Course Background

OCG 123G Climate Change and the Oceans presents basic principles of climate science and evidence for global environmental change at an introductory level. This includes topics in geology (sedimentary records of global change), chemistry (composition and reactions), biology (types and effects of living things) and physics (motion) of the oceans. Armed with the basics, we explore the impact of human activities on climate, the origin and magnitude of natural climatic change, and their impacts on the global environment and society. (Lec. 3) (A1) (C2) (GCH)

The course meets twice per week. Starting in the Fall of 2016, we met one day each week in the Active Learning Classroom, which prompted significant revisions to the course from previous semesters. In the Fall of 2017, I continued to update the course to make better use of the ALC.

Course Changes

Goals

1. Lecture Less (-40%)
2. Improve scientific literacy
   Rather than deliver a class-length lecture on topic of Sea Level change, the students used GoogleEarth to explore regional differences, calculate rates of changes, and identify processes described in a minilecture and refined readings that could explain their observations. This was facilitated by using the Active Learning Classroom.
3. Increase engagement with course material
   In class activities focused on putting data in the hands of the the students. This included the use of paper and pencil, spreadsheet and plotting programs, and on-line tools.

Integrating General Education Requirements...

STEM, Global Responsibility, and Grand Challenge Overlay

This course strives to teach the basics of climate science and the potential for human and ecosystem impacts. It seeks to to bring the urgency for action on climate change to the fore and reveal how future climate depends on collective global participation. This is largely done through a World Climate Summit Simulation, a multi-day role-playing exercise (https://www.climateinteractive.org/programs/world-climate/). Students, as representatives of different nations or regions, made pledges to reduce greenhouse gas emissions, deforestation, and donate money to the Green Climate fund and tracked the impact of these efforts on CO$_2$ temperature rise and sea level, using an interactive climate model.

Results

Course details

- Content delivery was reduced in 2016 and again in 2017. This provided time for deeper learning on each covered topic.
- Attendance was significantly better on Thursdays when we were in the Active Learning Classroom.
- Class average course grade has improved stepwise over the last two years. In 2016, the average grade improved from C to C+ and although the average was a C+ in 2017, the distribution was skewed higher.
- Students do not do assigned reading without an incentive.

Student Feedback

- Many students valued the interdisciplinary activities where discussions of economics, ethics, and global responsibility played a role.
- Students appreciate learning new tools and being shown publically available tools and data.
- The summit gave students a clearer picture of the global scale of the problem and the necessity for developed nations to play a role if we are to prevent major temperature and sea level changes.

Take home:

The revisions to OCG123 appears to have improved student learning. The ALC allowed for more one-on-one and peer-to-peer learning as well as deeper engagement with material.