
Clinical Experiences (CERAC)

Marilyn Strutchens, Auburn University, strutme@auburn.edu

Ruthmae Sears, University of South Florida, ruthmaesears@usf.edu

Jeremy Zelkowski, University of Alabama, izelkowski@ua.edu

Belinda Edwards, Kennesaw State University, bedwards@kennesaw.edu

Basil Conway IV, Columbus State University, conway_basil@columbusstate.edu

Charmaine Mangram, University of Hawai'i at Manoa, cmangram@hawaii.edu

Problem Addressed and General Approach

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; National Governors Association Center for Best Practices & Council of Chief State School Officers, 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: Ensuring Mathematical Success for All* (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 college- and career-ready standards 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 2014 Mathematics Teacher Education Partnership's (MTE-Partnership) *Guiding Principles for Secondary Mathematics Teacher Preparation Programs*, 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.

Moreover, the 2017 Association of Mathematics Teacher Educators' *Standards for the Preparation of Teachers of Mathematics* (AMTE Standards) state:

An effective mathematics teacher preparation program includes clinical experiences that are guided on the basis of a shared vision of high-quality mathematics instruction and have sufficient support structures and personnel to provide coherent, developmentally appropriate opportunities for candidates to teach and to learn from their own teaching and the teaching of others. (p. 26)

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 teaching 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 27 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 and researching to meet the goals that we set forth in our primary drivers and our aim statement. See Figure 1 for the CERAC's driver diagram. 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 Canvas platform. They use Dropbox, Google Drive, and Canvas as ways 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 overlapping 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 *Standards for Mathematical Practice* (National Governors Association & the Council of Chief State School Officers, 2010) 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.

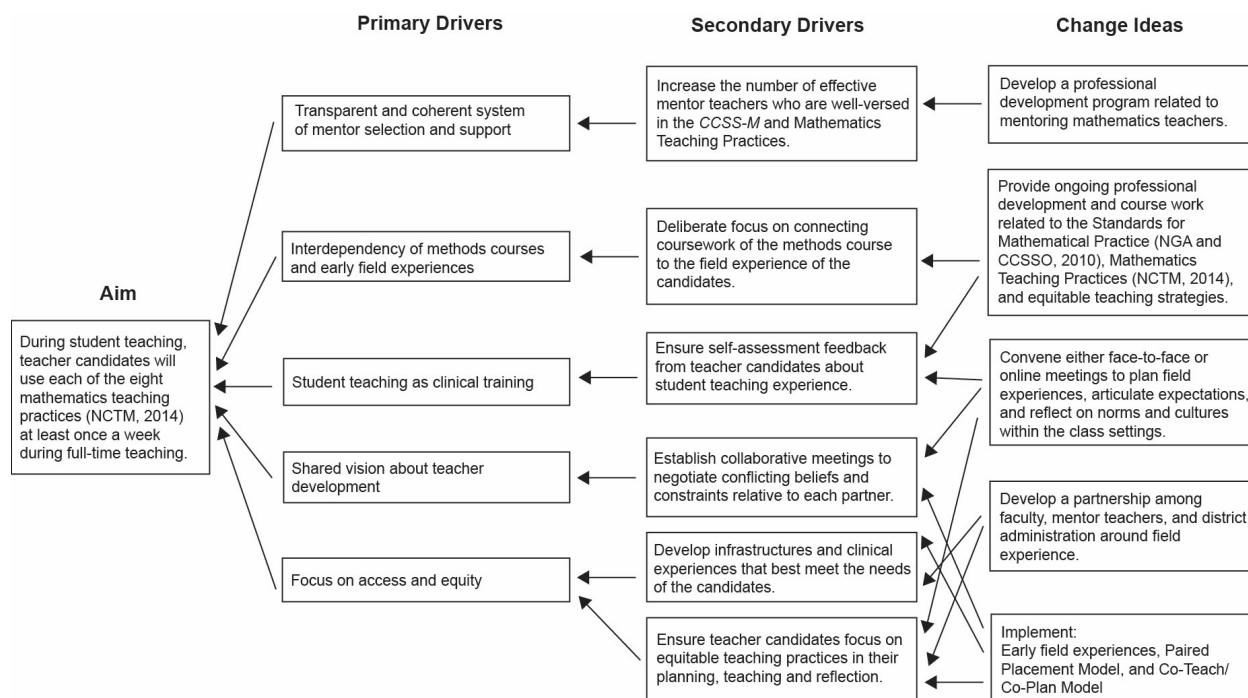


Figure 1. CERAC Driver Diagram.

RAC Updates

Since the 2019 MTE-Partnership Conference, the CERAC has continued implementing the work related to the National Science Foundation-IUSE grant, *Collaborative Research: Attaining Excellence in Secondary Mathematics Clinical Experiences with a Lens on Equity* (DUE-1726998, 1726853, 1726362). 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). We are 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 is being conducted by members of the three sub-RACs as described above.

In conjunction with the grant, the CERAC had a meeting of the Leadership Team and the Advisory Board members in October 2019, a face-to-face meeting of the RAC in November 2019, and other virtual leadership meetings throughout the academic year. We also updated our webpage at the APLU website: <https://www.aplu.org/projects-and-initiatives/stem-education/mathematics-teacher-education-partnership/mtep-racs/mtep-racs-clinexp.html>. Each of the sub-RACs also met monthly during this time period.

During the 2020 conference, RAC members reflected on their data collection plan; members from each sub-RAC were placed in cross sub-RAC teams to discuss data collection and other important elements of the CERAC, also three of the project's advisory board members (Dr. John Staley, Dr. Keith Leatham, and Dr. Dorothy White) provided their observations about the grant work and challenged the members to share their stories and scale up the work that we are doing. 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. We also had times during the CERAC meeting where members worked in their respective sub-RACs, discussing next steps and challenges related to COVID-19. Members of the CERAC contributed six chapters to the *Mathematics Teacher Education Partnership: The Power of a Networked Improvement Community to Transform Secondary Mathematics Teacher Preparation* monograph (Martin et al., 2020):

1. Grady, M., Sears, R., Stone, J., & Biagetti, S. (2020). Using co-planning and co-teaching strategies to transform secondary mathematics clinical experiences, (pp. 235–256).
2. Mangram, C., Clarke, P. A. J., Waller, P. P., Ellis, R. L., & Castro-Minnehan, C. (2020). Focus on improving clinical experiences in secondary mathematics teacher preparation, (pp. 281–292).
3. Strutchens, M. E., Erickson, D., Sears, R., & Zekowski, J. (2020). Clinical experiences for secondary mathematics teacher candidates, (pp. 179–198).
4. Strutchens, M. E., Whitfield, J., Erickson, D., & Conway, B. (2020). Fostering collaborative and reflective teacher candidates through paired placement student teaching experiences, (pp. 257–280).
5. Strutchens, M. E., Sears, R., & Zekowski, J. (2020). Improving clinical experiences for secondary mathematics teacher candidates, (pp. 199–209).
6. Zekowski, J., Yow, J., Ellis, M., & Waller, P. (2020). Engaging mentor teachers with teacher candidates during methods courses in clinical settings, (pp. 211–234).

Furthermore, members of the leadership team gave the following presentations at national meetings during the 2019–2020 academic year.

Strutchens, M. E., Sears, R., Gobstein, H., Martin, W. G., Sutton, J., Zekowski, J., Conway IV, B., & Mangram, C. (2020, January). *Collaborative Research: Attaining Excellence in Secondary Mathematics Clinical Experiences with a Lens on Equity*. Joint Mathematics Meetings, Denver, CO.

Strutchens, M. E., Sears, R., Zekowski, J., Conway IV, B., & Mangram, C. (2020, February). *Collaborating to Improve Clinical Experiences for Secondary Mathematics Teacher Candidates*. Annual Association of Mathematics Teacher Education Conference, Phoenix, AZ.

Next, each sub-RAC will provide an update of their progress for the 2019–2020 academic year. They will also provide information about available resources and opportunities for engagement.

Methods Sub-RAC

The Methods sub-RAC has focused our work on the development of modules that educate teacher candidates on critical components of the teaching and learning of mathematics, as well as adding a critical component of the

teacher candidate engaging with the mentor/cooperating teacher in an activity that is a culminating experience following the modules' university-based activities. Specifically, the Methods sub-RAC aims to provide the mathematics education field

- developed knowledge and understanding of critical components of teacher preparation in methods courses and connected field experiences for teacher candidates;
- a bidirectional learning trigger between teacher candidate and their mentor cooperating teachers in clinical settings; and,
- modules that have been tested and refined through PDSA cycles that engage teacher candidates and their mentor cooperating teachers with the Standards for Mathematical Practice (CCSS-M, 2010) and the Mathematics Teaching Practices (NCTM, 2014).

During the 2020 MTE-Partnership conference, the Methods sub-RAC members discussed our use of the PDSA cycles as a component of module validation and our continued use of NIC to learn about implementation in different settings. The members reflected on comments received from the California State Fullerton site regarding their pilot implementation of the Feedback Module. We determined that the Feedback Module needed greater focus on engaging the mentor/cooperating teacher in a collaborative learning experience with the teacher candidate. We also worked to refine and complete the Lesson Plan Module. Throughout the 2019–2020 academic year, members of the Methods sub-RAC met virtually to discuss our progress revising and refining the Lesson Planning and Feedback modules. The Lesson Plan Module is now available on Canvas. Enrollment in our Canvas course and information/updates on the modules can be found here: <https://cerac-methods.ua.edu/>. If you have questions about each module, email links are posted on our CERAC-Methods website and you can sign up for our Canvas course page housing the module materials. The Feedback Module is slated for use in Fall 2020 and Canvas ready in Spring 2021.

Resources

- **Standards for Mathematical Practice (SMPs) Module**
 - The SMP Module is designed to provide teacher candidates and mentor teachers a bidirectional, shared experiences to better understand the SMPs and their relevance to impactful teaching.
 - This module is fully completed and available for use from our Canvas course page.
- **Lesson Planning Module for SMPs and MTPs**
 - The Lesson Planning Module is designed to discover teacher candidates' preconceived beliefs about lesson planning and move them toward a greater understanding of the components of high-quality lesson plans embedded in the Mathematics Teaching Practices designed to engage students in the Standards for Mathematical Practice.
 - This module is posted in our Canvas course page and is ready for Fall 2020 implementation.
- **Student Feedback to Improve Mathematical Goals**
 - The Feedback Module is designed to provide teacher candidates with opportunities to develop knowledge in effective feedback/assessment practices for providing student feedback that is constructive, critical, and equitable. The focus is on learning to provide rich and appropriate feedback to students based on the mathematical goals of the lesson/activity. Three variations/pathways for how to incorporate the Feedback Module within mathematics teacher preparation programs are a foci. This module is in a trajectory ready for use Fall 2020, Canvas-ready Spring 2021 and updates will be posted on our CERAC-Methods website periodically.

Please visit our website for information: <https://cerac-methods.ua.edu/>

Paired Placement Sub-RAC

In 2019–2020, members of the paired placement sub-RAC were very productive. Leaders of the sub-RAC participated in CERAC leadership meetings and the CERAC Advisory Board Meeting. In addition, members of the sub-RAC presented at several local and national conferences. In particular, members presented the work of the group along with other members of the CERAC in a symposium session at Association of Mathematics Teacher Educators (AMTE) 2020 annual conference and the MTE-Partnership annual conference. In addition, findings from cross sectional RAC research were shared at the Georgia Association of Mathematics Teacher Educators. Furthermore, some members of the sub-RAC planned and implemented a workshop with members of the co-planning and co-teaching sub-RAC for teachers and teacher candidates at the University of South Florida.

Moreover, members of the paired placement sub-RAC continued to implement the model and related data collection instruments for their NSF grant. Members facilitated orientation sessions and workshops for teacher candidates and mentor teachers, updated syllabi based on previous PDSA cycles, and revised other resources for implementation of the model. To further disseminate the model and encourage broader use of the paired placement model by other teacher educators, the paired placement team created a living manual (<https://sites.google.com/view/thepairedplacement/>). The living manual provides information about the model, how to implement the model, research on the model, tools for implementation, and tips for successful implementation for mentors, supervisors, and candidates.

The paired placement team conducted PDSA cycles and collected data to answer questions relative to partnering with regional schools, co-teaching and co-planning, and the observational task protocols. Members of the paired placement sub-RAC have been working with the program evaluator, John Sutton, to compile data (as permitted and available between institutions) for cross-institutional analysis.

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

CPCT sub-RAC members have worked to merge broader CERAC work into their courses. Some institutions have implemented methods modules as they fit into their own contexts. Tools from the co-planning/co-teaching modules also have been used during methods courses and internships to promote collaboration and increase success of the paired placement model. During the CERAC meeting June 30–July 2, 2020, the CPCT sub-RAC met to discuss a plan-do-study-act cycle for the upcoming academic year (2020-2021).

The CPCT sub-RAC members acknowledged that there exist challenges in collecting data if clinical experiences were to be offered online. They noted that the pandemic is creating uncertainty for the upcoming academic year as to ultimately what will be viable. Therefore, the sub-RAC indicated that they will collect what data they can, with the realization that data collection will vary based on institutional constraints and enrollment trends. Dr. Dorothy White, an advisory board member echoed the group's sentiment and noted that the realities of collecting data are going to be challenging going forward. Thus, she suggested the sub-RAC engage in re-examining the data previously collected through different lenses. Therefore, the group agreed that data collection may not be as robust, when compared to previous years, based on the uncertainty of educational operations due to the pandemic. The sub-RAC will also reflect on factors that may contribute to equitable mathematics practices based on existing data.

The CPCT sub-RAC also agreed that they will engage in chunking videos of professional development held at the University of South Florida in January 2018 and September 2019. The team will look for exemplars across the two video-recorded training sessions that can help with the implementation of co-planning and co-teaching

during clinical experiences. Thus, the videos will be divided into shorter segments so that they are easier to use and can be disseminated to others. Faculty (Dr. Maureen Grady and Dr. Charity Cayton) from East Carolina University will coordinate the video-editing.

Additionally, the CPCT sub-RAC acknowledged that there is a need to reflect on clinical experiences within a virtual space due to multiple districts providing the option for instruction to be face-to-face, asynchronous, or synchronous for the academic year. Thus, to meet the demands of our community and our current realities, the team members agreed that examples are needed as to how CPCT strategies can be enacted virtually. As a result, the sub-RAC plans to enact PDSA cycles around implementing CPCT strategies in virtual settings during the upcoming year. Dr. Ruthmae Sears agreed to spearhead this initiative. Despite the constraints and current challenges sub-RAC members have experienced due to COVID-19, they reflected on how they can advance the work. Particularly, they are planning to advance the work by providing resources that can be used virtually.

References

- Association of Mathematics Teacher Educators (2017). *Standards for preparing teachers of mathematics*. Author. Retrieved from <http://amte.net/standards>
- Gleason, J., Livers, S. D., & Zelkowski, J. (2017). Mathematics Classroom Observation Protocol for Practices (MCOP²): Validity and reliability. *Investigations in Mathematical Learning*, 9(3), 111–129.
- Martin, W. G., Lischka, A. E., Smith, W. M., & Lawler, B. R. (Eds.) (2020). *The Mathematics Teacher Education Partnership: The power of a networked improvement community to transform secondary mathematics teacher preparation*. Volume 4 in B. Benken (Ed.), Association of Mathematics Teacher Educators Professional Book Series. Information Age Publishing.
- National Council of Teachers of Mathematics (2014). *Principles to actions: Ensuring mathematical success for all*. Author.
- National Governors Association Center for Best Practices, & Council of Chief State School Officers (2010). *Common core state standards for mathematics*. Author.