students can clarify preset course material and can introduce examples and extensions to the material that the instructor might miss. These extensions were especially critical to a course on the workplace given as the country entered the worst economic crisis since the Great Depression.

Keys to our Success

Technical Support

Having Laura to iron out technical issues with the vendor and the IT staff at the university freed Marty to attend to his job of teaching. Although this level of support is not necessary or sustainable as the program is rolled out later, it is crucial for a successful pilot as problems are identified and corrected. As there were only 150 minutes in each class session, every minute was precious, and we needed to make sure that all possible time was dedicated to teaching and learning, instead of working out technical problems.

Teamwork

For this project to be successful, several elements needed to be working together: the professor, the students at University City, the students at Regional, the technical staff (including the content management systems, networking systems, help desk, and other staff) at both Regional and University City, and finally, the vendor. When a problem arose, the students and professors needed the problem to be resolved as quickly as possible. They did not know, nor need they know, the intricacies of the system. As we worked together, all parties benefitted: the professor was able to reach students who would not ordinarily be able to attend, the staff became familiar with the setting, the vendor received several suggestions for product improvements, and most importantly, the students were able to expand their learning. In sum, the system worked, from both technical and personnel standpoints, but the path to success was not a smooth one. It required patience, dedication, flexibility, and teamwork to make this class available to the students regardless of location.

Conclusion

By the close of the class, we determined that most of the classes worked, and we were able to serve the remote student's needs. As Abby may not have been able to attend the class if the Wimba system were not available, we were all committed to making the pilot work. In the end, the small class size and the single remote student allowed us to experiment and learn. Subsequently, we were able to use the system in other classes with larger numbers of remote students. Marty is currently using the system for two additional classes, and the pilot has been expanded to other classes in other disciplines. Several of these programs would not have been possible without the use of the Wimba technology. In a nation in which President Obama has requested that every American commit to at least one year of additional post-secondary education or training, the Wimba technology can help us meet these needs for education for

all, including those who live in areas previously underserved by education (Obama, 2009). This technology can bridge the gap between students who live in remote areas and professors who are concentrated in University City.

Acknowledgments

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