

Reflections

Benefits of the Course

We were able to introduce students to html, JavaScript, and the use of the Google Maps API to create a range of web mapping applications. The textbook that we used for the course, Peterson's *Mapping in the Cloud*, provided a good overview of basic cartographic and GIS principles and also provided numerous example code for developing various web mapping applications. This course also took advantage of our separate skills, Professor Slocum's in cartography and visualization, and Professor Li's in spatial analysis and programming. It also gave us a chance to be involved in team-teaching, something that we had not done together before.

Challenges of the Course

Probably our biggest challenge was the limited programming capability of the students. As discussed in Module 1, several of the students enrolled in the class had little or no programming background. In emails that we had sent to students prior to offering the class, we had stressed that some programming background was essential. Since we could not afford to have too many students drop the class, we had to move slower through the material than we originally had anticipated. In particular, we had to spend much more time than we planned to help students finish the assignments.

As a result, we simply could not cover as much material as we had hoped. To illustrate this, we have prepared both an [Original Syllabus](#) and a [Final Syllabus](#). The Original Syllabus is the syllabus that we started the course with and the Final Syllabus shows what we actually ended up teaching. At the end of the Final Syllabus, you will see the list of topics that we did not have time to cover. These topics included Map Layers and GIS, Map Layer Mashups, Concepts in Online Mapping, Mobile Mapping, Local Mapping, Analysis in the Cloud, and Virtual Reality in the Cloud. We were particularly disappointed that the latter two topics could not be covered. With respect to Analysis in the Cloud, remember that the title of our course was Mapping and Analysis in the Cloud and that Professor Li's strength is in analysis. We were able to briefly introduce Google Earth Engine (which has a strong analysis component), but we didn't have time for students to complete an associated exercise. With respect to Virtual Reality in the Cloud, we had hoped to focus on the novel [Oculus Rift](#) hardware. Although we weren't able to emphasize this in class, one of our more advanced students did experiment with the hardware and related software, and provide a brief demo to the class (see the [Student 4 final project](#)).

Another challenge that we faced was trying to fit our conception of what should be covered with what Peterson covers in his text. As discussed in the [Course Notes for Module 1](#), the Peterson book alternates chapters of cartography/GIS material with chapters of coding approaches. At an introductory level, we expect that this approach could be quite effective, but many of our students already had considerable background in cartography and GIS; as such, our students would have benefitted by more of a programming emphasis in the book. Another difficulty in using Peterson's text is that he does not emphasize some of the recent developments in Big Data. For example, there is no mention of developing applications for social media, such as Twitter data.

Potential Revisions to the Class

Presuming that we teach this class or a similar one in the near future, there are several improvements that can be made. One is that we would have to make very clear at the outset that some programming background is required. This is probably not unrealistic because we already offer other programming classes in the department. We need to examine our course structure in cartography and GIS, and see how we can develop a better tract for preparing students for such a class. We also need to look to other departments (e.g., computer science) to see if we can recruit students who have an interest in developing their programming capabilities in the geographic arena.

Regardless of which students ultimately take the class, we need to look for more effective ways of introducing the programming tools used in the class. [As discussed in Module 6](#), one approach for speeding up the programming process and learning the Firebug debugger would be to have students work with very simple programs in which minor bugs have been introduced by the instructor. Students would be required to find any bugs and get the programs working correctly. We suspect that having students work with 5 to 10 such programs would enhance both the students' programming capability and their ability to work with the debugger.

If students are able to program more effectively, we anticipate that we would be able to move through material quicker and thus be able to cover the range of topics that we originally had anticipated. In addition to examining the topics listed at the end of the Final Syllabus, we clearly need to place greater emphasis on Big Data and associated CyberGIS principles. We will be evaluating the course material that other CyberGIS fellows are developing to see if we can borrow some of that material to enhance our course.