

# Normalizing an Off-Campus Course with Video-Conferencing

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## INTRODUCTION AND BACKGROUND: LUMPY OFF CAMPUS COURSES

Off-campus credit courses requiring substantial travel on the part of the instructor are often presented as a series of intense workshops (e.g., 36 hours presented as four 2-day workshops). Although this traditional off-campus course presentation mechanism keeps both travel costs and time manageable, such an approach does not appear to be ideal for either the students or the instructional process. More specifically, instruction provided in such a lumpy context is not an ideal way to provide students with sufficient opportunities to process new information and procedures or assimilate or accommodate new concepts and ideas (Bruner, 1966), nor does it provide students with opportunities to attempt to apply the ideas presented or to reflect on their experiences before a new topic is presented or addressed. Additionally, such a course format limits the opportunities that the students have to interact individually with the instructor (i.e., office hours) and limits the opportunities that the instructor has to reflect and act upon formative assessments to better meet the needs of the students.

Although well developed Web-based instruction (WBI) and classroom instruction (CI) appear to be equally effective when similar instructional methods are being used and students are selecting WBI (Sitzmann, Kraiger, Stewart & Wisher 2006, Wickersham & Tyler 2004), WBI may not be viable when the topic requires the collocation of instructors and students (i.e., CI) for specific activities. Still, some of these courses that require face-to-face interaction (F2F) and learner-centered instruction may also contain components that could be presented or undertaken in alternate formats - either as an asynchronous WBI component or as a synchronous component using inexpensive Internet-based video conferencing technology (IVC) (e.g., Chou 2001) or other online tools (e.g., Elluminate, Anderson et al 2006). Blended learning has recently become the standard term for describing the thoughtful integration of online

and F2F learning activities and related pedagogies to enhance learning opportunities (Garrison & Kanuka 2004, Oliver & Trigwell 2005).

Earlier computer-based innovations such as e-mail and online discussion forums appear to have generally improved the efficiency and quality of teacher-student communication in both on-campus and online courses (Francis Pelton & Pelton, 1998; Davis 2001). Two factors that appear to support the effective implementation and ongoing use of technology in education are a) the technology must be manageable for both the teachers and the students - being both low threshold with respect to the initial costs and learning curve and low friction with respect to ongoing effort to use (Pelton & Francis Pelton 2008), and b) there must be advantages relative to the traditional instructional presentation and support mechanisms (e.g., Shih et al. 2003).

Although video conferencing services have been available for many years, the associated costs were initially relatively high and impractical for most educational applications. However in more recent years, broadband Internet service has become almost ubiquitous, sufficiently powerful computer systems have become commonplace, moderate-quality Webcams are now low-cost options and video "chat" software has become readily available and easy to use. These changes have lowered the threshold and friction associated with the adoption and use of IVC - increasing the potential for such to be used to support teaching and learning.

Note that the fidelity of the audio and video signals presented in current inexpensive IVC is somewhat limited and as such it may still require some level of tolerance and adaptation to be judged effective (Pillion, Johnston and Lehman, 2003). Still, even with extremely marginal video quality supporting the process the use of IVC has been found to be successful (e.g., a latency of 10 s, a frame rate 0.25-4 fps, and a minimal resolution of 160x120 pixels) (Latchman, Salzmann, Gillet & Kim, 2001).

The mathematics methodology course observed in this study requires significant F2F classroom experiences to support practice with manipulatives, flexible collaboration opportunities, modeling of in-class pedagogical techniques and the development of classroom skills. However, in addition to these activities, the students benefit from preparing and presenting a short demonstration lesson, and practicing their teaching with their peers taking on the dual roles of student and evaluator. Thus, a blended learning model was identified as feasible because the instructor could observe and participate in these demonstration lessons from a distance using IVC thereby somewhat mediating the lumpiness of an off-campus course offering.

## **MAIN FOCUS: USING IVC TO SMOOTH OUT THE LUMPS**

### **Technology To Support IVC**

Setting up an IVC capability is a relatively straightforward process typically requiring minimal technical support and minimal training. IVC resources required for a remote (i.e., off campus) site will typically include:

- Laptop computer with built in wireless networking and Bluetooth capability (e.g., Apple Powerbook or MacBook)
- Wireless access to the Internet
- Webcam (integrated with the laptop or separate)
- Bluetooth headset or microphone (e.g., Motorola)
- Video chat software (e.g., iChat: Apple, 2005)
- Onsite student help to support IVC use
- Optional – TV or large display

At the remote instructional site a laptop computer with wireless connectivity will generally be required in order to conveniently and temporarily place the webcam and chat software in the regular classroom for class use and then in an office space for office hours (alternatively one or two desktop systems with wireless or hard-wired Internet access might also be used to support the process).

The webcam should be of moderate to good quality. Lighting and focus is often an issue and will need to be explored to ensure that adequate visual fidelity is

achieved. Lighting should be maximized wherever possible (e.g., raising the blinds) to maximize the quality of the image being sent to the instructor. Because typical webcam microphones are designed for close proximity, they are not ideal for listening to either the class in general or the presenter. When the instructor is primarily focused on observing/hearing a presenting student in a classroom setting, an over-the-ear Bluetooth headset (i.e., a surface device not an in-the-ear-canal device) has been found to be effective - minimizing the intrusion and leaving the student teacher's hands free.

The video-chat software needs to support efficient transfer of both audio and video. The audio needs to be well synchronized with the video image and the time lag - or latency - should be minimal. If the bandwidth available is limited, the audio signal should generally be given priority over the video signal (i.e., skip image frames rather than audio content). The software should allow users to modify the size, screen position, hue, saturation, brightness and contrast of the image presented, and the audio volume. The screen image from the laptop may also be 'mirrored' onto a classroom TV to allow an approximately full-size image of the instructor's face to provide a virtual presence and to support communication between the students and the instructor.

For convenience an on-site student helper can be enlisted to set up, test and support the IVC in the classroom during the lessons. As current IVC is both low threshold and low friction, only minimal training and guidance is required. After only a minor introduction, most students are able to manage the setup of the IVC on their own –supporting private teacher-student interviews and online office hours.

IVC resources required for the instructor's workstation will generally include:

- Desktop computer or laptop computer with Internet access
- Webcam
- Headphones
- Video chat software
- Supplementary lighting

The requirements for the webcam and the video chat software are the same at the instructor's end of the IVC. Similarly the training will also be minimal, although the instructor may need to be a bit more technologically

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