Introduction to TPSE Math: Origins and Priorities

Chairs +1 Conference #2
University of Maryland
March 10-11, 2017

Conference hashtag: #TPSE2017
Background & Rationale

- Traditional math ed doesn’t meet needs of students or society.
- Modern careers require math training of greater relevance and diversity.
- Too few undergrads see value of math as currently taught.
- Too many undergrads find math a barrier to college & career success.
- TPSE Math aims to understand problems & causes; promote solutions in partnership with math community & other stakeholders.
- Many innovative reforms underway but are mostly local, seldom coordinated.

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Underway: Multiple Pathways (lower division)

- To increase completion rates, better align coursework with students’ programs of study
- Pioneering work by Dana Center in many states
- AMPSS (Advancing Mathematics Pathways for Student Success) coalition: AASCU, APLU, CCA, Carnegie Foundation, Dana Center, NASH, TPSE; support from Lumina Foundation

http://advancingmathpathways.org

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Priorities Under Discussion

• **Multiple pathways for upper division curricula**
  – Respond to rising demand from other disciplines
  – Provide math pathways more relevant to careers

• **New teaching & learning strategies**
  – Including use of educational technology
  – Evaluate & scale up early-stage initiatives underway

• **Broaden education of graduate students for**
  – teaching in universities
  – teaching in community & public 4-year colleges
  – non-academic careers

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Established MAG, several dozen well informed and interested department chairs; nexus among faculty, students, administration

Inaugural meeting March 2016

Initial focus on lower-division multiple pathways
Chairs +1 Conference #1

• MAG, additional chairs, directors of undergrad studies, administrations (October 2016)

• Areas of special interest to administrations
  – Demand for quantitative/math skills in all disciplines
  – Economic/staffing pressures
  – Create faculty incentives for reform
  – Study reform attempts by other STEM disciplines

• Engage NSF & other funding agencies seeking guidance from math community in designing grant programs

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Goals for Chairs +1 Conference #2

• Focus on preparing to apply new ideas in home departments
• Participants to build partnerships with colleagues
• Advance discussion of potential grant programs to support implementation including scale-up, evaluation & dissemination of innovative reforms

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Session 1: Upper Division Pathways

• Consider how to make math more attractive & relevant by relating it to careers
• Design pathways (relevant course sequences) in partnership with other disciplines that need advanced math
• Gather information about demand for & economic value of mathematics
• Develop recommendations for professional societies & others who could support reform at department & system levels

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Session 2: Broadening Graduate Education

• NAS Grad Ed study
  – Presentation
  – Facilitated small group discussions
  – Plenary

• Workshops
  – Introduction: NSF perspectives
  – Choice of 5 interactive workshops facilitated by Dana staff

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Session 3: New Teaching Strategies

• Introduction

• Choice of 8 interactive workshops facilitated by Dana staff (2 sessions)

• Issues to consider:
  – How to know when new strategies are called for, which will be effective in given settings, financial implications
  – How to adapt & disseminate successful innovations

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Next Steps (1)

- Upper-division pathways: discuss further who should be taught, how & what
- Grad ed: develop strategy parallel to upper-division pathways work
- Learn to design, adapt, scale up & evaluate major initiatives
- Seek support from private foundations, public agencies, private sector

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Next Steps (2)

• Expand work with partners:
  – AMPSS coalition: lower-division pathways
  – ITHAKA: assess educational technologies; major foundation support to be announced soon
  – Societies of other STEM disciplines: co-design courses/majors/pathways

• Support new research on pedagogy, labor economics, teaching technologies, cross-disciplinary courses

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For Discussion

• How to design, adapt, scale up & evaluate promising reforms

• Economic questions
  – What information is needed for institutions to offer career-relevant options?
  – How might leaders use economic data in decision-making?
  – Where can chairs learn more about workplace relevance?

• How to help funders develop effective grant programs

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Challenges

• How to convert what has been learned into tangible results

• How to position the math community to take advantage of strategies already identified

• How to communicate to the public & policy makers that math skills are increasingly relevant across the academic spectrum & in the workplace

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