
Clinical Experiences¹

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Teacher preparation programs face significant challenges in providing secondary mathematics teacher candidates with quality clinical experiences. The problem is two-fold:

1. There is an inadequate supply of quality mentor teachers to oversee clinical experiences. Too few teachers are well versed in implementing the CCSS and teachers are especially inexperienced with embedding the standards for mathematical practice into their teaching of content standards on a daily basis.
2. Bidirectional relationship between the teacher preparation programs and school partners in which clinical experiences take place are rare. Such relationships that reflect a common vision and shared commitment to the vision of CCSSM and other issues related to mathematics teaching and learning are critical to the development and mentoring of new teachers.

The work of Clinical Experience RAC (CERAC) encompasses a number of the principles and principle indicators from the MTE-Partnership Guiding Principles, including fostering partnerships between institutions of higher education, schools and districts, and other stakeholders such as state departments of education and is focused on preparing teacher candidates who promote student success in mathematics, as described in the Common Core State Standards for Mathematics (CCSS-M) and other college- and career-ready standards. In the CERAC higher education faculty and partner school districts and schools work together to actively recruit, develop, and support inservice master secondary mathematics teachers who can serve as mentors across the teacher development continuum from preservice to beginning teachers. Moreover, the CERAC helps to ensure that teacher candidates have the knowledge, skills, and dispositions needed to implement educational practices found to be effective in supporting all secondary students' success in mathematics as defined in the CCSS-M and other college- and career-ready standards.

The CERAC consists of 24 university led teams, each consisting of at least one mathematics teacher educator, a mathematician, and a school partner. The CERAC is divided into three Sub-RACs based on the three types of field experiences that we are implementing to

¹ The RAC Promo Sheet, presented during the opening of the conference to report on current activities of the RAC, can be found after the reference list.

meet the goals that we set forth in our primary drivers and our aim statement. The Sub-RACs are: Methods, Paired Placement, and Co-planning and Co-teaching. Each Sub-RAC is implementing Plan-Do-Study-Act (PDSA) cycles based on their goals and objectives. Teams work together via conference calls, email, and the Trellis platform. We use Dropbox and Trellis as a way of sharing files and materials. We have held face-to-face meetings as a whole RAC that included breakout meetings for Sub-RACs. The SUB-RACS have overlap areas that drive and focus the RAC as a whole, such as the emphasis on the mathematics teaching practices (National Council of Teachers of Mathematics [NCTM], 2014), PD for mentors related to the CCSS and mentoring mathematics teacher candidates, and outcome measures. There are also specific goals to be attained within each of the Sub-RACs. Each Sub-RAC has developed their own specific research questions.

Methods Sub-RAC

The Math Methods Sub-RAC of the CERAC includes members from 10 institutions of higher education and public school districts. Our work has focused on strengthening the connection between the university based methods courses and the field experience component associated with the methods courses. We have given particular attention to increasing and deepening teacher candidates' (TCs') and mentor teachers' (MTs') understanding and implementation of the Common Core State Standards for Mathematical Practice (CCSSO, 2010). We created a Standards for Mathematical Practice (SMPs) module available for use in methods courses and the associated field experience. The module includes three activities designed to support TCs and MTs in meeting the following goals:

Activity 1

- TCs will recognize that for the typical student, U.S. mathematics classrooms lead them to develop unproductive habits related to mathematics.
- TCs will begin to consider how their actions as teachers might support the development of a different, more productive set of habits (e.g., the mathematical practices).
- TCs knowledge and understanding of the SMPs will increase.

Activity 2

- TCs will engage in the SMPs as “students” while exploring high school geometry content they are likely to teach.
- TCs will apply the knowledge gained from Activity 1 to identify and discuss the SMPs they experienced as they worked on the Properties of Quadrilaterals task and identify how the facilitator supported their engagement in the SMPs.
- TCs gain a deeper understanding of teacher moves that support student engagement in the SMPs using the Park City Math Institute (PCMI) Rubric.

Activity 3

- TCs and MTs will watch a video clip of a lesson designed to engage students in the SMPs and then discuss their observations of the students during the lesson.
- TCs and MTs will consider how what they observed in the video might impact their teaching.

The SMP Module has been implemented by six members of the Methods Sub-RAC and revised based on their experiences. We are currently seeking additional methods instructors interested in incorporating this module into their methods courses.

Our next steps include the development of a Lesson Design module. The goals of this module are for TCs 1) to recognize the need to approach lesson planning with a focus on student learning and engagement; and 2) begin to integrate select Mathematics Teaching Practices (NCTM, 2014) into their planning and instruction practices. This module will be piloted by Methods Sub-RAC members starting in the fall of 2016.

Co-Planning and Co-Teaching (CPCT) Sub-RAC

The Co-Planning and Co-Teaching (CPCT) Sub-RAC includes members from 10 institutions. Our goal is to enable mentor teachers and teacher candidates to carefully plan and subsequently use various co-teaching strategies during clinical experiences. We focused on six co-teaching strategies, namely: *one teach, one observe*; *one teach- one assist*; *parallel teaching*; *team teaching*; *station teaching*; and *alternative teaching* (Friend et al., 2010; Murawski & Spencer, 2011). CPCT is a paradigm shift from traditional approaches to clinical experiences. Hence, the Sub-RAC members has placed an emphasis on training and disseminating information about how to implement CPCT effectively. Additionally, the members facilitated CPCT activities at their respective sites, and assisted with data collection to provide insight into the nature of implementation of CPCT during clinical experiences.

To date the CPCT Sub-RAC has engaged in a rigorous effort to disseminate research and scholarship to a wider audience. Members of the group have facilitated professional development workshops, published articles in a journal and multiple conference proceedings, and presented at national and international conferences about preliminary findings and practical means to implement CPCT. The CPCT Sub-RAC plans to solicit for funding to host a working group meeting to produce a deliverable (i.e., book and/or video) that would clearly explain how to integrate CPCT into clinical experiences. Overall, the CPCT Sub-RAC has been actively seeking to increase the visibility of CPCT in the literature and at educational meetings.

During the MTE-P 2016 annual conference, members of the CPCT Sub-RAC engaged in refining our *Annual Perspectives in Mathematics Education 2017* manuscript that describes how the group uses improvement science to transform clinical experiences, presented three brief research reports, articulated the PDSA cycles for the next academic year, revised multiple

instruments used to gather data about the *process measures*, reflected on challenges at various institutions that hindered data collection efforts, planned to embed equity and social justice into our CPCT activities, suggested that CPCT training badges ought to be used, and explored funding possibilities to produce a publishable deliverable and support the group's research efforts.

Looking ahead, the CPCT sub-RAC will continue to implement CPCT at their respective institutions, garner data and engage in PDSA cycles, in an effort to transform clinical experiences. With careful planning, and allocation of time to gather data, the team intends on scaling up their research activities.

Paired Placement Sub-RAC

The Paired Placement Sub-RAC is comprised of members representing five institutions. The Sub-RAC focuses on the paired placement model for student teaching in which two prospective teachers are paired with a single cooperating teacher. The cooperating teacher provides purposeful coaching and mentoring, and the two pre-service teachers offer each other feedback, mentoring, and support (Mau, 2013, Leatham & Peterson, 2010b). As a Sub-RAC, we read articles (Goodnough, et al. 2009; Leatham & Peterson, 2010a & 2010b; Mau, 2013) to learn about the model. One team implemented the model fall 2013 and reported to the other teams about its findings. The two teams used this information along with information from the literature to prepare mentor teachers and candidates for the experience Spring 2014. Teams also worked with their participants to adjust the model within their context utilizing PDSA cycles. Teams monitored the process throughout the semester. Teams met via conference call to discuss the results of the implementations and what they would do differently. Teams created professional development modules, syllabi, and measures Fall 2014. Teams implemented the model again Spring 2015 utilizing suggested improvements from previous iterations. One pair was implemented in the fall of 2015, and six pairs were implemented spring semester 2016.

Through PDSA cycles and data collected from participants, we are learning much about the model. We have found that it allows teacher candidates to really focus on student learning and the craft of teaching. Teacher candidates and mentor teachers who have experienced this model believe that it benefits all of their growth in teaching as well as the students' growth in learning mathematics. They also stated that the model has helped them to become more collaborative.

During the conference, we acclimated new members and revised and streamlined our measures. We also made plans to implement the revised workshops and syllabi in the spring semester of 2017. We intend to submit proposals to speak at appropriate venues and submit a

manuscript related to our work. We will also work in concert with the other Sub-RACs to seek funding to support the work.

We have given presentations about the model at conferences and are working on submitting papers to journals. Our goal is to refine the workshops and syllabi so that they can be adapted to different contexts.

CERAC

The CERAC as a whole has made good progress toward our goals. We have created measures (Mathematics Teaching Practice Survey and others) to help with gauging the growth of teacher candidates involved in our programs, and we are also using measures developed by others. Measures used across the three Sub-RACS include the following:

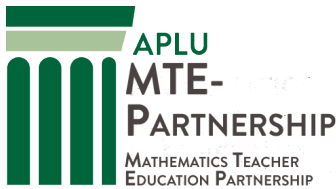
- *MCOP²* – The Mathematics Classroom Observation Protocol for Practices in a K-16 mathematics classroom instrument (Gleason, Livers, & Zelkowski, 2015).
- *MTE-P Completer Survey* will show how well prepared the teacher candidates feel based on the experiences that they had in their programs.
- *Mathematics Teaching Practices Survey* used to determine the level at which prospective secondary teachers are engaged with NCTM's (2014) Mathematics teaching practices.

As a RAC, we plan to pay explicit attention to equity and social justice issues in the next iterations of our modules. Even though we have included issues of equity in our driver's diagram, we feel that it is important to make it known in our products that access, equity, and empowerment for each and every student is important to our work.

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MTE-Partnership
Solicitation for Participation in the
Clinical Experiences RAC
April, 2016

Problem Addressed

Teacher preparation programs face significant challenges in providing secondary mathematics teacher candidates with quality clinical experiences. The problem is two-fold:

1. There is an inadequate supply of quality mentor teachers to oversee the experiences. This is related to the quantity of teachers who are well versed in implementing the CCSS, especially embedding the standards for mathematical practice into their teaching of content standards on a daily basis.
2. There needs to exist a bidirectional relationship between the teacher preparation programs and school partners in which clinical experiences take place. This relationship should reflect a common vision and shared commitment to the vision of CCSSM and other issues related to mathematics teaching and learning.

The work of Clinical Experience RAC encompasses a number of the principles and principle indicators from the MTE-Partnership Guiding Principles, including fostering partnerships between institutions of higher education, schools and districts, and other stakeholders such as state departments of education and is focused on preparing teacher candidates who promote student success in mathematics, as described in the Common Core State Standards for Mathematics (CCSS-M) and other college- and career-ready standards. In this RAC higher education faculty and partnering school districts and schools work together to actively recruit, develop, and support inservice master secondary mathematics teachers who can serve as mentors across the teacher development continuum from preservice to beginning teachers. Moreover, the clinical experiences RAC helps to ensure that teacher candidates have the knowledge, skills, and dispositions needed to implement educational practices found to be effective in supporting all secondary students' success in mathematics as defined in the CCSS-M and other college- and career-ready standards.

General Approach

- The RAC is divided into three Sub-RACs based on the three types of field experiences that we are implementing to meet the goals that we set forth in our primary drivers and our aim statement.
- Each Sub-RAC is implementing PDSA cycles based on their goals and objectives.
- Teams work together via conference calls, email, and the Trellis platform.
- We utilize Dropbox as a way of sharing files and materials.
- Have had face-to-face meetings as a whole RAC with breakout meetings for Sub-RACs.
- There are overlap areas that focus the RAC as a whole, such as the emphasis on NCTM's mathematics teaching practices, PD for mentors around the CCSS and mentoring mathematics teacher candidates, and outcome measures.
- There are also specific goals to be attained within each of the Sub-RACs.
- Each Sub-RAC has specific research questions, which they are addressing.

Who We Are

| Methods | Paired Placement | Co-Plan/Co-Teach |
|---|---|--|
| <u>University of North Dakota MTEP:</u> Michele Iiams Cathy Williams <u>USC Midlands MTEP:</u> Jan Yow DeVonne "Vonnie" Smalls Beth Oliver Nevermind Chigoba <u>West Alabama Partnership, University of Alabama:</u> Jeremy Zekowski Jim Gleason John Abby Khalilian Karla Moore Jill England Melinda Williams <u>GSU MTEP:</u> Gregory Chamblee Missy Jenkins Sharon Taylors Pier A. Junor Clarke <u>California State University, Fullerton</u> Mark Ellis <u>California State University, Northridge</u> Ivan Cheng <u>California State University, San Bernardino</u> Su Liang <u>Oregon MTEP:</u> Rebekah Elliott Wendy Aaron | <u>Central Alabama MTEP:</u> Marilyn Strutchens Brooke Barron Peggy Dagley Huajun Huang <u>Montana MTEP:</u> David Erickson Bill Lowney Lee Brown Jim Hirstein <u>East Central Texas MTEP:</u> Jennifer Whitfield Dawn Parker Laura Wilding <u>New Mexico State University MTEP:</u> Lida J. Uribe-Flórez Ted Stanford Silvia Celedón-Pattichis Tom Gruszka | <u>Tampa Bay Area MTEP:</u> Ruthmae Sears Fernando Burgos Gladis Kersaint Julie Wagner <u>North Carolina State University MTEP:</u> Karen Keene Karen Norwood Allison McCulloch Karen Hollebrands <u>East Carolina University MTEP:</u> Charity Cayton Maureen Grady Ron Preston Rose Sinicrope. <u>UCF MTEP:</u> Janet Andreasen Melissa Dagley Amanda Ellis Bryan Zugelder <u>California State University, Chico:</u> Jennifer Oloff-Lewis: Mary-Elizabeth Matthews Kerrie Girt <u>California State University, San Bernardino:</u> Catherine Spencer <u>California State University, Northridge</u> Ivan Cheng Julie Gainsburg <u>California State University, Sacramento:</u> Stephanie Biagetti Elaine Kasimatis <u>OSU MTEP</u> Patti Brosnan Marguerethe Jaede |

Current Progress

RAC Activities

- In March 2015 we submitted a Phase 4, Robert Noyce Research Grant to the National Science Foundation. While not recommended for funding, we plan to revise and resubmit for the 2016 Noyce competition.
- Sub-RAC leaders attended the Carnegie Foundation for the Advancement of Teaching Networked Improvement Community Design Learning Lab in spring and fall 2015.
- We are disseminating our work through conference venues, such as AMTE's Annual Meeting and SMTI's Annual Meeting.
- Some of our members will be presenting their work at the 13th International Congress on Mathematical Education (ICME-13), July 24 – 31, 2016 in Hamburg.

Early Field Experiences within Methods Sub-RAC

- Teams revised and implemented a module designed to strengthen teacher candidates' and their mentor teachers' understanding of the CCSS Standards for Mathematical Practice (SMP). The opportunity to build a productive teacher candidate and mentor teacher relationship is an additional goal. In addition to increasing teacher candidates' and mentor teachers' knowledge of the SMP the module provides an opportunity for the teacher candidates and mentor teachers to develop a relationship and common language around these ideas.
- Teams developed a survey to measure the possible effects of completing the module activities on teacher candidates' and mentor teachers' understanding of the SMP.
- Teams developed and employed additional measures for the SMP Module: Activity "Exit Slips" for teacher candidates and an implementation survey completed by the methods instructor.
- Teams created and are piloting a survey on teacher candidates' knowledge and use of the Mathematics Teaching Practices.

Co-Plan/ Co-Teach Sub-RAC

- Teams created instruments and professional development training module relevant to CPCT, and received feedback from all members of the group.
- During the 2014-2015 academic year, the CPCT Sub-RAC conducted a pilot study to examine mentor teachers' and teacher candidates' knowledge about the Common Core State Standards for Mathematics – Content Standards and Standards for Mathematical Practice, as well as documented their beliefs and instructional practices.
- During 2015- 2016 academic year, the team revised the PDSA cycle for Cycle 2, and increased its membership.

Paired Placement Sub-RAC

- Teams read about the model.
- One team implemented the model fall 2013 and reported to the other teams about its findings.
- The other two teams used this information along with information from the literature to prepare mentor teachers and candidates for the experience Spring 2014.
- Teams also worked with their participants to adjust the model within their context.
- Teams monitored the process throughout the semester.
- Teams met via conference call to discuss the results of the implementations and what they would do differently.
- Teams created professional development modules and measures fall 2014.
- Teams implemented the model again Spring 2015 utilizing suggested improvements from previous iterations.
- One pair was implemented in the fall of 2015 and six pairs are being implemented spring semester.

Opportunities for Engagement

Early Field Experiences within Methods Sub-RAC

1) Implementing SMP module and contributing to data collection; and 2) Collaborating on the development of additional modules and measures of module effects on teacher candidates and mentor teachers

Co-Plan/ Co-Teach Sub-RAC

1) Developing, utilizing, and sharing instruments used to measure the influence of the co-teaching model; 2) Implementing and examining teacher candidates' experiences throughout their field-based preparation (i.e., practicum and internship); and Studying the influence of professional development on the success of the co-teaching model.

Paired Placement Sub-RAC

1) Developing, utilizing, and sharing instruments used to measure the influence of the paired placement model; (2) Implementing and examining teacher candidates experiences throughout their field-based preparation (i.e., practicum and internship); and (3) Refining and studying the influence of professional development and orientation sessions on the success of the paired placement model.