

Forming Partnerships to Improve Secondary Mathematics Teacher Preparation: Why Can't We All Just Get Along?



Presentation to “JimFest”
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Goals:

1. To reflect on efforts by one project to create stronger partnerships, particularly between mathematics and mathematics education, including both successes and failures.
2. To suggest how we might find more productive paths moving forward.



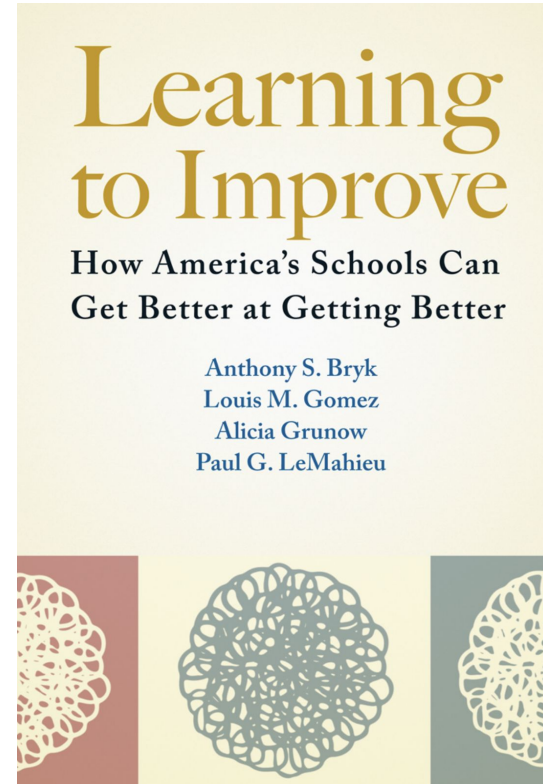
- The Mathematics Teacher Education Partnership (MTE-Partnership) was formed in 2012 by Association of Public and Land-grant Universities (APLU).
- Its stated goal was to transform secondary mathematics teacher preparation in light of the Common Core State Standards.

Networked Improvement Community (NIC) Design

Design for educational research and development that combines improvement science methods with the power of networking

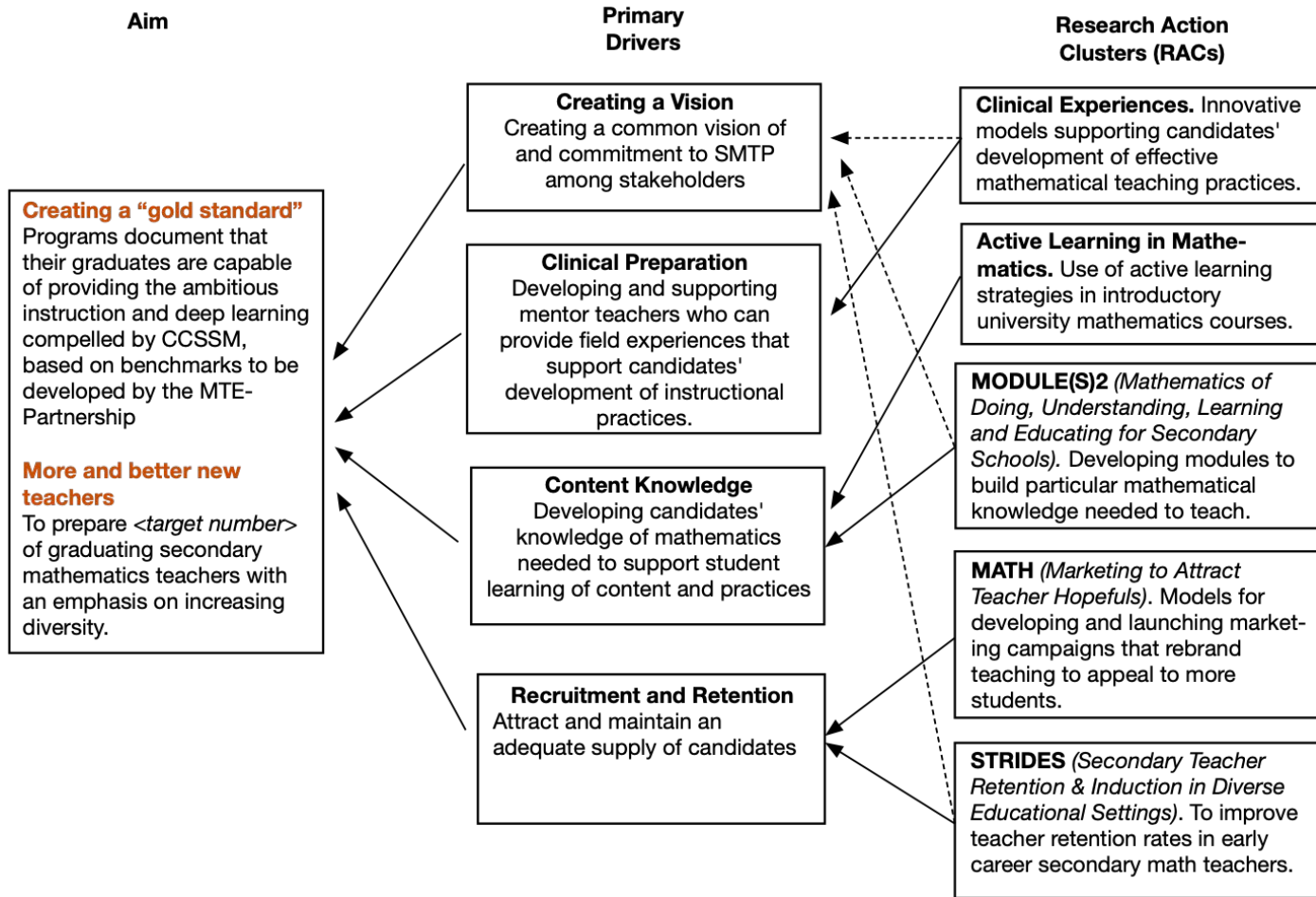
Four features of a NIC:

1. Focused on a common aim
2. Guided by deep problem analysis
3. Disciplined inquiry based on continuous improvement
4. Networked to accelerate progress



Emphasis on Partnership

- MTE-Partnership consisted of partnership teams that included an APLU institution as the lead, at least one K-12 district, and at least one other organization.
- Teams had to demonstrate involvement of:
 - Mathematics educators
 - Mathematicians
 - K-12 educators



The Active Learning Research Action Cluster (RAC)

Goal: To improve the mathematics preparation of college students who are pursuing degrees in mathematics-intensive fields, including teacher preparation, with an emphasis on enacting active learning in precalculus, calculus I, and calculus II classes.

Over time, we had 22 participants representing 26 institutions.

Outcomes:

- Sharing of ideas and approaches across the community.
- Creation of sample materials to support active learning.
- Recognition of the need for departmental transformation.



Student Engagement in Mathematics through an Institutional Network for Active Learning (SEMINAL)

A National Science Foundation-funded effort to better understand how to sustain success in implementing active learning in undergraduate mathematics classes and how to influence similar success at other institutions.

- Phase I: Study of six institutions with a proven track record of success.
- Phase II: Expansion to 9 additional institutions who proposed strategies to enact active learning.
- Phase III: Further expansion to 12 additional institutions.

Student Engagement in Mathematics through
an Institutional Network for Active Learning



SEMINAL



University of Colorado
Boulder



NEBRASKA
UNIVERSITY OF NEBRASKA-LINCOLN

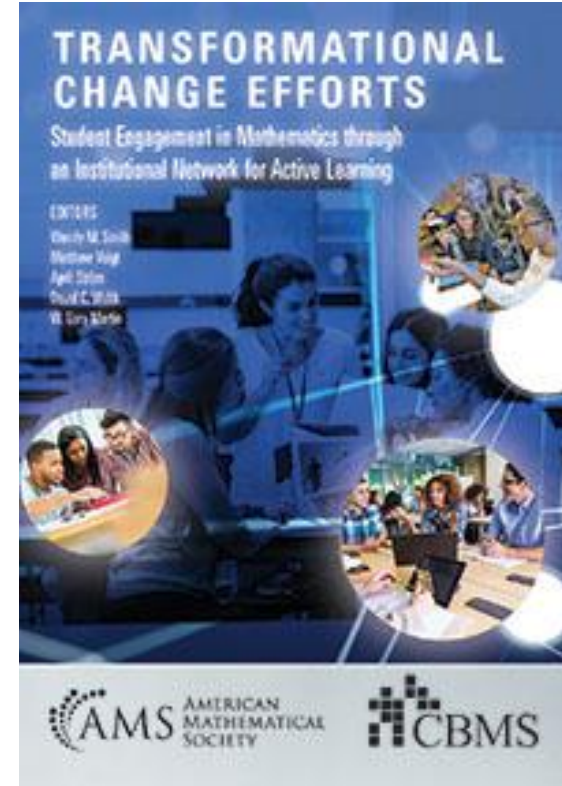


SAN DIEGO STATE
UNIVERSITY

The SEMINAL PI team included:

- Mathematicians (4)
- Mathematics educators (4)
- APLU (1)

More information at: mtep.info/SEMINAL



Our Project

<https://modules2.com>



The Mathematics of Doing, Understanding, Learning and Educating for Secondary Schools (MODULE(S²)) project creates and supports the use of undergraduate mathematics course materials that provide opportunities for users to develop deep mathematical knowledge of **geometry**, **statistics**, **algebra**, and **modeling**, specifically as it relates to doing the work of teaching.

Use MODULE(S²)

<https://modules2.com>

MODULE(S²) materials are designed to be used as the primary text for mathematics and statistics courses that future secondary mathematics teachers take. We have curriculum materials in four areas: **Algebra**, **Geometry**, **Modeling**, and **Statistics**. They can be flexibly used in a variety of course settings, including semester-long content courses and capstone courses. MODULE(S²) materials have been successfully used in courses with in-service teachers as well as undergraduate students with a variety of majors.

The PI team included:

- Mathematicians (4)
- Math educators (4)

Materials have been accessed by 200+ faculty in 160+ institutions, including 12 community colleges, 7 state/local school boards, 18 AANAPISI, 31 HSIs, 2 HBCUs, and 1 TCU, and 3 institutions in Asia, and 1 institution in Europe.



MODULE(S²)
Mathematics Of Doing, Understanding, Learning
and Educating for Secondary Schools



The Mathematics Of Doing, Understanding, Learning, and Educating Secondary Schools (MODULES²) project is made possible through funding from the National Science Foundation RISE (Improving Undergraduate STEM Education) multi-institutional collaborative grant #1726707 (APLU), #1726098 (University of Arizona), #1726252 (Eastern Michigan University), #1726723 (Middle Tennessee State University), #1726744 (University of Nebraska - Lincoln), and #1726806 (Utah State University).

Clinical Experiences RAC (CERAC)

Goal: Develop infrastructures and models for clinical experiences that best meet the needs of teacher candidates, mentors, and students in multiple contexts.

Included 27 membership teams working on three models designed to forge bidirectional relationships with school partners:

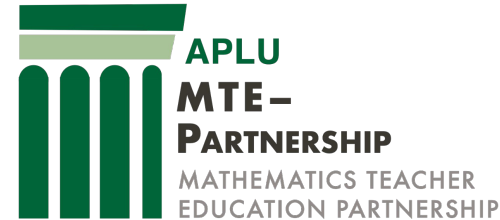
- Modules to use in methods courses
- Co-planning/co-teaching approach to clinical experiences
- Paired placement clinical residency model

Clinical Experiences RAC (CERAC)

NSF funding: “Attaining Excellence in Secondary Mathematics Clinical Experiences with a Lens on Equity”

Outcomes: Developed comprehensive models that can be used to improve clinical experiences in secondary mathematics teacher education.

- www.mtep.info/cerac



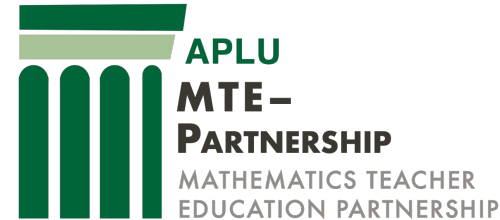
Attaining Excellence in Secondary
Mathematics Clinical Experiences
with a Lens on Equity

Clinical Experiences RAC (CERAC)

Perhaps not surprisingly, the PI team was comprised of mathematics educators

There were K-12 teacher, administrators, and a few mathematicians involved in the teams working on the grant.

They also had a strong advisory board comprised of district personnel and mathematics teacher educators/researchers.



**Attaining Excellence in Secondary
Mathematics Clinical Experiences
with a Lens on Equity**

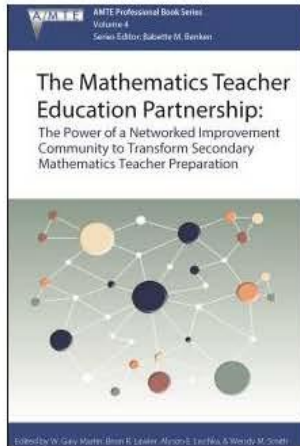
Additional RACs and Working Groups

- Program Recruitment and Retention RAC
- Secondary Teacher Retention & Induction in Diverse Educational Settings (STRIDES) RAC
- Equity and Social Justice Working Group
- Transformations Working Group

An AMTE Monograph Summarizes This First Phase of Work



New Book Information



The Mathematics Teacher Education Partnership: The Power of a Networked Improvement Community to Transform Secondary Mathematics Teacher Preparation

Editors: **W. Gary Martin**, *Auburn University*; **Brian R. Lawler**, *Kennesaw State University*; **Alyson E. Lischka**, *Middle Tennessee State University* and **Wendy M. Smith**, *University of Nebraska - Lincoln*

A volume in **The Association of Mathematics Teacher Educators (AMTE) Professional Book Series**
Series Editor: *Babette M. Benken, CSU Long Beach*

www.mtep.info/monograph



Reflection 1

Our stated goal was to transform secondary mathematics teacher preparation in light of the Common Core State Standards.

- We developed resources that addressed common problems of practice in secondary mathematics teacher preparation.
- However, many local mathematics teacher preparation programs weren't making the overall changes needed for transformational change.

Reflection 2

Throughout the MTE-Partnership, we emphasized the engagement of a broad range of partners, including mathematics teacher educators, mathematicians, and K-12 personnel.

- However, engagement of mathematicians (and K-12 personnel) varied greatly depending on the focus of the RAC.



Launch of MTEP 2.0

- These concerns led to the launch of a reimagined MTEP 2.0 project in Fall 2020.
 - MTEP 2.0 is a network of secondary mathematics teacher preparation programs working to transform their programs to better align with the MTEP Guiding Principles – www.mtep.info/gp – which are aligned with the Association of Mathematics Teacher Educators' (2017) *Standards for Preparing Teachers of Mathematics*.
 - Initially consisted of 19 teams including 44 programs engaged in local improvement work following the NIC model.
- Funding by NSF is supporting research into how we build that network.



MTEP 2.0 Membership

The primary membership of MTEP 2.0 consists of **Program NICs**, which include individuals working to improve a specific mathematics teacher preparation program.

Program NICs are also a part of **Partnership Teams**: one or more Program NICs along with other stakeholders working to improve secondary mathematics teacher preparation as a broad partnership.

Note: APLU membership no longer required; all are welcome!



MTEP 2.0 Overall Aim

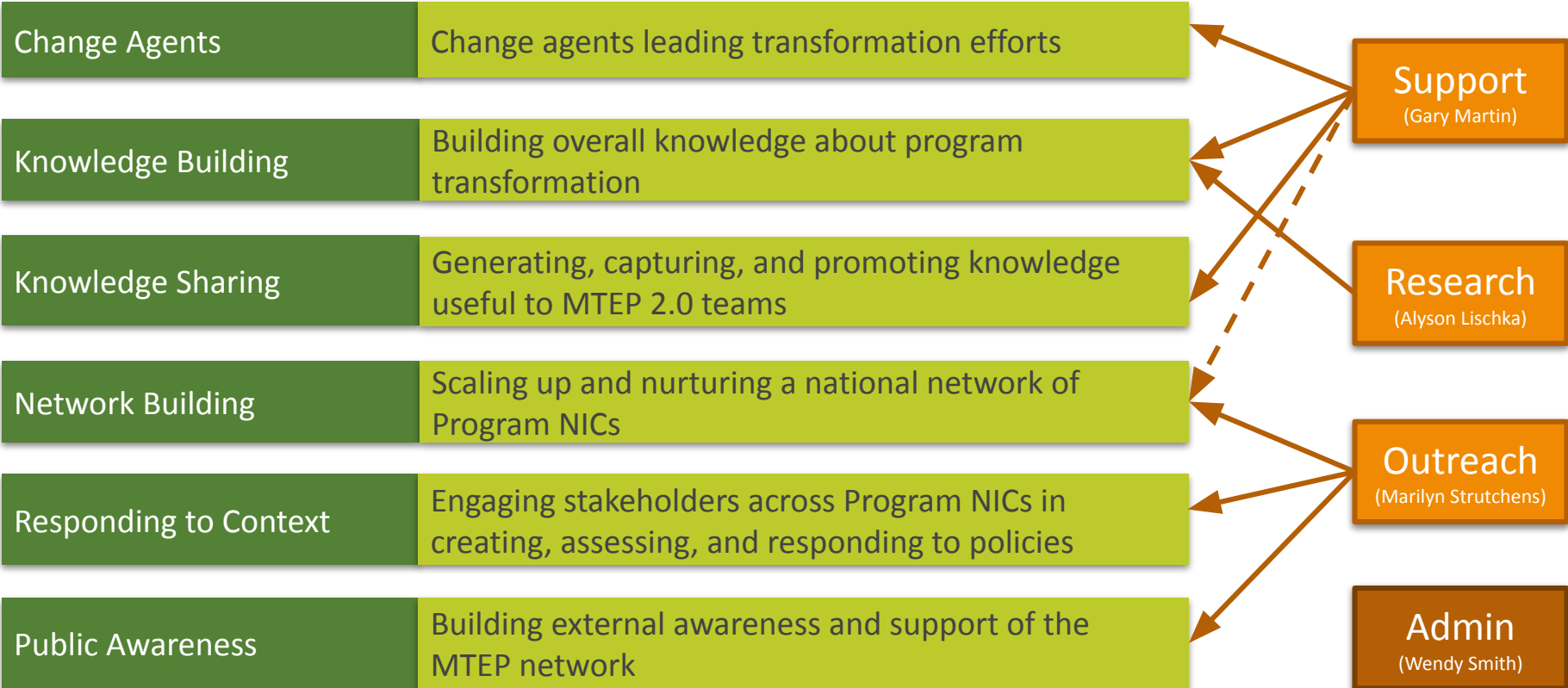
By 2025, 65 MTEP 2.0 programs, including 11 under-resourced institutions and/or minority-serving institutions, will be:

- actively engaged in an explicit, localized, prioritized improvement process
- toward alignment with the AMTE Standards and MTEP Guiding Principles
- in order to increase the number of well-prepared beginning secondary mathematics teachers, foregrounding issues of equity and access both in the objectives and practices of the programs



MTEP 2.0 Primary Drivers

Hubs



Who Might Your Team Include?

- Mathematics teacher educators
- Mathematicians
- K-12 mentor teachers
- K-12 and IHE administrators
- Other relevant internal or external partners (SPED, ELL, field supervision, regional/state level personnel, ...)

Step 1 in the
Application Process



Consider:

- Whose voices are represented currently?
- Who else should be “at the table”?
- Does your team reflect a focus on access and equity?

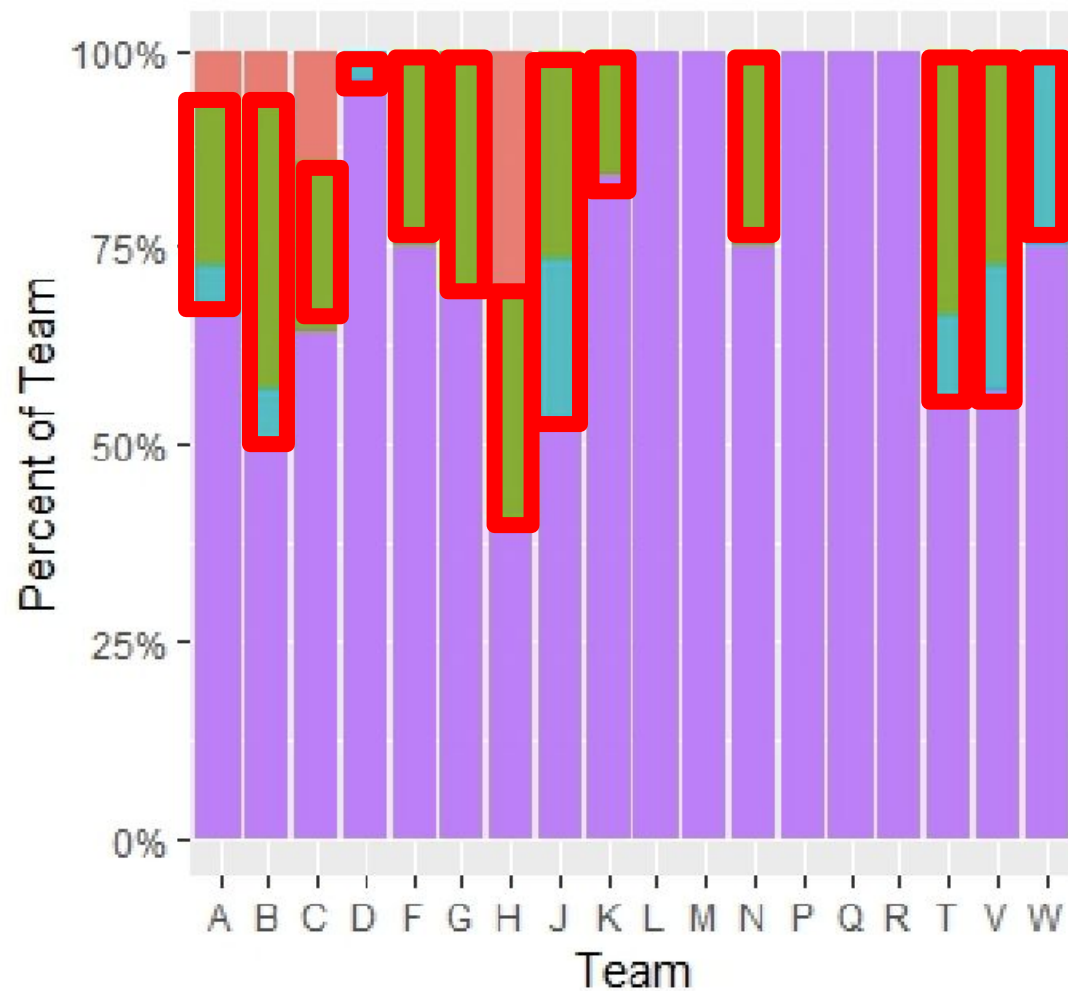


The MTEP 2.0 teams annually document their progress.

- Each team is on its own trajectory, and is making strides forward.

But how are we doing in building stronger partnerships?

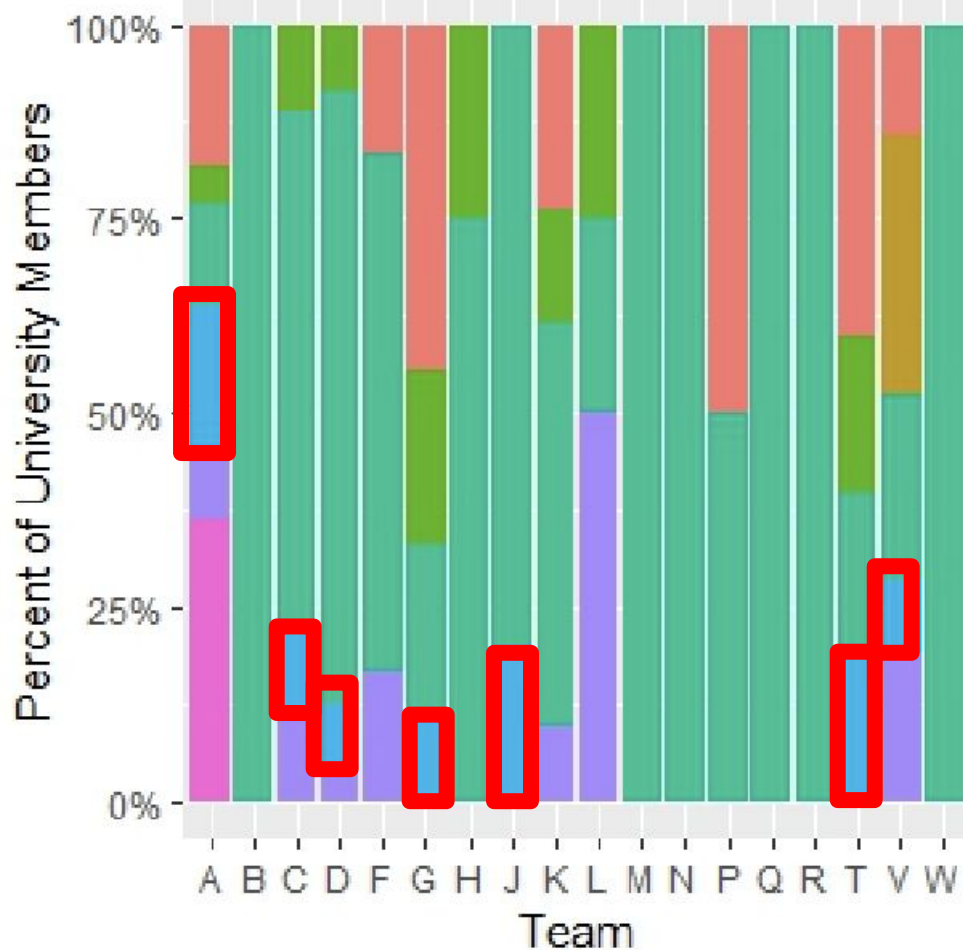




MTEP Team Member

- Community College
- K-12 Community
- State Level Representative
- University





MTEP Team Members

- University Administrator
- University Advisor
- University Faculty: COE
- University Faculty: Math Ed
- University Faculty: Mathematician
- University Faculty: Other
- University: Graduate Student

How Do We Address This Issue?



Proposed Principle #1

Mathematicians (and mathematics departments) must own teacher preparation as a central part of their mission, rather than viewing it as a necessary evil.



MET II



Common Priorities of MTEP 2.0 Teams

- **Equity, Diversity, Inclusion** -- e.g., teaching practices and indicators for equity-based instruction; diversity of candidates
- **Recruitment Strategies** -- e.g., gathering information on effective practices; collaborations with high schools or community colleges; transfer students
- **Partnership Building** -- e.g., expanding partners to include additional institutions, including community colleges, minority-serving institutions, and other universities; strengthening school partnerships; expanding partners
- **Supporting Graduates as They Enter the Profession** -- e.g., creation of a database of credential graduates; teacher mentoring.

Where do math departments fit in?



Example: Recruitment Strategies

Whose problem is it? Whatever your role, do you “see yourself” in the problem?

- Mathematics teacher educators:
 - We need students in the program! This is urgent!
- K-12 administrators or teachers:
 - We need teachers/colleagues! Recruitment will help with this, although the payoff will take time.
- Mathematicians:
 - We need well-prepared students, which means we need well-prepared teachers. However, the payoff will be very long term.
 - On the other hand: *Mathematicians (and mathematics departments) must own teacher preparation as a central part of their mission, rather than viewing it as a necessary evil.*



Proposed Principle #2

Mathematics teacher educators (and education departments or colleges) must seek out and value the contributions of mathematicians as central to effective teacher preparation.

- As Jim Lewis, one of the founders of MTEP, emphasized to me many times over the years, accusation and blame are not good foundations for collaboration.



Example: Recruitment Strategies

Are mathematicians seen as part of “the problem” for discouraging students from going into education?

Or are they invited in as partners who have an important voice in what might happen? Who have important contributions to make?

- Note that in addition to their insights from academia, they may also have insights as parents and members of the community.



Common Priorities of MTEP 2.0 Teams

- **Equity, Diversity, Inclusion** -- e.g., teaching practices and indicators for equity-based instruction; diversity of candidates
- **Recruitment Strategies** -- e.g., gathering information on effective practices; collaborations with high schools or community colleges; transfer students
- **Partnership Building** -- e.g., expanding partners to include additional institutions, including community colleges, minority-serving institutions, and other universities; strengthening school partnerships; PLCs with K-12 partners
- **Supporting Graduates as They Enter the Profession** -- e.g., preparation of a database of credential graduates; teacher retention through mentoring.



Another Approach

Can We Walk and Chew Gum?

- In some cases, a selected issue for attention may not be of equal priority for all members of the local NIC.
- Some teams are addressing this problem by setting up subgroups to work on two (or more) issues in parallel.



Conclusion

It is imperative that we live out these principles in our everyday work to achieve our goal of better preparing effective teachers of mathematics:

1. Mathematicians (and mathematics departments) must own teacher preparation as a central part of their mission, rather than viewing it as a necessary evil.
2. Mathematics teacher educators (and education departments or colleges) must seek out and value the contributions of mathematicians as central to effective teacher preparation.

Lip service will not suffice.



Learn More!

- Subscribe to our newsletter to learn about the progress of MTEP 2.0 and upcoming events:

mtep.info/newsletter

- Join the MTEP communication list for announcements:

mtep.info/join

- And, of course, visit the MTEP website!

mtep.info



SAVE THE DATE

2025 MTEP Conference-within-a-Conference

*Transforming Secondary Mathematics Teacher Preparation:
Sharing Successes, Challenges, and Promising Practices*

To be held concurrently with the 2025 AMTE Conference

February 6-8, 2025

Grand Sierra Resort, Reno, NV

(virtual attendance is also possible)





Mathematics Teacher Education Partnership

Inspire. Empower. Transform. For All.

