CSU Mathematics Teacher Education Partnership Measures Working Group Report and Next Steps from January 30, 2015 Meeting

Prepared by Mark Ellis, CSU Fullerton

The Mathematics Teacher Education Partnership (MTEP) was organized by the Association of Public and Land-grant Universities (APLU) to address the national priority of preparing more secondary mathematics teachers ready to help their students meet the rigors of the Common Core State Standards. In support of its aim to develop a “gold standard” for secondary mathematics teacher preparation while also working to increase the supply of new secondary mathematics teachers, MTEP assembled a Working Group to identify measures of candidate and program quality in alignment with its Guiding Principles for Secondary Mathematics Teacher Preparation. California State University (CSU) Fullerton led one of 38 founding teams (each including at least one K-12 partner) of MTEP; the team was extended in 2014 to include all CSU campuses offering a mathematics teacher preparation program, and subsequently named the CSU MTEP. This led to some of the first CSU-wide meetings of mathematics faculty and mathematics education faculty of the past decade.

In support of this effort, the S. D. Bechtel, Jr. Foundation provided funding for a project entitled “Accelerating Progress in the Preparation of Secondary Mathematics Teachers: A Collaboration of the MTE-Partnership and the California State University System.” One objective of this project focused on collaborations of the national APLU MTEP with CSU MTEP “to explicate what a well-prepared new secondary mathematics teacher completing a CSU program should know and be able to do, and to explore measures that support that definition along with members of the MTE-Partnership Measures Working Group.”

To launch the effort to define and measure the attributes of a well-prepared new secondary math teacher, a full-day meeting at the CSU Chancellor’s Office was attended by 12 CSU faculty representing 10 campuses, two Chancellor’s Office teacher education program directors, two members of the APLU MTEP Measures group, and two representatives of a major aligned effort that is assisting the CSU system in its teacher preparation efforts (see Attachment 1 for the complete participant list). The overall goals driving this work are to help CSU faculty involved with the preparation of teachers of secondary mathematics:

1. to have a shared vision and collect common information that will allow for increased collaboration across the system; and
2. to have common, meaningful, actionable information about multiple aspects of secondary mathematics teacher preparation.

Time was first spent discussing the question, “What should a well-started CSU-prepared teacher of secondary mathematics in the era of the CCSS-Mathematics know and be able to do?” The discussion was informed by both the experience and expertise of those present as well as a set of papers (see Attachment 2: Readings) reflective of recent research and reform efforts related to secondary mathematics teacher preparation.
A second discussion was initiated by the question, “How can progress toward this vision of a well-prepared teacher of secondary mathematics be meaningfully measured to allow for informed program improvement?” Participants were asked specifically to consider three criteria:

- What type of measures, of what qualities (aligned with vision), with what sort of items, and at what time points, are useful?
- What constitutes evidence that a candidate has demonstrated proficiency in or mastery of a particular attribute?
- How do data get returned to program faculty in order to serve ongoing improvement?

The goal was to generate a set of faculty-driven ideas about the sort of measures that would provide us, both as individual programs and collectively as a system, with actionable insight into the outcomes of our preparation efforts at both the undergraduate and post-baccalaureate levels. A summary of the meeting and planned next step follows.

The Well-Prepared Teacher of Secondary Mathematics
The members of the working group spent two hours brainstorming, discussing, reflecting on, and refining characteristics of the well-prepared teacher of secondary mathematics. Jennifer Oloff-Lewis (Chico) and Mark Ellis (CSUF) will take the ideas discussed and generate a draft vision statement and description of key characteristics that will be sent to the larger group for feedback. The beginning of this effort is offered to provide a sense of a starting point. As this is developed, there will be explicit linkages made to the APLU MTEP Guiding Principles.

Attributes (to be developed into a vision statement over the next several months…)
The well-prepared teacher of secondary mathematics (TSM) will enter the profession with the knowledge, skills, and dispositions needed to

- productively engage all students in mathematical thinking and learning reflective of current standards,
- collaborate with colleagues in the design and revision of instructional materials based on student outcomes, and
- engage in ongoing learning that builds on initial preparation to further develop knowledge of mathematics for teaching and proficiency with research-based pedagogical practices.

The specific characteristics of the TSM to be developed by the preparation program can be grouped into the following categories (not hierarchically ordered):

- Knowledge of Students
- Knowledge of Mathematics Content (including PCK/MKT) and Mathematical Practices
- Pedagogical Skills of Designing, Implementing, and Assessing Instructional Activities
Pedagogical Skills for Attending to Equity, Diversity, and Participation in Mathematical Discourse
Dispositions and Beliefs about Students
Dispositions and Beliefs about Mathematics
Dispositions and Beliefs about the Teaching Profession

CSU MTEP Measures Sub-Groups
Based on the group discussion, five areas to measure candidate progress/outcomes were identified as having high potential for informing our understanding of the impact of teacher preparation efforts at both the undergraduate and post-baccalaureate levels. Sub-groups were formed around four of these. Each of these is meant to provide a snapshot of specific components identified in the vision of the well-prepared TSM that will inform faculty thinking about and collaboration around program improvement.

1. Mathematical Knowledge for Teaching – Elsa Medina (SLO), Judy Kysh/Eric Hsu (SFSU), Greisy Winicki-Landman (Pomona)
   - This can be measured in multiple ways ranging from tests (forced choice, constructed response) to observations of in-the-moment classroom practice.
   - Consider the benefits/costs of each including existing measures (e.g., COACTIV study from Germany).
   - Explore whether/how to have common measure of students just before entering credential program (either in SMPP capstone course or of applicants who’ve passed CSETs).

2. Beliefs and Attitudes toward Mathematics – Brian R. Lawler (CSUSM), Laurie Riggs (Pomona), James Martinez (CSUCI), David Pagni (CSUF)
   - Build on work of CLAMS (based on CLASS in science) with David Webb from CU Boulder (and member of APLU MTEP Measures group).
   - Explore how to use prompted student responses to video clips to get at dispositions and beliefs about mathematics teaching and learning.

3. Classroom Practices: Protocol for Candidate Observations – Mark Ellis (CSUF), Jennifer Oloff-Lewis (Chico), Stephanie Biagetti (Sac State)
   - How do we gauge candidates’ proficiency with specific “teaching practices” (i.e., NCTM’s Eight Teaching Practices)?
   - All programs have field observations of candidates, so using a common protocol that is specific to mathematics teaching would provide fodder for conversations among faculty about this aspect of teacher preparation.
There are two protocols that the APLU MTEP Measures group has identified as well-aligned with the vision in the MTEP Guiding Principles:

- MCOP2 (has been validated with some research)
- TRU Math (new instrument not yet validated)

4. Dispositions, Skills, Practices: Completer Exit Survey – Ivan Cheng (CSUN), Rafaela Santa Cruz (SDSU), Fred Uy (CSULA), Paul Tuss (CSU CTQ)
   - Send ideas to Paul Tuss re: items to measure candidates’ growth mindset AND items related to the mathematical teaching practices.
     - Streamline survey by eliminating items that don’t inform program reform.
     - Use format suggested by Ivan Cheng from USDOE survey.
     - Consider including items that correlate with/reflect CSTP expectations.
     - Figure out a way to integrate MTEP Exit Survey such that the items are unchanged and raw data goes to APLU MTEP Measures group.
   - Work on making the data more accessible and useful to program faculty.


**Linkages to APLU MTEP Work**

It is important to note that the efforts of the CSU MTEP Measures group are well aligned with the Guiding Principles and ongoing efforts of the APLU MTEP Measures Working Group. Specifically, the vision of the well-prepared teacher of secondary mathematics that emerges from the CSU MTEP Measures group will build from the vision that has been articulated in APLU MTEP Guiding Principles, and, if appropriate, identify additional attributes of particular interest. With respect to development of specific measures of those attributes, there will be collaboration with the APLU MTEP Measures Working Group in areas of common interest (e.g. completer survey; observation protocol). The collaboration will ensure instruments are developed and implemented in the same way such that the data generated can inform the efforts of the larger group. Other areas of work by the CSU MTEP Measures group will be shared back to the APLU MTEP Measures group to help inform their national efforts.

Initial efforts to establish these linkages occurred at the CSU MTEP Measures meeting on January 30, attended by representatives of the APLU MTEP Measures Working Group. APLU MTEP members provided formative input throughout the proceedings, and the entire APLU MTEP Measures group attended a final debriefing. Representatives from the APLU MTEP group will be invited to attend future convenings of the CSU MTEP Community as appropriate.

Brian R. Lawler (CSUSM) and Mark Ellis (CSUF) also serve on the APLU MTEP Measures Working Group, which met immediately following the CSU meeting, helping to forge the national vision for measures and ensure connections with the CSU efforts. Thus, the APLU
MTEP leadership views the CSU MTEP Measures group as an important partner in mutual learning around developing measures of candidate and program quality for secondary mathematics teacher preparation.

**Timeline**

- Mid-March: Mark Ellis will check in with each sub-group
- April/May: Mark Ellis will schedule a conference call with all CSU MTEP Measures members (as well as APLU MTEP representatives) to plan for June 22-24
- June 22-24: MTEP National meeting – CSU MTEP Measures Working Group meeting (during or in close proximity), including APLU MTEP Measures committee
- Fall 2015: CSU MTEP Measures Working Group meeting (TBA)

**Ideas for Further Discussion (future meetings)**

- Think about big picture strategy of all of the “parts” being explored to build coherence and ensure they will be useful and be used by faculty.
  - One example might be to examine program requirements across all campuses (e.g. pre-requisites, coursework, fieldwork) for earning a credential. Where there are differences, faculty can think about whether/how these might relate to specific measures.

- Share strategies for making productive use of data from candidate performance assessments (e.g. PACT, CalTPA, EdTPA) to inform secondary math teacher preparation.

- Think about how to compile data (from multiple measures) to inform program completers’ continued growth (baseline for future growth), including content knowledge, pedagogical content knowledge, and teaching practices, as well as how to ensure completers see themselves as part of a professional learning community or network (PLC/PLN).
  - For example, how might we develop a “plan for professional growth” that could be used as early as freshman year to help future teachers of secondary mathematics monitor their development into teachers as it begins with their undergraduate coursework.

- Think about how to (better) utilize induction as a way to continue new teachers’ professional growth.

- Compile a collection of common misconceptions within specific domains along with ideas for anticipating and addressing these. Elsa Medina and Jennifer Oloff-Lewis were interested in this. The following examples were mentioned as places to begin:
  - [High-leverage practice within Teaching Works](#)
  - [Middle school math misconceptions](#)
## Attachment 1:
### Attendees of January 30, 2015 CSU-MTEP Measures Working Group Meeting

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| Melissa White                                      | mwhite@wested.org        | WestEd            |               |
| Howard Gobstein                                    | hgobstein@aplu.rgo       | APLU MTEP         | Co-Director, APLU MTEP                                |
| W. Gary Martin                                     | wgarymartin@auburn.com   | Auburn/APLU MTEP  | Co-Director, APLU MTEP; Chair, Measures Group         |
| David Webb                                         | dcwebb@colorado.edu      | Colorado/APLU MTEP | APLU MTEP Measures Group                              |
Attachment 2: Readings that Informed Discussion

2. The Mathematical Education of Teachers II (Ch 5-6) (CBMS, 2012)
3. Measuring Graduate and Program Quality (Martin & Garcia, 2013)
4. The Three Faces of Performance Improvement (Solberg, Mosser, & McDonald, 1997)
5. Teachers’ Mathematical Knowledge, Cognitive Activation in the Classroom, and Student Progress (Baumert, et al., 2009) [access full-text through library database]
7. Principles to Actions: Executive Summary (NCTM, 2014)
8. Beginning Teachers’ Perspectives on Attributes for Teaching Secondary Mathematics (Wasserman & Ham, 2013)