

**2006 Progress Report - Faculty/Librarian Presidential Grants Program**  
**Ed Brush - Chemical Sciences**  
**Webcast Lecture Supplements for Organic Chemistry I&II**

**Summary.** The purpose of this project is to introduce and evaluate the use of webcast tutorials in my two-semester Organic Chemistry classes during the fall and spring semesters of the 2006-07 academic year (CHEM-343 & 344). These tutorials will be made available to students as downloadable audio and video files for their laptops or desktop PC's. The goal is to enhance teaching and learning by providing critical course content in a readily accessible and portable format: tutorials, lecture supplements/clarifications, problem solving hints, worked examples, quizzes, and pre- and post exam review. Students will be asked to complete a written evaluation form at the end of each semester, and the results disseminated to the BSC community. This is a pilot project being done in collaboration with IT personnel.

**Significance.** I am a strong proponent of collaborative classroom learning and interactive problem solving for developing creative thinking and problem solving skills. Unfortunately, I have been spending increasing amounts of class time reviewing basic knowledge at the beginning of each semester, and course content and problem solving methods throughout the school year. I am piloting this project in the hope that I can review specific, key concepts outside of class time, and bring the classroom to "where students live" (on the internet and plugged into MP3 players), in a more relaxed and less threatening atmosphere. This way I hope to spend more class time on collaborative problem solving and self-guided "discovery." Although I see equal potential for labs, my focus will remain with the lecture component of organic chemistry. Potential advantages include: education becomes more portable by supplementing (not replacing) the classroom and office hours; students can access information on their own time, over and over again; students can pause the tutorial to think through problems and supplement their lecture notes; a potential benefit to students with certain learning disabilities or who work part-time or have families; that the technology is available to all students; there are unlimited potential applications for faculty.

**Activities completed and in-progress.**

- June: Purchased recording software application and USB microphone and experimented with practice webcasts. I "produce" my own webcasts using my Tablet PC, the internal or an external microphone, Camtasia Recorder audio/video recording and processing software, and Windows Movie Maker to compress the recorded .avi file. My Tablet PC allows me to "write" directly on the screen as if it were a blackboard or overhead, so the "video" part of my webcasts directly captures my screen work, with my own audio narration. Students can view the webcasts using software typically included with the purchase of a PC or laptop, or available as a free download: Windows Media Player, QuickTime Player, or Real Media.
- July – August: I attended a webcasting session at the Biennial Conference on Chemical Education (BCCE) at Purdue University. The presenters spoke about their use and evaluation of "enhanced" webcasts, which include both audio and video content, using a format very similar to that in my project. Enhanced webcasts are produced in short, 5-10 minute segments that focus only on the key points for 1-2 topics as instructional material. These were typically produced as a "Screencast" with audio, using a Tablet PC as a blackboard. All presenters reported that enhanced webcasts are "easy" to produce but time consuming as a pre-prepared script is essential. The short segments offer a manageable file size (10-50 MB) as compared to recording an entire lecture, and provide an alternative presentation format that many students interpreted as a "talking textbook." Assessment of the enhanced webcasts indicated that students did not use an iPod or MP3 player

but preferred to view the webcast playback on their PC or laptop, and that 20% of class found the resource useful, but no more effective when compared with all other course resources.

- August 2006: Eric LePage and I gave a presentation on webcasting at the New England Association of Chemistry Teachers summer conference held at BSC, August 7-10. The attendees learned about the potential for incorporating webcasting in teaching chemistry, and Eric was particularly helpful in explaining the technology, and also the nuts and bolts of finding and downloading webcasts from the internet. The session was very well received by over 70 high school science educators.
- Fall 2006: My goal was to post about three webcasts each week to my course web page. However, as the work involved in preparing a single webcast was more than I expected (see below), I am preparing one webcast at the completion of each chapter, with content based on a survey given to the class to assess student's comfort level with the topics covered in each chapter.

My "enhanced" webcasts include a combination of video and pure audio, and at the end of the fall and spring semesters I will ask my students to evaluate each form of media, the usefulness of the content, and how/where they listened to and/or viewed the tutorials. My webcasts are limited to 5-10 minutes, and the .avi file format is compatible with any laptop or desktop PC. These files are made available through my course web page, and my web host space has been increased to accommodate these files.

**Obstacles.** Recording a simple 10-minute webcast is much more time consuming than I first anticipated. I have found it necessary to produce a script of my webcast as a power point outline, then produce the video recording as a screen capture as I draw on my Tablet PC, plus adding in my own audio narrative. A simple 10 minute webcast has taken up to two hours to produce. I expect that this will become easier as I go along, with the hope that my webcasts will be "recycled" each year, with periodic updates. I am also working through a purely technical issue, where about 25% of the class only hears the audio portion of the webcasts, but are unable to view the video. As the majority of the class is having no trouble with audio or video, I suspect that these students are using an outdated software application, and I have asked them to download the latest free version of "Real Player".

#### **In-progress.**

- Fall 2006: Develop and maintain a web database of the most recent publications and applications on webcasting;
- December: Develop an evaluation form and conduct preliminary assessment;
- Spring 2007: Produce a "Getting Started" webcast tutorial for faculty;
- May 2007: Presentation at the CART Celebration and write final report;
- August 2007: Give report at the American Chemical Society National Meeting in Boston.