Calculus One provided a first and friendly introduction to calculus, suitable for students who have never seen the subject before, or for students who have seen some calculus but want to review the concepts and practice applying those concepts to solve problems.

Calculus is about the very large, the very small, and how things change. This area of mathematics is seemingly so abstract, yet ends up explaining the real world. Calculus plays a starring role in the biological, physical, and social sciences. Through the creative approach to lectures and problems in Calculus One, students explored examples of calculus appearing in daily life.
Key Engagement Strategies

The Calculus One team was very active in the discussion forums, as well as occasional interactions on the Google Plus, Facebook, and Twitter social media platforms.

The Calculus One team provided responsive support for students in Coursera and in the MOOCulus adaptive platform. This involved addressing MOOCulus bugs and Coursera issues quickly, often within a few hours of student reporting. This commitment to rapid response was highly appreciated by the students and helped to strengthen the trust students had for the MOOCulus platform and the course as a whole.

The lectures were structured to pose one question and then answer that question. The approach the instructor took with lecture development and forum responses showed the students that the teacher was on this journey with them. To that end, students felt like they were truly on a team with the professor.

The Calculus One team built MOOCulus (screenshot above) to provide students with exercises that are difficult enough to be fun and educational, but not so easy as to become boring and repetitive. Currently, homework systems are typically not adaptive, and tend to work traditionally whereby the instructor chooses problems and assigns identical problems to all students. MOOCulus was developed to adapt to each individual student and guide her/him to understanding.
What worked well

In a traditional face-to-face class, a lot of time is spent providing context; that context is awfully important and helps ground students by suggesting which exercises are important, what topics to cover first, what topics will be covered next and soon covered thereafter.

In the MOOC format, the shorter videos ended up being very much focused on the math at the expense of the wider course context, so it was important to add that context back in. To address this, the Calculus One team provided rather lengthy summaries of each week’s content, using icons to suggest what sorts of media was being linked to. Future enhancements will connect videos, text, and problems sets together.

What needs improvement

Student feedback showed the initial quizzes were too difficult. During the development of Calculus One, the focus was primarily on the formative assessments provided through MOOCulus. The summative assessments on Coursera were insufficiently developed. In particular, the first week quiz was much too difficult, which seemed to prompt many students to un-enroll, many of whom already un-enrolled out of the other calculus course on Coursera.

Many students requested solution sets for the quizzes and exams to help them understand the steps involved in each of the problems. Lengthy solution sets, video procedural explanations, and a revamped approach to discussion threads for the quizzes and exams are a few potential options to address that request.

Next Steps for Calculus One

Calculus One will run again in August 2013, converted into a fourteen-week course.

Based on student feedback, the course will provide review materials in the form of a ‘week zero’. This will point students toward refresher materials as the course begins.

Based on feedback, the class week will begin on Fridays so students can spend the weekend reviewing content, practicing calculus, and attempting quizzes without added stress of needing to finish during a normal work-week.

"I would not have found my way to understanding, enjoyment, and the crazy idea of taking more than just the one required math course at university—w"ere it not for your fantastic explanations and the stellar exercise problems & drills online.

- Student A

"I have completed around 30 MOOCs in the past year. Yours has been one of the very best experiences for me. The way you explained it all so well and without leaving any mysterious gaps was excellent. And your smile made me smile as well."

- Student B

"The quality of Dr. Fowler and his team’s work is all amazing, entertaining, hilarious, innovative, thought-provoking and engaging... 32 years ago I paddled in the calculus pool, [over] the last 15 weeks I swam and grew gills.

- Student C"