Transforming Post-secondary Education in Mathematics

Upper Division Pathways
Morehouse College

Tara. Holm @ Cornell.edu

9 June 2019
Post-secondary education in mathematics will enable any student, regardless of his or her chosen program of study, to develop the mathematical knowledge and skills necessary for productive engagement in society and in the workplace.

We believe that a collective effort by the mathematical sciences community will be required to achieve that vision.
Change is coming

State Funding for Higher Education Remains Far Below Pre-Recession Levels in Most States
Percent change in state spending per student, inflation adjusted, 2008 - 2015

Source: CEPP calculations using data from Illinois State University’s Annual Grapewine Report and the National Center for Education Statistics. These funding data is provided by the Fiscal Policy Center of Voices for Illinois Children. Because enrollment data is only available through the 2014 school year, enrollment for the 2014-15 school year is estimated using data from past years, years and fiscal years.
Change is coming … why now?

Answer 1

Discipline-based education research, which matured in the 1980s and 90s, has produced significantly new ways of understanding knowledge, thinking and learning.

Mathematician are beginning to use this research to inform how they teach.
Change is coming … why now?

Answer 2

There is *renewed federal interest* in higher education in general, and undergraduate STEM in particular.
Change is coming … why now?

Answer 3

It has become a question of social justice. Higher education is key to social mobility. Mathematics classrooms are among the most segregated in the United States.

“… over the entire career, the typical bachelor’s degree graduate worker earns $1.19 million, which is twice what the typical high school graduate earns …”

Growth versus Fixed Mindset

- Can good teaching be achieved through hard work, or only with innate talent?

- “Smart” label can reinforce fixed mindset.

- Factor by which a white public school student is more likely than a black student to be labeled “gifted”? 2.4


Harper's Index, May 2016.
TPSEMath Strategic Priorities

- Lower division Pathways
- Upper division Pathways
- Graduate Education
- Teaching Strategies and Practices
Upper division Pathways

- How do institutions learn from one another?
- 2 parts ideas, 5 parts local details
- Modernize curriculum, courses, majors, etc
- Coherence without uniformity
• **Narrow the gap** between today’s mathematics and the mathematics students study in college.

• Make mathematics departments **essential partners** in improving quantitative education in all disciplines.

• Ensure that post-secondary mathematics education gives **all students** a platform for success (toward college completion and achieving aspirations)
What can YOU do?

- Find like-minded colleagues (in math and beyond!) and build community
- Share your findings and materials
- Apply for local (or NSF or ….) funding to improve undergraduate courses and programs
- Continue to engage with TPSE
Let’s work together …..

Thank you!!

http://www.tpsemath.org/

@tpsemath