
Addressing Equity within the Clinical Research Action Cluster: Establishing a Common Lens through which to Examine Mathematics Lessons

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The Clinical Research Action Cluster (RAC) within the Mathematics Teacher Education Partnership (MTE-Partnership) has been examining challenges related to the clinical fieldwork and associated methods coursework of secondary mathematics teacher candidates (TCs). The primary concern among RAC members—university faculty and school district partners—is the mismatch between research-based practices of mathematics education that foster engagement and success among a diverse range of students—something central to our preparation programs and embedded in AMTE’s *Standards for Preparing Teachers of Mathematics*—and the actual practices TCs encounter in their field placements that are often more reflective of procedurally-oriented 20th-century mathematics teaching. Since fieldwork experiences have the most influence on TCs’ future professional practices (Wilson, Floden, & Ferrini-Mundy, 2001), we have worked to identify reasons for this mismatch and to implement strategies that address these.

Discussions among RAC members led to the realization of the importance of a) articulating between university and school district partners a mutually agreed upon common vision of high-quality secondary mathematics lessons and b) establishing a common lens through which to examine mathematics lessons as a measure of the degree to which this vision is being enacted. The *Common Core State Standards for Mathematics* (and other similar standards documents) have done well to emphasize mathematics as more than content standards, identifying the eight standards for mathematical practice (SMPs) as central to students’ processes of mathematical reasoning and sense making. We agreed that our vision of high-quality secondary mathematics lessons would be grounded in student engagement in the SMPs. NCTM’s (2014) eight research-based Mathematics Teaching Practices (MTPs) delineate specific professional practices known to promote learning for all students that is aligned with new college and career ready content standards, so we came to agree that becoming knowledgeable about and proficient with the MTPs must be at the core of teacher preparation coursework and clinical experiences. This is reflected in the Clinical RAC Aim Statement: “During student teaching Teacher Candidates (TCs) will use each of the eight Mathematics Teaching Practices at least once a week during full time teaching.”

However, within our partner school districts there are not enough mentor teachers (MTs) at the secondary mathematics level who routinely engage their students in the SMPs and would be prepared to foster the growth of teacher candidates in their use of the MTPs. Conversations with school-district partner leaders indicated that this was the result of a) long-standing beliefs among MTs about how mathematics is taught; b) concerns among MTs about students’ readiness or willingness to engage in mathematical reasoning and sense making; and c) insufficient opportunities for MTs to learn strategies for engaging students in the SMPs through implementation of the MTPs. As a result, we came to see the preparation of each new teacher of secondary mathematics as an opportunity to disrupt long-standing teaching practices that contribute to inequities in learning outcomes. We acknowledged it was our collective responsibility (university teacher preparation faculty and school district partners) to ensure that requirements for student teaching and feedback during student teaching emphasize the responsibility of TCs to advance mathematics learning of all students through routine engagement

in the SMPs.

One tool our RAC has begun to utilize that both reflects our shared vision of high-quality secondary mathematics teaching and serves as a measure of the extent to which such practices might be occurring in field placement classrooms is the *Mathematics Observation Protocol for Practices* (MCOP²; Gleason, J., Livers, S.D., & Zekowski, J., 2015). Built from a rigorous process of drawing on research and multiple rounds of seeking practitioner input, the MCOP² has both strong psychometric properties and strong validity. The 16 indicators fall into two factors—student engagement (SE) and teacher facilitation (TF)—each of which have nine items (with two items loading on both SE and TF). With respect to equity, three of the SE items include language about the proportion of students productively engaged in the mathematical discourse community:

1. There was a high proportion of students talking related to mathematics.
2. There was a climate of respect for what others had to say.
3. Students were involved in the communication of their ideas to others (peer to peer).

The descriptions for these items reference concerns with equitable participation and the teacher's role in creating a learning environment in which all students have a voice and are given mathematical authority. The specific indicators include quantitative estimates of the proportion of students meaningfully participating in mathematical discourse and sharing ideas. While far from a perfect gauge, it is fair to say that there cannot be equity without first equality of participation.

After identifying the MCOP² as a tool that would provide feedback about our progress toward the aims of the Clinical RAC, some colleagues and I at California State University, Fullerton designed a training on the use of the MCOP². We felt in order to really understand where it came from time had to be devoted to examining the rationale for changing what we have been doing in mathematics classrooms in the United States since the early 1900s. Part of the training calls into question 20th-century schooling practices, including beliefs about mathematics and beliefs about ability, that led to a) the system of tracking that denies so many students access to meaningful learning and b) the method of teaching mathematics as rule-following rather than sense-making. We share that this system reflects social biases and misconceptions that were much more pronounced at the beginning of the last century but whose impact is seen in practices of schooling throughout the United States. We then talk about current research that has informed the MCOP² and engage in watching video clips of mathematics lessons and determining ratings for each of the nine MCOP² items. The spirited discussions that arise help participants to clarify what is meant by commonly used terms such as “problem solving” and “engagement.”

Having done this training with over 100 teachers, faculty, and supervisors within teacher credential programs at CSU Fullerton, we have received feedback indicating it has helped them to think more deeply about what it looks like to engage all students in learning mathematics. Our programs place TCs in diverse school districts in southern California in which historic student outcomes in mathematics mirror national trends with large differences in achievement that correlate with demographic markers of ethnic, SES, and linguistic background. We believe that the MCOP²'s focus on students' equitable engagement in SMPs offers a productive avenue through which to bring attention to inequities in participation that are otherwise ignored (and accepted as the norm). While in the early stages of implementation, there are indications the use of MCOP² to examine mathematics lessons is reshaping conversations about planning and instructional practices that have the potential to impact students' experiences in mathematics classrooms and their learning outcomes.

The questions we will be exploring as our implementation of the MCOP² continues include:

- How might we use MCOP² items to inform candidates' lesson planning?

- How might we strengthen the quality of evidence that people are using for their MCOP² ratings?
- And how might the MCOP² help us to open doors to conversations with district partners about addressing long-standing disparities in student outcomes in mathematics?

References

Gleason, J., Livers, S.D., & Zelkowski, J. (2015). Mathematics classroom observation protocol for practices: Descriptors manual. Retrieved from <http://jgleason.people.ua.edu/mcop2.html>.

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

Wilson, S. M., Floden, R. E., & Ferrini-Mundy, J. (2001). *Teacher preparation research: Current knowledge, gaps, and recommendations*. Seattle, WA: Center for the Study of Teaching and Policy.