

Speaker:

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Title: Our Experience in Flipping the Classroom in Three Large First Year University Calculus Courses

Intended Audience: Post-Secondary

Type of Presentation

Preferred: Long Presentation (60 minutes)

Language(s) of

Presentation: English

Description:

Over the past two years we have investigated "flipping" the classroom in three of our large enrollment first year calculus courses: differential and integral calculus for scientists and engineers. In this session we want to share our approach and implementation of the flipped classroom which uses active learning, peer instruction and just-in-time teaching. We'll look at the resources we created (videos, online quiz questions, in-class clicker questions) and have a peek inside the flipped class itself through video taken during one of our classes.

What exactly is the "flipped classroom"? This is a very broad term that encompasses a lot of other teaching methods. At its very heart it describes an approach where in-class time is re-purposed for inquiry, application, and assessment. Central to the idea are the two stages required to gain new scientific knowledge; first the student must gather information, secondly they must assimilate this information. The information gathering stage is what is often focused on in the formal lecture model. Students meet in large lecture theatres, instructors present scientific information and students dutifully record/consume this information. After the lecture students are left to make sense of this information on their own, connect these new ideas with prior knowledge, and apply this information to solve problems. The "flipped" model attempts to switch which of these two stages takes place in the classroom. The information gathering stage is the task given to the student to do outside of the classroom, and the assimilation stage is moved into the classroom where the instructor can guide students in what may be considered the more challenging of the two stages.

Although flipped classroom pedagogy is not a recent invention (pre-readings followed by classroom discussion provide one example of implementation), it has become increasingly popular over the past few years. A number of factors contribute to this change: the increased availability and versatility of media and communication technology allow instructors to produce recorded lectures and disseminate them online fairly easily and at a relatively low cost; the persistent emphasis on the importance of STEM subjects is propelling research and experimentation into new and innovative classroom practices; and MOOCs have directed tremendous attention to the use of instructional videos to support active and

flexible learning inside and outside of the classroom.

Implementations of the flipped classroom are differentiated by how information is delivered outside the classroom, and how learning activities are designed and executed inside the classroom. We decided to allow the student to choose between a video lecture or textbook reading in order to gather information.

As instructors we gather feedback from students through pre-class online quiz. Then the fun begins when we get into the classroom and use interactive engagement techniques to help the students assimilate this information.