Clinical Experiences

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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 Common Core State Standards for Mathematics (CCSS-M; Common Core State Standards Initiative, 2010), and teachers are especially inexperienced with embedding the standards for mathematical practice into their teaching of content standards on a daily basis. Further, many veteran teachers do not implement the mathematics teaching practices as discussed in *Principles to Actions* (National Council of Teachers of Mathematics [NCTM], 2014) on an ongoing basis.
2. Bidirectional relationships 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 the CCSS-M and other issues related to mathematics teaching and learning are critical to the development and mentoring of new teachers.

The work of Clinical Experience Research Action Cluster (CERAC) encompasses a number of the principles and principle indicators from the Mathematics Teacher Education Partnership (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 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 in-service master secondary mathematics teachers who can serve as mentors across the teacher development continuum from pre-service 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 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. They use Dropbox, Google Drive, and Trellis as a way of sharing files and materials. Additionally, they have held face-to-face meetings as a RAC that included breakout meetings for sub-RACs. The sub-RACS have overlap areas that drive and focus the RAC, such as the emphasis on the mathematics teaching practices (NCTM, 2014) and other equitable teaching practices, professional development for mentors related to the CCSS-M and mentoring mathematics teacher candidates, and outcome measures. There are also specific goals to be attained within each of the sub-RACs, and each sub-RAC has developed its own specific research questions.

Update on the Collective Work of the RAC

One of the major accomplishments of the clinical experience RAC since the 2017 MTE-Partnership conference was the receipt of funding for a proposal to the Engaged Student Learning, Design or Development and Implementation (level 2) of IUSE of the National Science Foundation. The project is led by principal investigators from Auburn University, the University of South Florida, and the Association of Public and Land-grant Universities (APLU). The NSF-IUSE grant, *Collaborative Research: Attaining Excellence in Secondary Mathematics Clinical Experiences with a Lens on Equity,* is implementing an improvement science study to answer the following question: How does a continuum of collaborative and student-focused clinical experiences, including co-planning /co-teaching and paired placement fieldwork models, impact pre-service teachers' equitable implementation of the Mathematics Teaching Practices (MTPs; NCTM, 2014) across multiple institutional contexts? The research will be conducted by a consortium of 24 universities, along with their school partners engaged in APLU's MTE-Partnership, which is currently developing and testing three alternative models for clinical experiences using a networked improvement community (NIC) design (Bryk et al., 2015). Throughout the 2017–2018 academic year, members of the RAC began implementing the project. During the 2018 MTE-Partnership conference, RAC members reflected on their data collection plan, discussed what they gleaned from the conference that could help them in ensuring that teacher candidates across the 24 teams are developing equitable teaching practices and other skills that the teacher candidates need in order to facilitate their student's mathematics growth. RAC members also discussed challenges related to the goals that they have set for themselves as a RAC and for the grant and found some solutions.

In addition to starting the work on the grant during the academic year, members of the RAC submitted two chapters to a handbook related to clinical experiences. The submissions are listed below:

- Yow, J. A., Waller, P., & Edwards, B. (2018, Accepted). A national effort to integrate field experiences into secondary mathematics methods courses. In T. Hodges & A. Baum (Eds.), *Handbook of research in field-based teacher education.* Hershey, PA: IGI Global.
- Strutchens, M., Sears, R., Whitfield, J., Lewis, J., Erickson, D., Brosnan, P., Conway, B., Junor-Clarke, P., Biagetti, S., Parrish, C., & Ellis, R. (2018, Accepted). Implementation of paired placement and co-planning /co-teaching field experience models across multiple contexts. In T. Hodges & A. Baum (Eds.) *Handbook of research on field-based teacher education.* Hershey, PA: IGI Global.

RAC members as a whole also made plans for writing the clinical experience RAC section of the proposed MTE-Partnership monograph to AMTE during the 2018 conference.

Consistent with the whole RAC goals, each of the sub-RACS worked on materials that they had already been developing and began thinking about PDSA cycles that they would like to run in the fall to continue improving their products and processes. What follows are brief summaries of the work of each of the sub-RACS since the 2017 MTE-Partnership conference.

Methods Sub-RAC

The Methods sub-RAC finished the multi-year effort to develop the Standards for Mathematical Practice Module #1 last year. It was made available for use across the entire partnership for the 2017–2018 academic year. No updates will be made to this module while multiple individuals of this group are working on writing for publication with respect to the findings. This module focuses on faculty engaging teacher candidates in a quadrilaterals activity, learning to understand what engaging in the standards for mathematical practice as students look like, and capping the experience by asking the teacher candidates to watch a short video with their

cooperating teachers and discuss the standards for mathematical practice. Multiple surveys are included for faculty to collect teacher candidates' work, as well as surveys from their cooperating/mentor teachers.

Lesson Planning Module #2 is a second module that the methods sub-RAC is creating. The sub-RAC has worked through two full years of implementing PDSA cycles on this module. This module team has solicited six pilot sites for Fall 2018 and two for Spring 2019. The module team plans to collect data from the pilot sites, revise the module, and roll it out to the entire partnership for the 2019–2020 academic year. This module focuses specifically on teacher candidates and mentor teachers planning lessons that involve the mathematics teaching practices (NCTM, 2014). They are simultaneously developing a lesson plan rubric that is centered on the Mathematics Classroom Observation Protocol for Practices ($MCOP^2$) (Gleason, Livers, & Zelkowski, 2017) and will be used by pre-service teachers and cooperating/mentor teachers to evaluate planned lessons, revised lessons, and implemented lessons.

The third module is the Student Feedback Module #3. The sub-RAC has worked through one full year of development on this module. The module team will implement this module at two sites in Fall 2018, collect and analyze data, and revise the module. Pilot sites will be solicited again for the 2019–2020 year for implementing PDSA cycles. The timeframe for full partnership rollout is planned for the 2020–2021 academic year. This module focuses specifically on the value of providing students high-quality feedback related to mathematical goals as a teaching practice. Components of this module include exploring the different forms of feedback, understanding effective feedback, and structuring high-quality feedback for students.

Co-Planning/Co-Teaching Sub-RAC

Since the 2017 meeting, the co-planning and co-teaching sub-RAC engaged in data collection and analysis activities for the NSF-IUSE grant, facilitated professional development at the University of South Florida, and disseminated components of their work at the Psychology of Mathematics Education-North America Chapter annual meeting, the MAA and AMS Joint Mathematics Meeting, and the Florida Association of Mathematics Teacher Educators. We were also accepted to the Association of American Colleges & Universities (AAC&U) Transforming STEM education meeting later in 2018. The citations for the presentations are as follows:

Brosnan, P., Cayton, C., Grady, M., Sears, R., & Strutchens, M. (2018, January). *Co-planning and co-teaching with a focus on equity.* Professional development training at the University of South Florida, Tampa, FL.

Cayton, C., Grady, M., Preston, R. V., Sears, R., Oloff-Lewis, J., & Brosnan, P. (2017, October). *Improving pre-service secondary mathematics clinical experiences through co-planning and co-teaching*. Working group sessions at the International Group for the Psychology of Mathematics Education-North America Chapter, Indianapolis, IN.

Sears, R. (2018, January). *Using improvement science to promote mathematics teaching practices and equity during clinical experiences*. Presentation at the Florida Distance Learning Association & Florida Association of Mathematics Teacher Educators, Altamonte Springs, FL.

Sears, R. (2018, November). *Attending to equity in secondary mathematics using co-planning and co-teaching Strategies*. Presentation at the AAC&U Transforming STEM education meeting [accepted], Atlanta, GA.

Strutchens, M., Sears, R. (2018, January). *Attaining excellence in secondary mathematics clinical experiences with a lens on equity.* Presentation at Mathematics Association of America and American Mathematical Society Joint Mathematics Meeting, San Diego, CA.

At the 2018 meeting, the co-planning and co-teaching sub-RAC identified features and resources that should be available on the website and refined instruments that measure the implementation of co-planning and co-teaching with an attention to equity.

The website for the co-planning and co-teaching sub-RAC will be designed for a practitioner audience. It will include brief vignettes of the various co-planning and co-teaching strategies that promote equity, enacted lessons, sample lesson plans, handouts that can be used to provide an overview of co-planning and co-teaching, and other practical resources that may provide insight for implementation of the model in secondary mathematics classrooms.

The co-planning and co-teaching sub-RAC also refined their just-in-time survey and exit survey so that the sub-RAC can gain insight into how collaborating pairs (mentor teachers and preservice teachers) attend to equity during instruction. Particularly, the collaborating pairs will be asked to explicate what they do to facilitate equitable learning opportunities for students and discuss factors that help or hinder their ability to attend to equity during enacted lessons.

Paired Placement Sub-RAC

Since the 2017 MTE-Partnership conference, members of the paired placement sub-RAC presented at the Georgia Association of Mathematics Teacher Educators (GAMTE) in Eagle Rock, GA, and submitted a paper for the GAMTE conference proceedings. The citation is listed as follows:

Conway, B., Erikson, D., Parish, C., Strutchens, S., & Whitfield, J. (2017, October). *An alternative approach to the traditional internship model.* Paper presented at the Georgia Association of Mathematics Teacher Educators, Eagle Rock, GA. Retrieved from http://digitalcommons.georgiasouthern.edu/gamte/.

Additionally, the paired placement sub-RAC members worked on guidelines for orientation sessions and workshops for teacher candidates and mentor teachers, syllabi, and other resources for implementation of the model. They also conducted PDSA cycles and collected data to answer research questions related to the implementation of the model. Members of the paired placement sub-RAC plan to place the implementation materials on Trellis so that other MTE-Partnership teams may access them and implement the model. They will also create questionnaires to go with the materials to determine how well people are able to implement the model with integrity within their context.

References

Bryk, A. S., Gomez, L. M., Grunow, A., & LeMahieu, P. G. (2015). *Learning to improve: How America's schools can get better at getting better*. Harvard Education Press: Cambridge, MA.

Common Core State Standards Initiative. (2010). *Common Core State Standards for Mathematics.* Washington, DC: National Governors Association Center for Best Practices and the Council of Chief State School Officers.

Gleason, J., Livers, S. D., & Zelkowski, J. (2017). Mathematics Classroom Observation Protocol for Practices ($MCOP^2$): Validity and reliability. *Investigations in Mathematical Learning, 9*(3), 111–129.

National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. Reston, VA: Author.