



Factors Influencing Faculty Motivation to Improve Teaching



Scenes from University
Mathematics Departments

Prepared by the National Center for Postsecondary
Improvement: Project 5.3

Teaching, learning, and assessment

- ◆ Question: How have institutions responded to calls for improvement?
- ◆ Prevailing views and criticisms
 - Undergraduate education is in a state of decline
 - Faculty are unwilling to improve teaching
 - Increased emphasis on student assessment will lead to improvements in teaching and learning

Theoretical frameworks

- ◆ Content/context/form/structure of curricular decision making (Stark and Lattuca, 1997)
- ◆ Social learning theory (Bandura, 1977)
- ◆ Scholarship of teaching (Boyer, 1990)

Method

- ◆ Three mathematics departments reported to be innovative were selected
- ◆ Urban University, Landgrant University, National University (all Research I)
- ◆ Four faculty in each department were interviewed
- ◆ Documents relating to tenure and assessment were analyzed
- ◆ Other events (lectures, meetings) were observed

Calculus faculty perspectives: Reflections on students

- ◆ Student preparation: Are students ready for college calculus?
- ◆ Student motivation: Do students want to do anything while in class?
- ◆ Destination: What lies ahead for students?

Calculus faculty perspectives: Reflections on student preparation

- ◆ This is where you get resistance from faculty. That's because high school failed, so now the university has to pick up the job of the high school How do you deal with this huge number of students coming in who are unprepared? (Former department chair, Urban University.)
- ◆ (The advanced placement course) has come to be something which it was not designed to be; it's now being used as a way to get into (National University). You take this course, you write it down on your application form, you never planned on taking any exams or taking any credit for it. So, here are students, all of whom believe that they had an A in this material. And in fact, many of them don't even test into calculus because their basic skills are so weak. (Instructor, National University.)

Calculus faculty perspectives: Reflections on student motivation

- ◆ I think it's the expectation that we impart on students as a “feel good society” ... go to college and just sit there. You don't have to read the books, you don't have to do anything... The whole purpose is you pay your tuition. In the end, you get a piece of paper. Education as a credential. (Former department chair, Urban University.)
- ◆ Many of the students we have now are here to go to Business School or Medical School – or at least they say they are – and what they want of the faculty is that we stay out of their way. They weren't planning on learning anything. (Instructor, National University.)

What is reform calculus?

- ◆ A response to technology
- ◆ A response to increasing enrollments
- ◆ A new direction in calculus instruction
- ◆ A result of NSF-funded research into ways to make the populace more math literate

New teaching strategies

- ◆ A shift from formula-based learning to conceptual learning
- ◆ An emphasis on communicating mathematics to others in spoken and written form
- ◆ A focus on “real world” problems

Linking teaching to real world problems

- ◆ “Well, they do seem to enjoy the variety. Also because of the variety there's a greater chance that students can find a successful way to express their knowledge on the subject.”

(Undergraduate Ed. Coordinator, Landgrant University)

“Speaking the language of mathematics”

- ◆ Student group interaction and communication emphasized
- ◆ Homework is made sufficiently difficult to require people to work together to solve problems
- ◆ Often demonstration of knowledge is in prose or in an oral presentation

Using group interaction to stimulate learning

- ◆ “Group work is good. It has them speaking the language and it's hard not to learn something if you're trying to speak the language and explain aspects of it to other people in the group. Although, it's amazing sometimes one member will say something that's utterly nonsense and all the other ones will say yes, and seem to understand everything that's going on, so I don't know what's happening there, but just speaking the mathematics, in the past they didn't do that. I think maybe that might be one of the, probably the strongest things that we have going that the newer strategies that we're trying to use is simply that they're speaking the mathematics, having to use it that way, to verbalize it, and begin to own it.”

(Undergraduate Education Coordinator, Landgrant University)

What motivates faculty to improve teaching?

Changing practices and changing roles

- ◆ Closing distances between faculty and students
- ◆ Allowing students with differing intellectual strengths to grasp calculus concepts
- ◆ Creating conversations across disciplines about calculus education
- ◆ Providing a way for faculty to express their joy about mathematics to others

Rejuvenating careers

- ◆ Creating new fields of inquiry for faculty
 - Student development
 - Teaching techniques
 - Technology
- ◆ Providing new challenges after tenure and promotions are past
- ◆ Allowing older faculty to share the experience of many years with new faculty

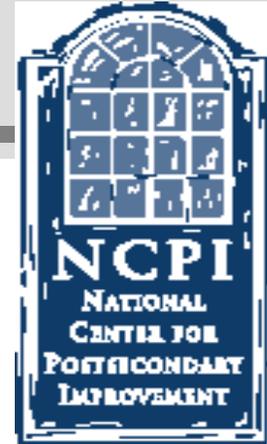
Realism: Barriers to adopting new teaching techniques

- ◆ Time
 - Creation of materials
 - Managing classroom issues
- ◆ Adaptation
 - Creating consensus in the department
- ◆ Faculty versus administrative authority
 - Retaining a sense of control over the department's destiny

Scenes from mathematics departments reveal...

- ◆ Tremendous effort and near revolutionary change in mathematics, despite criticisms of undergraduate education
- ◆ All faculty using reform calculus tended to embrace the challenge and the payback from getting closer to students
- ◆ These techniques require a time investment, which often is added to a busy schedule
- ◆ Faculty felt that they were learning new skills as mathematicians and teachers
- ◆ Faculty care enormously about student learning

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