

ANNUAL FACULTY REVIEW, 2016

Faculty Member's Statement

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TEACHING

Course Load

Spring 16: Math 175-003, Calc II 4 credits 42 enrolled
Fall 16: Math 170-003, Honors Calc I 4 credits 28 enrolled

Issues from 2015 Evaluations and Proposed Actions for 2016

The 2015 evaluations did not suggest much in the way of adjustments to teaching. Proposed actions were structural.

- Monitor the use of (limited) direct instruction and it's effect on student performance and satisfaction.
- Attempt to restart an old project to add videos to Calculus I materials.
- Switch to every semester reflections on evaluations with specific deadlines:
 - Review spring 16 evals before June 30, 2016.
 - Review fall 16 evals before Jan 7, 2017.

Actions Taken in 2016 and Observed Results

In the 2015-16 school year I organized and lead a faculty learning community with the purpose of designing (fall 2015) and delivering (spring 2016) a coordinated Calculus II course. These goals turned out to be far too ambitious,

but once the spring semester launched there was no going back. Throughout much of the semester I was developing lesson materials only hours before they went live, which created hardships for instructors and students alike.

This had little affect on my goal for monitoring direct instruction during the spring 2016 Calculus II course. I delivered the same mixture that I used in my 2015 Calculus II course. During the semester it seemed that the course was well received and effective. For the most part, student evaluation data confirm this.

In the fall term I taught an honors course (Calculus I) for the first time. This resulted in a partially new prep, since the common materials I normally use had to be altered in several ways. Approximately 30% of the course was newly created.

My plan going into was to continue the practice devoting most class time to student work, while inserting mini-lectures at key points. These points would be identified either from prior experience or by watching real-time data during class. This did not happen, partly because the Calculus I experience that I created was too easy for this collection of students (in aggregate). It never happened that I detected a real-time need. My planned interventions were also nearly pointless. When I halted students' individual or group work for a planned mini-lecture the overwhelming impression (from simply watching their reactions) was that the lecture was a waste of their time, and they would be better off containing their own work.

I'm not saying that this was universal (see below) but from an aggregate, class-wide, sense of things, they didn't need to hear from me in order engage successfully with the in-class activities.

The other two proposed actions for 2016 were not accomplished. The instructor of a summer 2016 online Math 170 course opted into the coordinated materials, and I arranged a small grant to support her development of some videos to supplement her course. However, these have not yet been curated or added to the general course materials. The plan to reflect on evaluations on a semester basis was also delayed. This review of all of 2016 is being written in the summer of 2017.

Recap and Review of 2016 Evaluations

Spring 2016

Numerical data from Spring 2016 Calculus II are summarized in Table 1,

Spring 2016	Math 175		n = 36 of 41 (88%)	
Question	Max	My score	MATH 175	All MATH
Prepared	5	4.5	4.5	4.4
Fostered learning	5	4.6	4.3	4.2
Clear assessment plan	5	4.6	4.3	4.2
Clear objectives	5	4.6	4.4	4.2
Class organization	4	3.8	3.5	3.4
Effective use of time	4	3.7	3.5	3.3
Clear presentation	4	3.6	3.3	3.2
Student questions	4	3.5	3.4	3.4
Critical thinking	4	3.9	3.6	3.5
Grading system	4	3.8	3.6	3.5
Feedback	4	3.8	3.4	3.1
Homework returned	4	3.3	3.4	3.4
Fairness	4	3.8	3.5	3.5
Classroom atmosphere	4	3.8	3.4	3.3
Assignments	4	3.8	3.5	3.3

Table 1: Spring 2016 Calc II Evaluation Scores

including comparisons to benchmarks for all MATH 175 and all MATH.¹ The response rate was 88%.

These are good numbers. I have, in the past, had better scores on the first four items. The slight dip is probably related to the very hectic process of creating common course materials literally hours before deployment. This was visible to the students and was remarked upon in a few of their written comments. I am particularly happy with the critical thinking score, which suggests that even though the pass rate in this course was 88% students found the course challenging.

There were only two slight negatives in the written comments.

1. Sporadic mention of the materials being posted or made available at the very last minute.
2. A few comments asking for either direct instruction before attempting

¹Previous year's summaries included all COAS. With the expansion of COAS there is no longer a common question set for the full college, so this comp is no longer available.

a problem, or explicit direction through a problem when a student or group is stuck and asks for help.

The first item is clearly the fault of my misjudgment of the development time required for the coordinated Calculus II project. Fortunately that problem is already solved for future semesters.

The second item is very much the standard complaint I see every semester. It is mirrored in the two numerical scores, “Clear Presentation” and “Student Question”, which, along with tardy return of homework and exams, are perennially my lowest scores. This is, of course, because I mostly do not present material at all, and because my standard practice when responding to questions during active learning sessions is to offer suggestions and nudges, rather than explicit “how to do it” instruction.

I believe that a small amount of this complaint is both inevitable and non-actionable. I plan to retain the current balance of direct instruction. Regarding responses to questions, I believe that I could be more sensitive to the level of frustration caused by my standard practice, especially when coupled with minimal *a priori* direct instruction. Although I do occasionally judge that the best response to a student question is a step by step guide through a problem, it may be that I need to be more aware of cases when this will be more successful than a hint or a suggestion, and perhaps choose the direct technique more often.

It should be noted that the vast majority of written commentary identifies the active learning structure, and often specifically my practice of hint-before-answer when questioned, as a strongly positive feature of the course.

Fall 2016

Numerical data from fall 2016 Honors Calculus I are summarized in Table 2, including comparisons to benchmarks for all Math 170 and all of Math. The evaluation included additional questions common to all honors courses. My scores, with honors-wide comparisons, are in Table 3. All but one student completed the evaluation.

Numerical scores, along with written commentary, show something similar to most recent semesters. But in this case there is a more pronounced response from students. As usual, the standout low scores are the two items that most closely indicate that students are asked to work, rather than listen, in class, and that I often respond to questions with hints and suggestions rather

Fall 2016	Honors Math 170		n = 27 of 28 (96%)	
Question	Max	My score	MATH 170	All MATH
Prepared	5	4.7	4.2	4.3
Fostered learning	5	4.6	3.8	4.2
Clear assessment plan	5	4.4	3.9	4.2
Clear objectives	5	4.5	3.9	4.3
Class organization	4	3.7	3.3	3.3
Effective use of time	4	3.8	3.3	3.3
Clear presentation	4	3.2	2.8	3.1
Student questions	4	3.2	3.0	3.3
Critical thinking	4	3.8	3.2	3.4
Grading system	4	3.9	3.4	3.5
Feedback	4	3.7	2.8	3.0
Homework returned	4	3.3	3.4	3.4
Fairness	4	3.7	3.3	3.5
Classroom atmosphere	4	3.6	3.2	3.3
Assignments	4	3.7	3.2	3.2

Table 2: Fall 2016 Honors Calc I Evaluation Scores

Fall 2016	Honors Math 170		n = 27 of 28 (96%)	
Question	Max	My score	All Honors	
Clear delivery	5	4.1	4.3	
Interesting delivery	5	4.0	4.1	
Effectively answered questions	5	3.7	4.3	
Instructor prepared	5	4.4	4.4	
Understand assignments	5	4.3	4.1	
Understood grading	5	4.7	4.2	
Instructor rating	5	4.3	4.3	
Personal preparation	4	3.4	3.1	

Table 3: Fall 2016 Honors Specific Questions

than direct instruction. Also as usual, written comments confirm that there is some amount of dissatisfaction with the absence of lecture and with my typical response to questions.

One thing that is distinctly different is that the scores on those categories are a bit lower than I typically receive. Interestingly, it is not the case that the written comments indicate increased dissatisfaction. As in most recent semesters, there are a small number of comments identifying these two issues as a weakness, and many more comments specifically calling them out as strengths, with the balance between positive and negative not noticeably different than previous semesters. I think that the unusually low numbers are essentially due to this group of students being “tough graders”. They have high expectations of their instructor and of the college experience overall. I don’t think I did worse by them than I do for a typical class, but I think that they were better able to identify what could have been better, and more willing to make that clear in their evaluation scores.

The above is a difference of degree, compared to other semesters’ evaluations. In this evaluation cycle there was also a difference in kind. Two things emerged from the honors course and the evaluations that were unlike anything I’ve encountered in previous terms. Each of these things had a novel affect on the course. Evaluations confirmed this and added depth to the picture.

First, many more students in the honors class were taking Calculus I from the perspective of already having had calculus. In a typical course a bit over half the students will have seen some calculus. In this group 90% had seen calculus before, and many had more extensive experience than is common. Sadly, I did not become sufficiently aware of this fact until very late in the semester. I believe that the high level of prior experience is the main reason for what I observed during in-class active learning sessions during the semester. My sessions are designed very much around encountering and mastering the lower level concepts and skills that form the core learning outcomes of Calculus I. Unsurprisingly, the large majority of the class found these activities very easy to complete and were not at all interested in being interrupted for a review lecture.

This was doubly unfortunate for the very small number of students new to Calculus I. I am quite used to the mixture of novice and experienced students and I usually leverage it by engaging the more experienced students

as group or team leaders who can facilitate learning for their less experienced classmates. But written comments make it clear that this did not work well for this class. The few people with no calculus experience appear to have felt out-classed by their peers, unsupported by my course structure, and intimidated to the point where they were not able to benefit from more experienced classmates. I failed to notice this. I did identify a small number of students struggling with some of the basic materials, and I focused extra attention on getting that group to master those skills. But I was unaware of and thus did not address the deeper issue.

One other theme emerged from the evaluation data. As the semester progressed it seemed to me that the course was pitched too far below the abilities of this particular group of students. Now that the evaluation data are available, I can see that the truth is more nuanced. It is the case that the basic skills of Calculus I were largely present in this group of students, and as a result there was probably too much class time spent on in-class activities that were too close to being review exercises. However, I built in a component of the course unique to the honors offering in the form of writing assignments that asked for deeper conceptual understanding and for appropriate articulation of such. The written evaluation comments indicate that these were nearly universally regarded as quite challenging. So, I was wrong. The course was not too easy. It was bi-modal. It had one component that was probably too much below the students. And it had another that was, if not too far above, probably under-supported by the course design.

This is valuable information that leaves me well positioned to deliver an improved course next time around. Without an excellent set of responses from students in the evaluation process, I would not have known any of this and would have misjudged my next offering of Honors Calculus I.

Proposed Actions for 2017

- This reflection is being written in the summer of 2017 so it is most relevant to the course I will teach in fall 2017. However, since I ended fall 2016 honors with the sense that the course was perhaps too easy, I designed my spring 2017 Honors Calculus II to require more of students in both the basic skills and the supplemental writing assignments. Clearly I should have looked more closely at the fall eval data before I made those choices. More about this below and in the next evaluation cycle, when I will reflect on the spring 2017 data.

- Revelations from the fall 2016 Honors Calculus I evaluations indicate several action items.

Action: At the beginning of the term, find out the level of prior calculus experience of each of my students.

Action: Provide explicit support for novice students to master basic skills. Do this in ways that mitigate (or at least do not exacerbate) their relationships with their more experienced classmates.

Action: Restructure the course (as much as possible in the limited time remaining) so that class time is less used for activities that build basic skills and is more used in ways that support higher level objectives, especially the writing assignments.

- For two years I have failed to execute the following. Third time's a charm.

Action: Complete post semester review reflection as follows:

- Review of spring 2017 evals before Aug 21, 2017.
- Review of fall 2017 evals before Jan 7, 2017.