



APLU Science and Mathematics Teacher Imperative

**MATHEMATICS TEACHER
EDUCATION PARTNERSHIP**

The Mathematics Teacher Education Partnership

Special Session at the Louisville Fall
Southeastern Sectional AMS Meeting

9:00 am October 5, 2013

Michael Mays, WVU



Abstract: The Mathematics Teacher Education Partnership (MTE-Partnership), an initiative of the Science and Mathematics Teacher Imperative of the Association of Public and Land-grant Universities, is a partnership of institutions of higher education and K-12 schools, districts, and other organizations working collaboratively to redesign secondary mathematics teacher preparation programs. Its goal is to transform the preparation of secondary mathematics teachers to ensure teacher candidates can promote mathematical excellence in their future students, leading to college and career readiness as described in the Common Core State Standards for Mathematics (CCSS-M) and other documents. The MTE-Partnership has developed a set of guiding principles describing a shared vision to be explored and refined by the MTE-Partnership and others involved in preparing secondary mathematics teachers, and is implementing the principles in projects organized around Research Action Clusters built using the Networked Improvement Communities model promoted by the Carnegie Foundation for the Advancement of Teaching.



Laura Vanderkam

Shortly before school started this fall, New York parents got some grim news. Student scores on old tests looked decent, but once the state aligned its tests with the more rigorous Common Core standards, proficiency rates plummeted.

Most likely, it will happen in your state, too, because 45 states have signed on to the Common Core idea. Soon parents nationwide will see just how much more students need to learn to succeed.

The good news is that changing one variable could change a lot. A growing research consensus finds that teacher quality matters more for student achievement than any other school-based factor (such as class size). Economist Eric Hanushek has calculated that replacing the bottom 7%-12% of U.S. teachers with average teachers would rocket the U.S. to the academic company of the world's highest-performing countries.

The bad news is that finding a way to guarantee an effective teacher in every classroom has vexed reformers for decades. If American schools want to clear the new bar set for them, they'll need a new idea, and they have at least one promising option. A few innovative programs are tying teacher certification not just to completing a degree or program, but also to classroom performance.

FOCUS ON TEACHER PERFORMANCE

Tougher Common Core highlights importance of well-trained teachers.



Background on the partnership



- 185 member institutions – leading public/flagship/land-grant research universities in every state
- 27 major university systems
- Largest well prepared undergraduate cohorts in science, engineering and mathematics
- Largest set, among most accomplished science, math and engineering faculties



SMTI --

- Initiated in 2008 by the Association of Public and Land-grant Universities (A♦P♦L♦U)
- Now a partnership of 131 public research institutions, 13 university systems across 44 states
- Collectively prepare over 8200 mathematics and science teachers annually
- Public IHEs in 40 of the states that have adopted Common Core State Standards for Mathematics
- Selected partner for *100Kin10* (2011)
- Developed an Analytic Framework to understand current teacher preparation programs (2009-2011)



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General Goal

To transform the preparation of secondary mathematics teachers to ensure they can promote mathematical excellence in their future students, leading to college and career readiness as described in the Common Core State Standards for Mathematics (CCSS-M).



Goals

- build a national consensus on guiding principles underlying secondary mathematics teacher preparation programs;
- promote partnerships (local, state, and national) focused on improving secondary mathematics teacher preparation;
- develop and coordinate a networked research and development agenda;
- serve as a clearinghouse for model programs and practices; and
- advocate for changes in policies around secondary mathematics teacher preparation.



Timeline

- November 2011 – Call for applications for partnership teams to join MTE-Partnership:
 - A lead university involved in APLU/SMTI
 - At least one K-12 institution
 - Other institutions and organizations focused on preparing secondary mathematics teachers (other colleges and universities, community colleges, regional inservice centers, ...)



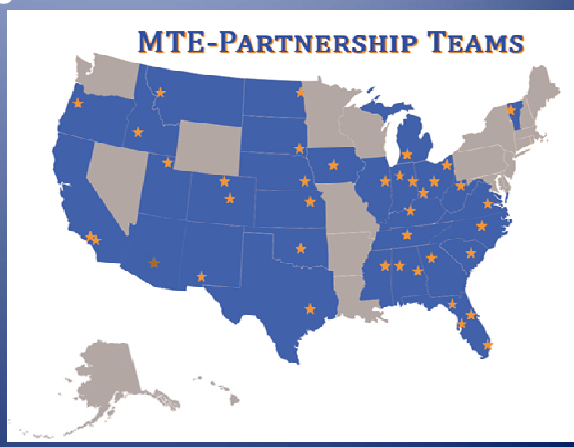
38 partnership teams

68 universities

9 community colleges

87 school systems

30 states



- Partnership Conference
 - March 25-27, 2012 in Atlanta, Ga.
 - 110 attendees, including mathematics teacher educators; mathematicians; secondary mathematics teachers; K-12 district mathematics supervisors and coaches; state supervisors of mathematics; ... and more!
 - Provided extensive feedback on “guiding principles” and project design



Purpose of Guiding Principles

The “guiding principles” form a shared vision to be explored and refined by the MTE-Partnership and others involved in preparing secondary mathematics teachers.



I. Partnerships

- Guiding Principle 1. [Partnerships as the Foundation](#)
- Guiding Principle 2. [Commitment by Institutions of Higher Education](#)
- Guiding Principle 3. [Commitment by School Districts and Schools](#)

II. Teacher Candidate Knowledge and Skills

- Guiding Principle 4. [Candidates' Knowledge and Use of Mathematics](#)
- Guiding Principle 5. [Candidates' Knowledge and Use of Educational Practices](#)

III. Support Structures

- Guiding Principle 6. [Clinical Experiences](#)
- Guiding Principle 7. [Student Recruitment, Selection, and Support](#)
- Guiding Principle 8. [Beginning and Inservice Teacher Support](#)
- Guiding Principle 9. [Tracking Success](#)



Timeline

- Formation of Working Groups
 - Partnership teams invited to join in July 2012 and started work in early September
 - Topics for the groups were chosen to represent high-priority interests based on initial discussion from the Conference and subsequent input from partnership teams
 - Groups have focused on:
 - Defining the problem – what are the causes?
 - Identifying potential measures and interventions.



I. Building a common vision.
(three partnership teams, eighteen people)

Guiding Principles 1,2,3:

- Partnerships as the Foundation
- Commitments by Institutions of Higher Education
- Commitments by School Districts and Schools



II. Preparing and supporting mentor teachers.
(eight partnership teams, 31 people)

Guiding Principles 6, 8:

- Clinical Experiences
- Beginning and Inservice Teacher Programs



III. Improving mathematics content preparation
(ten partnership teams, 54 people)

Guiding Principles 4, 5:

- Candidates' Knowledge and Use of Mathematics
- Candidates' Knowledge and Use of Educational Practices



IV. Recruiting and retaining teacher candidates
(four partnership teams, 20 people)

Guiding Principles 7, 9:

- Student Recruitment, Selection, and Support
- Tracking Success



DESIGN FOR RESEARCH AND DEVELOPMENT (SECOND CONFERENCE, JUNE 7-9 2013)



Networked Improvement Communities (NICs)

- Model developed by the Carnegie Foundation for the Advancement of Teaching.
- Seminal paper by Anthony Bryk, Louis Gomez, and Alicia Grunow: "Getting Ideas into Action, Building Networked Improvement Committees in Education."
- Ideas put in place in Statway and Quantway Network projects.

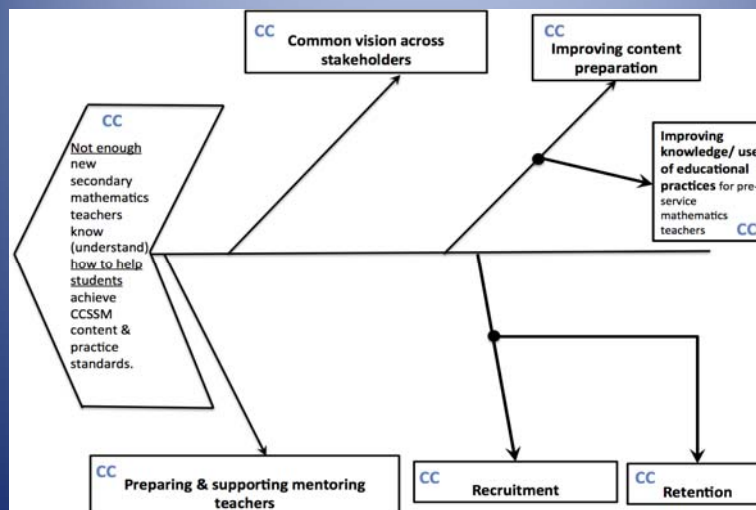


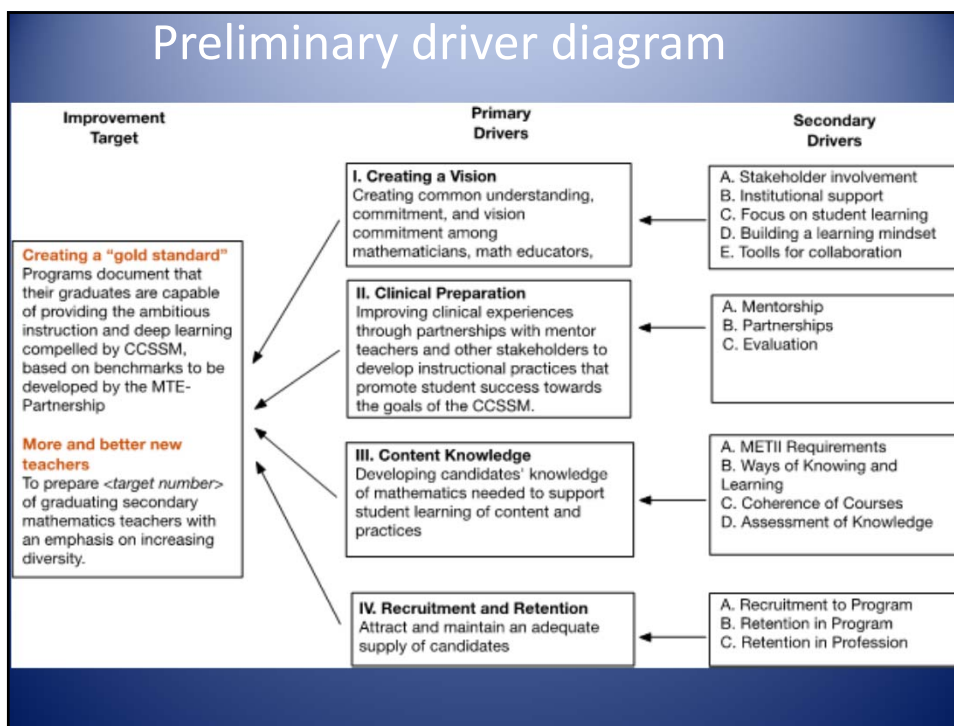
Aspects of Networked Improvement Communities (NICs)

- Rapid prototyping
- Root cause analysis
- Driver diagrams



Root cause analysis for MTE-P





Research Action Clusters (RACs)


Clinical Experiences

Building Communities/Courses

Actively Learning Mathematics

MATH: Marketing for Attracting Teacher Hopefuls

Knowledge-For-Teaching-Mathematics Tasks (KTMT)



- Support from NSF for planning, first conference
- Support from Helmsley Trust for planning, second conference
- Support from Helmsley Trust of \$1.05 million dollars for Hub functions, launch of Action Learning RAC



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