TRESTLE Course Transformation Report Outline

Estimated length: 3-4 pages

Date of report: 6/14/2017; updated 12/10/17; further updated 05/21/2018

Course name: ENVS-1001: Introduction to Developing Environmental Solutions

Authors: Eve-Lyn Hinckley

1. Intro

ENVS-1001 is the second part in the introductory core series for the undergraduate major in the Environmental Studies Program. It is taught as a 75-min "lecture" class two days a week, and 50-min recitation once per week. In Spring 2017, I piloted ENVS-1001 with one teaching assistant and 48 undergraduate students, including freshmen through seniors. I designed the course around several process-based learning goals, with the goal that students would build a quantitative skillset over the course of the semester. Students will apply these skills to a number of different environmental problems as they move forward in the major and beyond CU.

Update 5/21/2018: In Spring 2018, I scaled the course to 120 students, ranging from freshman (1% of the class) to juniors and seniors (60% of the class). The course is designed as introductory level, so the composition of the enrollment did not reflect the target demographic in ENVS. In future years, this issue will be addressed with restrictions on course enrollment to freshmen and sophomores.

2. Course specific information

A. About the course

- Course Description: This course is the second part of the undergraduate introductory series in the Environmental Studies Program. It will provide students interested in continuing in Environmental Studies with a foundational skill set that they need and will develop in the major to address multidimensional environmental issues. We will do this through learning about four local environmental topics over the course of the semester that will provide context for learning quantitative approaches—from "back-of-the-envelope" calculations to converting word problems into equations to introductory statistics. Much of our "lecture" time will be spent in doing activities to build these skills; recitation sections will be devoted to small group work focused on tackling a specific problem or challenge.
- Reason this course was chosen for transformation: The course was being developed using updated pedagogical approaches. We were not transforming an existing course.
- Course Structure: Hybrid lecture-flipped classroom (75-min) and recitation periods (50-min).

B. What did you do in the course transformation?

- It is worth noting that this was the development of a new course, not a transformation of an old course. As part of the TRESTLE award, we are currently mapping the learning goals of the two ENVS intro courses, 1000 and 1001. The idea behind 1001 was to develop it incorporating newer pedagogical approaches (e.g., active learning, flipped classroom, etc) rather than more traditional methods (e.g., lectures and exams). In general, the course introduced content in four discrete modules to provide context for learning quantitative skills. Classes were developed to be dynamic, with a lot of small group and partner work, in-class exercises, small projects, and discussion. Course material was presented in readings coupled to online assessments, which the students did prior to each class.
- People involved: Jason Neff (Co-PI on TRESTLE award), Anna Hermes (Teaching Assistant), Joel Singley (hired in Summer 2017 as an hourly research assistant on TRESTLE funds). In Spring 2018, I added an additional TA, and incorporated four learning assistants (LAs) into the course.
- Overarching learning goals (revised 12/10/17):
  - Use evidence as the basis for developing decisions about environmental issues
  - Demonstrate ability to convert between units
  - Demonstrate a logical approach word problems
  - Craft evidence-based claims
  - Conduct exploratory data analysis, introductory statistics, data visualization
  - Demonstrate facility with accessing and analyzing long-term data (third-party)
  - Work effectively in small groups to evaluate an environmental issue
- Assessments Developed
  - Online assessments (reading quizzes) in D2L; Spring 2018: moved to Canvas
  - Midterm exam (individual and group)
  - In-class exercises
  - Small group projects
  - Recitation activities (hands-on laboratory, and data analysis)
- Pedagogies Used
  - Active learning
  - Problem-based learning
  - Collaborative learning
  - Self-reflection

C. What assessments or documentation of impact were or will be used?

- Measures used to monitor student learning related to the course transformation efforts: two-stage learning exams, faculty evaluations, digital assessments of readings

D. How will you maintain the changes over time and across structures?

- Currently, the course materials are in a Dropbox that can be shared with other instructors. All materials are annotated with respect to learning goals, what worked

well, past student performance/difficulties. In the future, we hope to use a program like e-Portfolio, which will soon be made available (at least as a pilot) from OIT.

- Plan for Sustainability: Each semester, one presentation during faculty meeting; regular meetings with faculty who will teach the course; eventually transfer course materials to e-Portfolio.
- Challenges for sustainability: Limited number of faculty invested in teaching the course; best if taught by several faculty in multiple sections (rather than one large section); really need OIT to release e-Portfolio to help with curating course materials and storing student performance and learning gains data.

E. Plans for future work

Some of the in-class exercises and small group projects were not as successful as others. I would like to revise them for Spring 2018 when the course scales from 48 to 150 students. I would also like to work (in collaboration with OIT) to develop better measures to store student performance data.

Update 12/10/2017: Joel Singley (grad student supported on TRESTLE) will develop pre-/post-course assessment during Spring 2018.

Update on 5/21/2018: Joel Singley developed pre-/post-course assessment with funds from TRESTLE. We successfully piloted the test (in Google Forms) as a post-course test.

3. Community and expertise building in the department

- How did you use or generate broader expertise and/or community in your work?
  - I am one of the ASSETT Faculty Fellows. This community provided great input during the development of ENVS-1001.
  - I had regular interactions with Andy Martin (EBIO) about developing content and teaching approaches for this course. Andy also observed my course and provided useful feedback on ways to engage students.
  - I sought interactions with members of OIT to discuss other digital learning tools to use in the classroom, and how to document course materials.
  - Update 5/21/2018: In Fall 2017, I chaired the Intro Series Committee to map the learning goals for 1000 and 1001. This included all faculty and some TAs involved with teaching this course. In Spring 2018, I assembled a Faculty Learning Community (FLC) to evaluate all components of the undergraduate ENVS curriculum.
- Expertise you drew on (yours, others)
  - See above.
- Community built – were faculty across the department adequately involved? Did you engage in community building across departments or institutions?
  - See my previous comment about the ASSETT Faculty Fellows program – this was extremely helpful for getting feedback on approaches I was using/trying and developing a community of educators across campus.
  - I engaged faculty in my department through one-on-one meetings, as well as

meetings with the cohort of junior, pre-tenure faculty, and gave an end-of-semester presentation to the whole faculty.
    - Update on 12/10/2017: In Summer 2017, Joel Singley was supported as an hourly researcher on the TRESTLE award. He developed a framework/tool for mapping learning goals across a course (introduced, reinforced, assessed) as well as a whole department/program.
    - Update on 12/10/2017: In Fall 2017, I convened a committee of ENVS and Environmental Design (ENVD) faculty, instructors, and teaching assistants involved with teaching the ENVS intro series 1000/1001. The committee included: Jason Neff, Atreyee Bhattacharya, Maxwell Boycoff, Sharon Collinge, Marianne Holbert, Joel Singley, and Victoria Stout. We discussed learning goals for 1000 and how they map to 1001 and to programmatic learning goals in ENVS, how to teach 1000 consistently from semester to semester, and how to develop more community around teaching in ENVS (see attached Memo regarding this Committee's process and progress, dated 12/7/2017).
- Future plans or room for improvement in this area
    - I plan to develop a Faculty Learning Community (FLC) during fall semester 2017. It will be composed of the junior, pre-tenure faculty in my department, and advised by Carol Wessman (Director of ENVS), Andy Martin (EBIO), and Jason Neff (ENVS). The FLC will be focused on continuing the learning goal mapping started in this TRESTLE award; it will create a scaffolding of learning goals across the levels of courses in the ENVS major taught by this group of four junior faculty. At the end of fall semester, the product of the FLC will be turned over to the ENVS Undergraduate Committee to involve the rest of the faculty and to completely map courses across the major.
    - Update on 12/10/2017: In consultation with the chair of ENVS, we decided it was better to develop the 1000/1001 Committee prior to the FLC. I will now convene the FLC in Spring 2018 to begin mapping learning goals across the ENVS major, using the framework/tool developed by Joel Singley as part of the TRESTLE award. Members of the FLC will include: Cassandra Brooks, Amanda Carrico, David Ciplet, Lisa Dilling, Peter Newton, and myself. Advisors will be Carol Wessman (ENVS Chair), Andy Martin (EBIO), and Jason Neff (ENVS).
    - The FLC convened 6 times over the Spring 2018 semester. It included Amanda Carrico, David Ciplet, Lisa Dilling, Carrie Vodehnal, and myself. We created an approach for evaluating the undergraduate ENVS curriculum, finalized the 1000/1001 learning goals (drafted by the Intro Series Committee in Fall 2017), and wrote a proposal to improve the honors thesis program in ENVS.

4. The process and structure of the work in the department

- What worked well about the process and structure of the work? What could be improved? Consider the role of various experts leading and completing the work, whether you had adequate resources to do the work, whether roles were clear, and whether there was adequate leadership within the project and the department. What are your open questions or concerns? [I believe that I am too premature in the duration

of the TRESTLE award to answer this question.]

- Update 5/21/2018: The momentum is growing in ENVS! The chair is onboard with pedagogical improvement and was willing to invest resources in the FLC (faculty stipends). Faculty are interested in participating more fully in these efforts, and scaling them across the department.
- I still feel somewhat isolated in the development of 1001. It is difficult to reach out to faculty in real time across campus who can provide support (e.g., Stephanie Chasteen, Andy Martin, Nichole Barger). However, I expect that this will change next year when I bring on a colleague to co-teach the course with me in fall and spring semesters. The idea is that he will help to continue developing/improving course materials, and be able to rotate in to teach the course in the future.

5. Future Plans

- See bullet above about creation of the FLC in Fall 2017 to continue mapping of learning goals across the ENVS major.
- The course will scale from 48 to 150 students in Spring 2018. This will be a good test of the materials I developed and approaches I used this year.
- See previous section about plans to co-teach ENVS 1001 in fall and spring 2018/2019 and continue to develop exercises.