

EPS Gains Experience with Online Teaching

By Burkhard Militzer, August 2010

Online teaching was a hot topic at the recent meeting of the UC regents. While it appears to be very promising to some in the university administration as a way to reach out to many more students and to increase revenue, it has been controversial to many others. A diversity of opinions is present on campus and in our department.

Since Geoff Marcy (Astronomy) and I have just completed teaching "The Planets" online for the first time, I would like to share my experiences with you. Last fall, we were approached by the chairs in Astronomy and EPS to offer an online version of our very successful course "The Planets" that has been cross-listed by the two departments for many years and has drawn 200 students or more each semester. The goal of offering a summer online course in addition to our face-to-face class was to reach out to a large number of non-science majors who spend the summer off campus but have extra time to fulfill requirements. That is where I see the positive side of this online class. Students who would otherwise just be working can now also make progress toward their degrees. Nobody we spoke with suggested replacing our face-to-face course, but I will critically compare the two below. The fact that it took the committee on courses three sessions to approve our class indicates that online courses are controversial on campus.



Burkhard Militzer (EPS, Astro) and Geoff Marcy (Astro) in an introductory class video

As far as motivations go, there is also a financial aspect. From the fees of 100 students enrolled into our class, both departments will share a benefit equivalent to 25 phone lines per year, according to my rough estimate. This unusual financial unit is somewhat appropriate because phone lines have been the target of recent budget cuts.

Our online course consisted of *pre-recorded lectures, threaded discussions, online and written homework* as well as *office hours*. We used the same textbook as in the face-to-face class, "The Cosmic Perspective."

Geoff and I sat down in front of our computer and recorded all our PowerPoint lectures again for the online delivery. We produced video files based on our slides that included our explanations, some animations, cursor movement and whatever we decided to draw on the screen. This was a lot of work but also offered room for creativity. It was Geoff's idea to introduce "Star talk" that would bear some accidental similarities to a certain radio show. Adding humor, music, and sound effects to the recordings was our attempt to make it more appealing to students. "We will we will rock you" and "Under pressure..." respectively concludes the lectures on earthquakes and minerals. Examples can be viewed at <http://militzer.berkeley.edu/L21.mov> and <http://militzer.berkeley.edu/L.mov>.

I would say our lecture recordings were successful. The content was the same as in our face-to-face class. However, the interactive part was missing. Students did not see us perform in real time, which is far from optimal but is a compromise I am willing to make in order to reach out to more students in an online setting. (I am listening to CDs much more often than I go to concerts but admittedly all classes that had an impact on me were delivered in real time.) Moreover, in our face-to-face class, only a few out of 200 students use the chance to ask questions. Some surreptitiously surf the internet while they attend our lecture.

I see the biggest difference between an online and a regular class in the discussion format. In a threaded discussion as opposed to the conventional weekly discussion sec-

tions, students were asked to post one or two paragraphs about a given topic. Later, they needed to reply to a fellow student's posting and both components were graded. This worked best when students posted and explained images they found on GoogleMars. Some said they spent a whole night on Mars. However, when I wrote detailed replies to students' postings, it was disappointing to see how few responses I received. There was no real discussion. Students had already moved on after having fulfilled this assignment.

Every week students had to do homework with the online system MasteringAstronomy. It is graphical and interactive and provides instant feedback. I made sure that we still had homework submitted by email in order to develop skills that a machine cannot evaluate, e.g., essays, detailed calculations, and exploring Mars.

Students also had the option to email us questions and to attend electronic office hours but both were very seldom used. We as instructors felt somewhat detached from our students. We met most of the students only once when they took the written final exam on campus. Others took it at a proctoring service elsewhere. We also constructed two online midterm exams but that did not work as well as expected. We could not control access to the internet during the midterm exam and we also found that a disproportionately high number of students engaged in illegitimate collaborations.

If online teaching is to play a more prominent role in university teaching, then having an *interactive* component will be essential. Since we already have wonderful software tools that allow us to have group discussions with audio and video, file and screen sharing, for certain courses, there may no longer be a need for instructors and students to be at the same place. Still, the value of interactive teaching has not disappeared. On the contrary, since so much is prerecorded, the interactive part will have to be carefully constructed to compensate for the lack of human communication.

Our course evaluations for this year were very positive. For next summer when we expect a higher enrollment, we are thinking about how to add an interactive element to the course. The challenge will be to accommodate everyone's schedule but still to make this a more engaging online experience.