Sharing Classrooms Across the Pacific via the Internet, Part I.

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Sharing Classrooms Across the Pacific via the Internet, Part I.

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In this piece we will discuss how anyone with access to high bandwidth can use off-the-shelf software (often freeware) and the Internet to host video teleconferences with distant sites. Our experience has been derived from classes extending over a year between Pacific University in Forest Grove, Oregon, and Wenzhou Medical College in China. Here we will concentrate largely upon technological issues, and in subsequent pieces will discuss the actual classroom experiences and the pedagogical issues which we faced.

Many often confuse the hype we read daily regarding computing and the Internet with reality, particularly if we have no personal experience with the issue in question. This is especially true, we think, of video teleconferencing. We believe that these applications and technologies are now quite common and fully functional—for others in other places. We are aware that Vice-president Cheney used the technology often following the events of 9/11 and think that we, too, might well do so, if only we had the need.

The reality is far less appealing than the hype, however. Most commercial grade setups utilize dedicated technology and often must rely on multiple long-distance telephone calls to carry data. This means that the initial equipment purchase can run close to ten thousand dollars or more, and that the per-minute costs can easily make an hour-long event cost hundreds of dollars. If you have access to the resources of a major corporation or the Pentagon, then, video teleconferences are easily manageable.

For most businesses, however, and many educational institutions, particularly K-12 ones, these costs are prohibitive ones. Funded with a proof-of-concept grant from the Northwest Academic Computing Consortium (NWACC) [1] the Berglund Center set out to share classes via the Internet synchronously (in real time) with our academic partner in China, Wenzhou Medical College.
Part of our purpose was to demonstrate that this could be done cheaply and efficiently with off-the-shelf applications and hardware within the reach of any K-16 educational institution. In addition, presuming that we could solve the obstacles presented by technology, we also wished to learn about the pedagogy appropriate to shared classes.

Our project, “TransPacific Interactive Classrooms” (TPIC) received its funding in the spring of 2004 and we are now finishing up the second class in the initial period of the project. Our Chinese partners and ourselves are more than satisfied with the results and have agreed to continue the project for additional classes, fully funded by WMC.

Here we will summarize the project. To see the details of the project as it developed day-by-day, including highly technical findings that would be useful to any institution intending to develop an equivalent program, please go to: http://bcis.pacificu.edu/nwacc/

We began with the assumption that the project, while daunting, was feasible. Over the next several months during the summer of 2004, we had frequent occasion to doubt that assumption. Part of the issue for us was to better understand the wide range of variables that affected video and audio in an Internet Protocol enabled environment. (That is, using the World Wide Web.) It was important to us to use, whenever possible, the cheapest and most widely available programs and technologies that we could find.

At the U.S. end at Pacific University we had the resources of the Berglund Center for Internet Studies, including a good mix of Windows and Apple platforms, the campus high-bandwidth data pipe—twinned T-4 line—ably monitored by Lee Colaw and Ted Krupicka, and very importantly, the talents and dedication of our systems operator Benaiah Young. These resources, plus the ten thousand dollar grant from NWACC, gave us a unique opportunity to experiment freely. As the project supervisor, I also had the benefit of personal knowledge of Wenzhou, where I usually spend four to six weeks a year teaching.

At the Chinese end we had as a partner a very dynamic and aggressively reformist academic institution, Wenzhou Medical College (WMC) in Wenzhou, a city of some seven million on the coast about an hour’s flight from Shanghai. Shanghai is the most modern of the world’s cities, and we were within its technological shadow in effect, which gave us easy access to skilled personnel and sources of the most modern technology.

But again our most important resource there was people. The President of WMC, Qu Jia, is a cosmopolitan highly traveled administrator with a personal commitment to leveraging technology whenever possible to improve the teaching functions of his institution. As the medical college which has educated most of the hospital administrators and many of the medical personnel in Zhejiang province, China’s wealthiest and most dynamic region, WMC was able to command large resources and willing to do so.

Our teaching partner in the TPIC project was perhaps the single most important element in our
success. Tom Yang is a highly dedicated teacher who, with his Dean, Lu Yi, has been developing a program for elite students of English at WMC. The program is now in its third year and has three groups of outstanding English majors, many of whom could easily compete in an American college or university at present.

While he began with no particular computer expertise beyond the usual abilities to do work processing and email, Tom took on the task of supervising both the technology and the pedagogy at the Chinese end. Like Ben Young at the American end, Tom was endlessly creative, and above all dedicated.

When we began, it would be fair to describe WMC as a dynamic teaching institution, but like most Chinese institutions, one just beginning to feel the impact of the Internet. While the medical profession is, of course, extremely reliant upon high technology, the classrooms at Wenzhou often did not have Internet access and usually featured a first-generation digital projector and a windows-based older computer. Students had to go to the library to access the Internet and there were regulations limiting the use of personal computers on campus and in the dormitories.

Because so many Americans are burdened with the remnants of Cold War mentalities when conceptualizing China, it is important to point out that none of the limitations on computing and the Internet at WMC were in any sense political ones. WMC simply had not seen the need for wider access, and above all, feared that students who could access the Internet would not concentrate upon their studies.

This is to say that, in general, WMC did not yet understand the promise of computer-assisted instruction and the degree to which the Internet could compliment or surpass the library as a source of information.

As our shared classroom developed, WMC moved very quickly to institute necessary changes. During the first several months for example, they:

- Discovered that the local campus network was too narrow at the classroom end and brought in an additional dedicated ADSL line, making the decision to do so, installing, and enabling the line between a late Friday morning and the following Monday morning.
- Decided that the impact of the class was such that the English majors needed their own lab and installed a 24-station lab available 24-7 with the most modern Windows machines available, all in a matter of one week.
- Decided that the students should be encouraged to bring their own laptops to college and began wiring dormitory rooms for broadband access.

Tom Yang’s own Herculean labors in making the class work involved not only providing adequate technology, but also in working with us to develop appropriate curriculum and pedagogical techniques. His labors have been well rewarded by his Chinese peers. He has won a highly competitive teaching award and presented several academic papers, one of which also won
province-wide honors, based on his work on the TPIC project. As a professional linguist and a
dedicated teacher, Tom Yang was the ideal partner for us.

Our American teachers were first, Tim Thompson, a Professor of American Literature, and then
for the second class, Anita McClain, a Professor and senior member of the College of Education,
both at Pacific University. Tim taught American Literature in the fall of 2004, and Anita now is
finishing up a graduate-level class in “Teaching Reading and Writing Across the Curriculum.” In
the next issue of Interface we will discuss our pedagogical experience and findings. In addition,
both Tim and Anita are writing up their assessments of the project for future issues of Interface.

The two classes were deliberately chosen to present widely different challenges. With the first
class, Tim Thompson’s class in American Literature, our main problem was simply to provide a
good platform for the class. We decided to do the class from our labs, where we had good
access to technology and could closely monitor proceedings with a number of workstations. Tim
then presented a one-to-many class, essentially a talking head lecture monitored by sixty
Chinese students viewing him projected in front of their classroom and hearing him over large
speakers. When they wished to communicate with him, they could do so asynchronously with a
bulletin board on a class web site, or come to the front of the class and speak into a microphone
in real time.

We soon made a number of, for us, critical discoveries:

- Despite what we thought initially, video is far less important than good audio. A college
class spends most of their time looking at a notebook anyway, but they must be able to
hear the teacher with near perfect clarity. This is particularly true if they are listening in their
second language.
- Moreover, as bandwidth fluctuates, video is in some senses more forgiving than audio: it
simply slows down and does not “refresh” smoothly but begins to give the audience a
series of what come to seem to be still pictures. These can be tolerated for a surprisingly
long period while listening to a lecture. They do little more than reassure the class that the
teacher is there and not doing anything unusual, and that is, after all, enough.
- Audio, however, “clips” and begins to grow unintelligible as data packets “drop out.” This
problem can come, of course, from either the Chinese end or more critically from the
American end.

Our most frustrating series of problems had to deal with security issues at either end. Both
WMC and Pacific University are very conscious, necessarily, of network security and each new
application we tried usually encountered new problems with firewalls and other security issues.

Because of our inexperience and the learning curve we faced, we had several disastrous
classes. There were days when we could see each other, but not hear. Never, however, did we
call off or fail to complete a single class. In some sessions we had to rely on the BBS, on web-
enabled document drops, and on the web site.
One necessary component of our classes was the possibility for good text messaging. Some otherwise good applications did not have good messaging windows, and these proved inadequate for our needs. Our crew usually had at least one student free to message critical points, or to man another workstation to get more information as to our problems.

One of our most important discoveries was that much of what we understood to be theoretically correct mattered little in our own real world application. We encountered many situations in which the problem was not at all what we expected, and in most cases we had to try a variety of fixes before we could even fully understand the problem.

Many anticipated problems were not, in fact, problems at all. We learned, for example, that the condition of the Internet internationally was relatively inconsequential. We worried about bottlenecks as key servers went down or were slowed down internationally. There are programs for monitoring the “weather” on the Internet and for the first few weeks we watched them anxiously. [5]

We soon found, however, that what really mattered were local conditions. Our “window” for classes was late afternoon Pacific time (4-6 p.m.) and early morning (7-9 a.m.) Chinese time. [6] This meant at Pacific, that we wanted to hit the sweet spot between other classes ending, and students returning to dormitory rooms to download MP3 files or play on-line games. At the Chinese end, we soon learned to “read” the moments when millions of office workers sat down at their desks in the Shanghai region and fired up their email clients. Fortunately for us, however, Shanghai massively upgraded its pipe during the course of our initial class term, and Chinese conditions ceased to be a problem.

At the Pacific end, Lee Colaw, Director of Instructional Technology, used our packet shaper to allocate bandwidth as we needed it. In general, however, our needs have been well within the capabilities of our network, or any other high-speed network.

Our main response to these problems was first, to learn to recognize them, and then to build in adequate compensation. As Pacific University, like most institutions, does not yet have access to Internet II, we tried, as always, to get by with clever technological fixes rather than simply hurling money at our problems as they arose.

Days in which we sustained audio but lost video were more frequent, as video demands more ideal transmissions, that is, more bandwidth, but as stated above, it is less critical in the learning process. As long as students can hear, they can learn and respond.

Our initial assumption was that we wanted one combined application for both audio and video. We first tested “IVisit.” [7] IVisit, like all corporations mentioned here, was very generous with us, providing free licenses for our trial period. It should also be noted that depending on local conditions, others duplicating our approach might well find a different mix of either software or hardware more appropriate than those we settled upon.
Our tests with IVisit were extremely important ones. Their technicians were very generous with their advice and we are very grateful to them. They gave our project a very strong foundation and helped us understand a wide range of issues affecting us. At the urging of the Chinese, however, who wished to split out audio and video transmissions, sending one set of signals along their campus network (video) and another along a dedicated ADSL line (Audio) we experimented with restricting video to IVisit and tried Skype for audio, a program with which the Chinese technicians had had good results. [8]

Once we had made this decision, our audio quality increased tremendously. The first test using separate audio and video bands was the first day that we truly were sure that we could be successful. From that day forward we were delivering a class rather than struggling with technology.

Having solved the problems facing us we now felt free to experiment with other applications. The Chinese had wanted us to try Microsoft’s Netmeeting for some time, and we did so. [9] We had several problems with it however, though we still use it, because it is freeware. Microsoft has announced, however, that it will not continue to support Netmeeting but is presumably moving toward more applications better integrated into subsequent iterations of its Windows OS.

As a mixed platform environment at the Berglund Center, we have a variety of Apple or MAC machines available and a rich heritage as a MAC based enterprise. In China, however, MACs are very expensive and usually sold in boutique-like environments intended to appeal to artists and nonconformists. No MAC OS machines were available at Wenzhou. Several of us, however, had good results on our personal machine with the MAC ISight suite and wished to try it. [10] An opportunity was presented when my wife, Christine Richardson, and I were invited back to finish up the American Literature class on site in Wenzhou during December of 2004. [11] The Berglund Center supported Ben Young accompanying us, and Apple generously loaned us a high-end Mac Powerbook with ISight camera and other goodies.

Although we had some familiar problems with firewalls in China, generally the MAC functioned well above the PC-based applications we had tried. [12] For the first time, we had fully synchronized audio and video, and of such a high quality that it quickly became transparent; that is, an awareness of the technology became the exception rather than the rule in communicating between sites.

Although those of us who were directly involved experienced this program as an often frustrating one, the transformational changes that were occurring on a regular basis at the WMC end, and seem likely to occur at the Pacific end, have made it more than worthwhile. The overall impact has been such that WMC has contracted with us for additional courses following the period when we have exhausted the NWACC funding.

We are supplying WMC with a new mini-MAC, export licensing permitting, and, while this may usher in another brief period of experimentation, we believe that we have the platform and the
software we need to push the level of integration between the two sites still further.

It is our goal to one day have a joint degree program in which Chinese and American students will work together in both the virtual world of the Internet and on the real campuses of the two schools, and teachers from each will move back and forth.

In future issues we shall discuss the pedagogical findings of our experiment.

Footnotes


[2] We also had the invaluable assistance of Ben Bagley, our very creative video shooter who unhesitatingly provided his own equipment and hours of time to make this project successful, to Patrick Dedrick, our indispensable utility infielder who dealt with all those problems that no one else could seem to manage, to Heather Hawkins, who created a series of extraordinary web sites and continually reminded us that Windows is not the only platform out there, and to many others.


http://bcis.pacificu.edu/journal/2005/02/0205.php

[4] For adequate rates of packet delivery in both video and audio, please see the class site at

http://bcis.pacificu.edu/nwacc/


[6] China is fifteen or sixteen hours ahead, next day. Pacific University is GMT-7 or –8 depending on daylight Savings Time, and all of China is GMT +8. We found the constant need for computing time eventually required the simple expedient of adding an additional clock set to Chinese time to our classrooms.


[11] As Chinese classes last more than a month longer than Pacific University’s modified semester classes, there is always a need to add additional material in China after our classes have ended at Pacific.

[12] We believe that this is because the Apple applications, having been developed solely for the operating systems rather than by outside programmers who wanted them to run within a wide variety of window’s based environments, were leaner and more tightly integrated. They seem to simply make a better use of the critical bandwidth available to us.

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2 THOUGHTS ON “SHARING CLASSROOMS ACROSS THE PACIFIC VIA THE INTERNET, PART I.”

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