Clinical Experiences

Marilyn E. Strutchens, Auburn University, strutme@auburn.edu
Jeremy Zelkowski, University of Alabama, jzelkowski@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 Mānoa, cmangram@hawaii.edu
Ruthmae Sears, University of South Florida, ruthmaesears@usf.edu
Jamalee (Jami) Stone, Black Hills State University, Jami.Stone@bhsu.edu (retired)
Charity Adams Cayton, East Carolina University, caytonc@ecu.edu

Problem Addressed & 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 rigorous state mathematics standards, and teachers are especially inexperienced with embedding the standards for mathematical practice (CCSS-M; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) into their teaching of content standards daily. 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. Relationships that reflect a common vision and shared commitment to rigorous state standards and other issues related to mathematics teaching are lacking.

The work of the Clinical Experiences 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. CERAC emphasizes fostering partnerships between institutions of higher education, schools, and districts, as well as other stakeholders such as state departments of education, and focuses 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 basis on 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 mathematics 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 its 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 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 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 2020 MTE-Partnership Conference, the CERAC has been busy 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 aforementioned.

Leaders of the sub-RACs, the project evaluator, and the hub leadership have been meeting monthly to ensure that the work of the sub-RACs continues to move forward along with the grant work. The annual report for the grant was submitted at the end of July and approved by the NSF program officer in August 2020. The program...
officer was impressed by how much we were able to accomplish amid the challenges of COVID-19 and noted the significance of the project’s dissemination efforts, including the book chapters and recent presentations.

The 2020 MTE-Partnership Conference launched the MTEP 2.0 NIC, which changed the focus of the MTE-Partnership from teams working with RACs focusing on developing materials and protocols to implementing practices related to fostering the growth of teacher candidates to transforming programs. The CERAC is happy that many of its member teams are now also a part of the program transformation partnerships. We are also looking forward to sharing our work across the MTEP 2.0 teams.

Other highlights related to the RAC are that we convened a meeting of the leadership team and the advisory board members for the grant, participated in the MTE-Partnership pre-conference of the Association of Mathematics Teacher Educators’ Annual Meeting in 2022, and members gave presentations during the AMTE Annual Meeting. During each of these events we had good participation and received critical feedback for our work. Finally, we provided an overview of our work during the MTEP 2.0 2021 virtual conference and had a work session for the RAC. Two of our grant advisory board members were present and provided helpful feedback and support for the work.

As follows are two presentations related to the CERAC as a whole:


**Methods SubRAC**

Most of the methods sub-RAC work has focused on developing the following modules:

- **Standards for Mathematical Practice (SMP) Module.** The SMP Module is designed to provide teacher candidates and mentor teachers a bidirectional, shared experience to better understand the SMPs and their relevance to impactful teaching. This module is fully completed and available for use.

- **Lesson Planning (LP) Module for SMP & MTPs.** The LP 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 (MTPs) designed to engage students in the Standards for Mathematical Practice. This module is fully completed and available for use.

- **Student Feedback (FB) to Improve Mathematical Goals.** The Feedback Module is designed to provide teacher candidates with opportunities to develop knowledge in effective 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. This module is fully completed and available for use.

- **Mathematical Task Writing (TW).** The Task Writing Module is built around a mathematical letter writing exchange between middle and secondary teacher candidates and high school math students. Teacher candidates seem to better understand mathematics and are better able to understand their pen pals’
interests, attitudes, and learning progression. This module is nearing a phase of sharing beyond the development team.

From June 2020 to June 2021, the methods sub-RAC worked on multiple facets. These include:

1. Getting the SMP and LP modules in copy-ready upload to Canvas for users (posted).
2. Submitting the SMP and LP modules to the AMTE Supplemental Materials review (accepted).
3. Getting the FB module posted in Canvas (posted).
4. Starting the TW module materials/instructions (under construction).
5. Finishing a book chapter for a May 2021 submission. [The following book chapter was written throughout the spring 2021 semester and was submitted and notified of acceptance:
6. Updating periodically, our CERAC methods website: https://ceracmethods.ua.edu/

As follows are presentations given by members of the methods sub-RAC:

   https://amte.net/sites/amte.net/files/2021AMTEConf_Program_FINAL_02062021.pdf
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**Paired Placement SubRAC**

In 2020–2021, members of the paired placement sub-RAC were highly productive. Members of the paired placement sub-RAC met monthly to discuss implementing the model, data collection, and data analysis. Leaders of the sub-RAC participated in CERAC leadership meetings monthly and the CERAC Annual Advisory Board Meeting virtually. In addition, members of the sub-RAC presented at several local and national conferences. In 2020, members of the paired placement shared work through a presentation on *Fostering Competent, Collaborative, Reflective, and Caring Beginning Mathematics Teachers* via paired placements at the annual MTE-Partnership Conference. In addition, the CERAC leader, Marilyn Strutchens, gave a presentation to paired placement pre-service teachers, mentors, and faculty members at Columbus State University that focused on research related to inequities and micromessages that may take place during clinical experiences and mathematics teaching. She also showed how to combat these negative practices with equitable teaching strategies.

Furthermore, Charity Cayton and Maureen Grady, members of the co-planning and co-teaching sub-RAC, prepared and implemented workshops for members, mentor teachers, and pre-service teachers of the paired placement sub-RAC virtually at Columbus State University and the University of Hawai‘i at Mānoa to support collaboration and the implementation of the model in 2021.

Additionally, 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 has continued to update the living document (https://sites.google.com/view/thepairedplacement/), which is the paired placement website. The site 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. In 2020–2021, resources were branded with both NSF and MTE-Partnership logos to allow for further and larger dissemination.

In addition, in 2020–2021, the paired placement team conducted local PDSA cycles and collected data to answer questions relative to partnering with regional schools, co-teaching and co-planning, recruitment, retention, and the observational task protocols. These PDSA cycles have allowed members of the paired placement sub-RAC to analyze the intersection of the model with program improvement frameworks. Members of the paired placement sub-RAC used data from previous years to submit a new chapter that analyzed the effects of the implementation of the paired placement model on equitable teaching practices, mentor teachers, program improvement, and program completers:


Below are other published works by members of the group.


Sub-RAC members have worked to merge broader clinical experiences RAC work into their courses. At Columbus State University, the noticing protocol provided by one of the advisory board members was used to strengthen its program toward becoming more equitable and strengthened the teacher candidates’ use of the mathematics teaching practices during their clinical experiences. Some institutions have implemented modules as they fit into their own contexts. Tools from the co-planning/co-teaching modules have also been used during methods courses and internship to promote collaboration and increase the success of the paired placement model.

Co-planning and Co-teaching SubRAC

The co-planning and co-teaching (CPCT) sub-RAC consists of faculty and staff from the University of South Florida, Georgia State University, Black Hills State University, East Carolina University, and Chico State University. The goal of the CPCT sub-RAC is to educate collaborative pairs (teacher candidates and collaborating teachers) on how various co-planning and co-teaching strategies can support equitable learning opportunities and support the Mathematics Teaching Practices (MTPs). The following co-teaching strategies were used: one teach, one observe; station teaching; one teach, one assist; parallel teaching; team teaching; and alternative teaching. The co-planning strategies used were: one plans, one assists; one reflects, one plans; partner planning; one plans, one reacts; team planning; and parallel planning.
During 2020–2021, the team worked collaboratively to achieve the project goals. Monthly meetings were held virtually to discuss data collection, dissemination, and application of CPCT strategies in multi-faceted teaching contexts (e.g., virtual & hybrid) due to the COVID-19 pandemic. Also, a representative of the sub-RAC participated in monthly CERAC Leadership meetings and the Clinical Experiences Research Action Cluster (CERAC) advisory board meeting that was held in October 2020. The group participated in networking initiatives, facilitated professional learning opportunities, engaged in scholarly dissemination of work via conferences and journal submissions, and collected data from multiple institutions. Unlike past years where the CPCT sub-RAC has hosted live professional-development training events, this year sub-RAC members managed their professional development needs locally at each institution, which was primarily facilitated virtually due to COVID-19 restrictions. Cayton and Grady also facilitated virtual professional learning opportunities for Columbus State University and University of Hawai‘i at Mānoa.

Moreover, members of the sub-RAC produced a plan for creating vignettes of professional development videos. The CPCT team members at East Carolina University (Cayton and Grady) began storyboarding training videos that will be translated into vignettes. Raw video footage of the professional development training recorded in September 2019 at the University of South Florida will be used to create the videos. This training included pre-service teachers and collaborating teachers and will provide material for each of the CPCT strategies. The goal is to produce shorter 3- to 5-minute video vignettes of the CPCT training to make the CPCT training more accessible to a wider audience. ECU has been provided funding to support a student to assist in video editing, and these videos will become part of a CPCT website to be created during the 2021–2022 academic year.

As a result of COVID-19, the group acknowledges the impact of the pandemic on the sustainability of CPCT change ideas during the educational disruption and the need to adapt implementation of CPCT strategies to include a variety of classroom delivery contexts (e.g., face-to-face, virtual, hybrid) and will work to include lessons learned as part of sub-RAC work during the 2021–2022 academic year. In addition, members published or presented the following works:


**References**


