Annual Assessment Report

Environmental Science Major

Spring 2018

I. *Program Assessment Meetings*

The annual Environmental Science (ENVR) assessment meeting took place Wednesday, May 16, 2018 and lasted approximately 45 minutes. Niamh O' Leary (Major Chair), Chris Bailey, and Jackie Schnurr were present. In addition to the meeting, numerous informal conversations and exchanges related to assessment always take place throughout the academic year.

We discussed the items covered in this assessment report.

II. *Closing the Loop*

As outlined in our 2017 assessment report this year (2017-2018) we changed how we approach the lab paper write up in ENVR 101L. The lab paper assignment introduces students to the elements of writing a primary scientific lab paper. Students in the course complete a graded draft of the lab paper, receive feedback to help improve their work, and then submit a final version. As described in our 2017 report, the major change between fall 2016 and fall 2017 was the introduction of a checklist to articulate more clearly the different sections of the lab paper and their appropriate contents.

Table 1 below compares data gathered pre- and post- introduction of the checklist. Also shown in Table 1 are our current benchmarks. Outcomes are currently considered met if 70% of students get a C or higher, and 50% of students get a B or higher, on an assessed course element.

Table 1. Assessment data gathered on ENVR 101L lab paper before and after introduction of the checklist described in the 2017 assessment report; n =30 in fall 2016 and n = 42 in 2017.

	Draft Lab Paper		Final Lab Paper		Current Benchmark
	2016	*2017*	*2016*	*2017*	
C or higher	60%	52%	80%	83%	70%
B or higher	20%	26%	70%	74%	50%

Data shown in Table 1 show introduction of the checklist didn't make any significant change in outcomes. Once again, the outcomes are met for the final paper, but are not

met for the draft paper. This is discouraging, but more detailed examination of the data and the process helped us realize some things that improve our understanding of how this element of the course can best be utilized, and how teaching and learning are happening. Our reflections are as follows:

1. Although it had no significant impact on student scores, the checklist was very valuable as a grading tool.
2. Performance on the draft seems to be not so much a reflection of the format of the guidelines, but a reflection of certain students not using the guidelines, turning in incomplete work, or turning in no work at all. Greater emphasis in class time on the importance of the graded draft and the role of the checklist in its grading will address this. In addition, moving forward, we could exclude data points where students don't turn in any work, as a grade of zero on work that is not handed in is not the same thing as a grade recorded for a student who at least attempted the work and then fell short of expectations for whatever reason or combination of reasons. Work that is significantly incomplete might also fall into this category.
3. Individualized feedback on the draft takes a large amount of time, but is extremely valuable in improving student work. Final papers are exceeding expectations and benchmarks.
4. A holistic view of the work as a process that includes a draft, and that yields a product in the final paper, is more useful and more realistic than having rigid and identical expectations for the draft paper and for the final paper.

III. *Examination of Data Collected for This Year's Targeted Learning Outcomes*

In last year's annual assessment report we indicated that we would review the final exam in ENVR 101L and its connection to assessment outcomes of the major. ENVR 101L is a key course for the major so it's essential that we ensure that this course and its elements address various assessment outcomes well.

Relevant outcomes are included below in bold font, listed by number from the 2018 assessment plan. Each is presented with its corresponding objective and goal in the environmental science major, as well as with information about corresponding essay questions on the 2017 ENVR 101L final exam.

GOAL 1: Examine the nature of the earth

Objective 1.2: Examine the nature of natural resources

***Outcome 1.2.1*: Demonstrate awareness of the world's energy resources**

Essay question 9 in 2017 final exam on wind energy

***Outcome 1.2.2*: Demonstrate awareness of the nature of the world's water resources**

Essay question 1 in 2017 final exam on water resource issue using Colorado River as an example.

Objective 1.3: Examine the nature of the human-environment interaction

***Outcome 1.3.1*: Be able to describe how human activities degrade the earth**

Essay question 4 in 2017 final exam on acid deposition

***Outcome 1.3.2*: Be able to describe how human activities protect and restore the earth**

Essay question 7 in 2017 final exam on landfills

GOAL 2: Analyze environmental issues and science-based approaches to environmental problem-solving on different scales

Objective 2.2: Analyze environmental issues and problem-solving on global scale

***Outcome 2.2.1*: Demonstrate knowledge of major contemporary global environmental issues**

Essay question 6 in 2017 final exam on climate change.

Assessment results are shown in Table 2. Also shown in Table 2 are our current benchmarks. Outcomes are currently considered met if 70% of students get a C or higher, and 50% of students get a B or higher, on an assessed course element.

Table 2. Assessment data gathered on ENVR 101L final exam, fall 2017; n = 42.

Outcome	# Students Earning C or Higher		# Students Earning B or Higher	
		Current Benchmark		Current Benchmark
1.2.1	41 (97%)	70%	40 (95%)	50%
1.2.2	40 (95%)	70%	34 (81%)	50%
1.3.1	23 (55%)	70%	19 (45%)	50%
1.3.2	22 (52%)	70%	18 (43%)	50%
2.2.1	38 (90%)	70%	32 (76%)	50%

Data in Table 1 tell us that outcomes 1.2.1, 1.2.2, and 2.2.1, related to the topics of energy, water, and climate, are being met. Outcomes 1.3.1 and 1.3.2, relating to the course topics of acid deposition and landfills, are falling short of the benchmarks.

IV. *Program Changes for the Upcoming Year*

Data presented in III above suggest that improvements can be made in how the topics of acid deposition and landfills are taught. The topics will benefit from being covered in a slower more deliberate fashion that emphasizes their connections to program outcomes.

V. *Action Plan for the Upcoming Year (2018-2019)*

Continue to examine and review course elements in introductory course(s) to make sure that they are explicitly tied to assessment outcomes of the major. Professor O' Leary will be on leave; Professor Schnurr will examine a course element from BIOL 119L (Ecology & Evolution), which is another introductory course that all ENVR majors take.

Below are additional assessment focuses for the upcoming year. These were generated based on this year's assessment reflections. Now that we have a few years of regular assessment under our collective belt, it's a good time to use these reflections to inform our work going forward.

- The current assessment plan has many strengths, but is very detailed. Consider whether a simpler, more streamlined, assessment plan might serve our work better.
- The goals driving our assessment work were developed with ENVR majors in mind. However, courses in the program serve more and more non-majors. How do we take this into account in assessment of program and course elements? Will assessment of the new general education program provide a natural avenue for better assessing elements such as science courses that serve non-majors.
- It would be ideal to determine how to use Moodle to help us with assessment work.

VI. *The Updated Assessment Plan*

The updated 2018 assessment plan is submitted as a separate document. Below are some changes made this year:

- In compliance with EPC's request we have emphasized the alignment between the program's goals and the college's learning goals.
- The course objectives for ENVR 102L were updated to reflect the college's new general education program and its development into a non-major's course.
- We changed our benchmark for success to 70% of students earning a C or higher on an assessed activity. In 2016 we had changed our benchmark from an outcome being considered met if 70% of the students received a passing grade on an assessed activity, to an outcome being considered met if 70% of students get a C or higher, and 50% of students get a B or higher. In retrospect we might have been a tad aspirational in moving the benchmarks so much. We decided to switch now to the 70% C benchmark used by BCS (Biological & Chemical Sciences) as it might well be a suitable benchmark for ENVR too.