
Overview of the Conference

Brian R. Lawler
Kennesaw State University
blaw@kennesaw.edu

Robert N. Ronau¹
University of Louisville
bob@louisville.edu

Margaret Mohr-Schroeder
University of Kentucky
m.mohr@uky.edu

The MTE-Partnership emerged because the work of changing secondary mathematics teacher preparation is very difficult, particularly because of the lack of valid and reliable measures available to guide the process. This group stands apart from previous efforts because of the emphasis on connecting local efforts to network understandings and network understandings to local efforts. That is building a community of learners, learning together. Through well-connected efforts within the network, local experiments are leveraged to reveal powerful results in which the focus is transformation. Transformation is more than just taking to scale, but strengthening the relationships between those involved.

MTE-P uses the Networked Improvement Community (NIC) model, developed by the Carnegie Foundation for the Advancement of Teaching (Bryk, Gomez, & Grunow, 2011; Bryk, Gomez, Grunow, & LeMahieu, 2015), to guide the numerous and complex activities of the member partners, and to help them to transform their efforts into meaningful results. NICs are intentionally designed social organizations that are: (1) focused on a common aim, (2) guided by a deep understanding of the problem and a shared approach to solve it, (3) disciplined by the methods of improvement research to develop, test, and refine interventions; and (4) organized to accelerate interventions into the field and to effectively integrate them into the field.

These proceedings are of the fifth MTE-P conference. We have moved past the initial organizational startup issues and are rapidly learning how to translate individual partnership efforts into nation-wide results (Martin & Gobstein, 2015). Consequently, the theme for this conference is “From Improvement to Transformation.” In this case, Transformation is more than just taking to scale, but strengthening the relationships between those involved; that is strengthening the NIC to better support and share the work. As you will discover in these proceedings we have five research communities—Research Action Clusters (RACs)—that have developed and implemented strategies that span universities and stages and now are beginning to share results.

¹ Ronau contributed to this paper while serving at the National Science Foundation. The comments expressed here are those of the author and do not necessarily reflect the views of the National Science Foundation.

This fifth conference was designed to achieve four goals: (1) to build focus on the transformational change needed for teams and programs to achieve the partnership aim; (2) to make equity and social justice more explicit as an essential component of the partnership aim; (3) to build a sense of joint purpose and identity across the partnership; and (4) to accelerate the work of the five Research Action Clusters (RACs) towards their aims. To provide individual consideration and support to goal 4, the time of the conference was organized to provide substantive work time for the RACs. Also, several plenary and social events were scheduled to achieve the first three goals. Further, the plenary sessions were designed to provoke the work within the RACs to explicitly address issues of equity, underdeveloped to this point by the MTE-Partnership. Participants were especially challenged to move beyond individual work and seek ways to elicit systemic change, that is, to move from improvement to transformation goals. This executive summary will serve to identify the sections of the Proceedings and provide a brief overview of each entry.

Plenary Session

After attendees were welcomed and the conference opened by MTE-Partnership co-directors Dr. Gary Martin and Mr. Howard Gobstein, Dr. Suzanne Wilson delivered a talk in the first of the plenary sessions, “Staying the course: Transforming mathematics teacher preparation in responsive, responsible ways.” She challenged MTE-P to face our critics by using research, meaningful measures, coordinated cross-institutional efforts, and persuasive anecdotes to guide the public face of mathematics teacher preparation. Dr. Wilson related how lack of a common vision and meaningful measures place us at a disadvantage as we attempt to revise mathematics teacher education programs. Proxy measures may not be useful measures to help guide change in teacher preparation. O’Neil (2016) in her work “Weapons of Math Destruction” details how simple proxy measures commonly used to evaluate teacher work can cause great harm. O’Neil shows how simple, indirect and proxy measures can create systems that do not measure what they claim, inappropriately punish the targets (teachers and schools) of those measures, contribute little to improving quality of those systems, and resist transparency that might lead to meaningful change. Dr. Wilson stressed that we should continue work together to make small, well-documented interventions to incrementally move the field forward. We can transform teacher preparation by tweaking what we do based on current theory and guided by valid and reliable measures. MTE-P’s current efforts RACs are a very appropriate tool to take on this task. Dr. Wilson’s talk is reported in these proceedings by Robert Ronau.

After Dr. Wilson’s talk, each RAC provided a brief update on their progress over the past year. The remainder of this first afternoon of the conference was dedicated to RAC work time.

Panel Talks

The day concluded with a panel talk that chiefly served to foster conversation about the intersection of issues of equity, diversity, and social justice and the work of the MTE-Partnership. Approximately one-half the conference attendees joined this early evening discussion. Many questions and needs emerged during the discussions, and strong support for the development of a working group on equity, diversity, and social justice was expressed.

The morning of the second day began with the second panel talk, “A Deeper Dive into Plan-Do-Study-Act Cycles and Measures,” a discussion that focused on the application of PDSA cycles and the measures, tools and strategies developed to support the improvement science process. This plenary was designed to continue to increase the community’s understanding of the NIC research design. The presenters, Michele Iiams, Ruthmae Sears, Mark Ellis, and Marilyn Strutchens had recently attended a NIC workshop by Carnegie. Here, they shared both some important elements of the PDSA research cycles and their struggles and successes as their teams implemented the research cycles in their locales and shared the results across sites.

Addressing conference goal one, to build focus on transformational change, another panel talk focused on local efforts to transform teacher preparation at their institutions. The “Pathways to Program Improvement” plenary included Mark Ellis, Margaret Mohr-Schroeder, De Vonne Smalls, and Wendy Smith, with discussion by Robin Hill. Each member of this panel shared their experiences with respect of changing their secondary mathematics teacher preparation programs. Some of the challenges that they faced were similar; however, panel members described very different strategies and activities that drove change in their situation. All panel members indicated that the work has just begun and much more effort will be needed to reach their goals.

After lunch on the final day of the conference, three members of the national community concerned with the preparation of secondary mathematics teachers shared their experiences and reactions to the conference in a final panel talk, Karen King, Diana Suddreth, and Jim Lewis. These three individuals were invited to freely participate in the conference activities to assess the progress of MTE-P and to share their perspectives with the participants. Although the reactants praised the progress made by MTE-P, each was able to suggest additional perspectives and/or actions that the initiative might consider. For example, Dr. King suggested that MTE-P groups investigate research outside of mathematics education to learn about strategies and their potential unintended consequences with respect to diversity training. Ms. Suddreth encouraged MTE-P teams to broaden their engagement with their communities. Finally, Dr. Lewis suggested that the time may have arrived for MTE-P as an organization to reflect on the goals initially established by the partnership and on the work that has been accomplished to evaluate and re-assess the nature the of the task at hand, the fatigue of the participants after five years of continual struggle, and the transformative work that lies

ahead to strategically identify and pursue potential levers of evolution that could accelerate the effectiveness of the effort. The comments of these reactants are reported in these proceedings by Brian R. Lawler.

Research Action Cluster (RAC) Reports

Early in the growth of the MTE-Partnership, RACs were formed to address specific problems identified in the driver diagrams. RACs were designed to be the active agents of MTE-P, moving the effort from discussion to action. RACs provide the focus and impetus to take the initiative from organizing to theorizing to transforming.

In advance of the conference, each RAC submitted a “promo sheet” designed to orient new conference participants to the work of the RAC, and update long-time MTE-P members. These promo sheets are available online at the APLU MTE-P website, linked in these proceedings at the top of the RAC Reports. During the conference, the RACs had approximately 8 hours of structured work time. The RACs submitted reports for these proceedings that identified the work of the RAC to date, what was accomplished during the conference, and their next steps moving forward.

The Clinical Experience RAC (CERAC) consists of 24 partnerships organized into three sub-RACs: Methods, Paired Placement, and Co-Planning and Co-teaching (CPCT). The Methods sub-RAC is next focusing on creating a Lesson Design modules. Paired Placement is revising their workshop for teachers and preservice teachers, as well as developing manuscripts and seeking funding. And CPCT is working to scale up their measures work. All members of the RAC intend to pay explicit attention to equity and social justice issues in the next iterations of their modules. Each Sub-RAC developed its own research questions and PDSA cycles; however, overlapping interests, such as the Mathematics Teaching Practices, and measures, such as the MCOP², are used to drive a common focus across all partners in CERAC.

The Actively Learning Mathematics (ALM) RAC focuses on improving undergraduate mathematics in Pre-calculus through Calculus 2 (P2C2). ALM has developed class materials and a student survey that is available to all MTE-P partners. Currently, 14 partner institutions are participating in ALM. The ALM RAC reorganized to help manage growth, into course- and topic-specific groups such as Calculus I and Lesson Study in Calculus. In the coming year, one important element of their work will be to organize site visits.

The Mathematics of Doing, Understanding, Learning, and Educating for Secondary Schools MODULE(S²) RAC is focused on the development of prospective secondary mathematics teachers’ knowledge of mathematics content needed to support student learning. The MODULE(S²) RAC has developed modules in Geometry (3), Modeling (3), and Algebra (3 in progress) and Statistics (1). These modules are being piloted and are available for partner institutions to pilot.

The Marketing to Attract Teacher Hopefuls (MATH) RAC has completed the development of its recruiting materials which are available on their website at bit.ly/MATHImplGuide. Eleven partner institutions have developed PDSA cycles for recruitment at their local sites and shared their results at whole group meetings. In addition to sharing out, the RAC discussed new initiatives and next steps for the RAC with attention to both identifying funding to support recruitment work and research and to address the MTE-P commitment to equity and social justice.

The Secondary Teacher Retention & Induction in Diverse Educational Settings (STRIDES) RAC was recently formed and is off to a fast start. At this conference the STRIDES analyzed the results from a pilot survey ($n=66$) and used those results to revise a survey to be sent to students in all partner institutions. The STRIDES RAC divided into subgroups based on a change idea focus: (1) Long-Term Collaborative Groups for Early Career Teachers, (2) Role of Administrators and Site-Based Colleagues, and (3) Training & Supporting Teacher Mentors. Currently PDSA cycles are being developed within each of these three groups for implementation in the coming months.

Research Presentations

Research initiatives have emerged from the work of the RACs as team members designed and implemented studies about their work. As part of the announcement for the fifth MTE-P conference, for the first time, we included a call for research papers. These papers were reviewed and presented at the conference by the authors. Some presenters only elected to submit abstracts of their talk for the proceedings, others submitted a complete and revised paper for publication. The proceedings have grouped all the talks, abstracts and papers, as they were organized by themes for the conference. Here we report only on the full papers published in the proceedings, organized by themes as they were grouped for presentation at the conference. The papers are briefly mentioned below, grouped by these themes, and can be found in their entirety in the proceedings.

Building a common vision and/or partnerships across stakeholders

Garrett and Tameru report the results of a study examining the existing mathematics teaching practices at their institution. They categorized exam items from precalculus and calculus courses on five types of thinking necessary to respond. Students were infrequently expected to think beyond recall or application of known procedures.

Sears and Burgos investigated the process of collaboration among faculty members in the College of Education and the Department of Mathematics and Statistics in the development of middle school teacher's mathematical content knowledge for teaching. And Veneciano and Doerger report on a third effort to build common vision among the newly established MTE-P Hui team. They focused on recognizing commonalities and established shared goals.

Mathematical content knowledge (including mathematical knowledge for teaching)

Three papers in this collection focused on understanding developing mathematical understanding of future mathematics teachers. Burger and Markin report on a pilot study that explored conceptual approaches to learning Calculus I. They moderated their lessons to lead students to deeper understanding of targeted concepts by activating familiar prerequisite knowledge. Deka reported on the implementation of the Geometry Modules that were ready for pilot from the MODULE(S²) RAC. She shared how students reacted to the modules, the challenges experienced teaching the course, and discussed whether the approach seemed to make a difference in the preparation of mathematics teachers. Smith examined the mathematical content knowledge—specifically of geometry—of pre-service and high school mathematics teachers. Her findings suggested domains of Geometry Teaching Knowledge that could be emphasized in pre- service and professional development.

Knowledge and use of educational practices

Bowers and Smith report on how they modified the MCOP² observation protocol to examine the implementation of the products of the Active Learning Mathematics RAC at the university level. Their study suggested that the MCOP² student survey they created appears to be reliable. Secondly, the student survey appears to be useful for identifying what students believe are specific value-added aspects of active learning.

A second report by Smith provided a detailed description and the results of the implementation of ALM in the pre-calculus classes at University of Nebraska – Lincoln (UNL). Active learning has become well established at UNL, and the math department will extend this work to Calculus I and II classes during 2016-17. Recently they received an NSF grant to study mathematics department transformation using NICs as a lens.

Using the MCOP² as the Primary Observation Protocol for Assessing Teacher Candidates in Methods Courses and Student Teaching Practica by Zerkowski and Gleason describes the process used at their institution to move from a general observation protocol (used for all subjects) to using MCOP² for their mathematics teacher candidates. He reports that MCOP² provided a consistent rating with the other general observation tool used in their program.

Clinical experiences (including support for mentor teachers)

Biagetti & Oloff-Lewis investigated the *Variability in Clinical Experiences across the California State Universities* (CSUs). They report the similarities and differences of mathematics teacher preparation programs among 18 CSU campuses. They learned of surprisingly high variability across the campuses. For example, the number of times teacher candidates were observed during their first semester varied from one to ten times. They identified these great variations in program practices pose challenges to measurement efforts as well as transfer of effective practices, not only among the CSUS, but likely across the MTE-Partnership.

Brosnan & Sears report on their PDSA cycles for their Co-Planning and Co-Teaching SubRAC. Specifically, they investigate the ways in which co-planning and co-teaching strategies assist the mentor teachers and teacher candidates to focus their work on students' learning of mathematics? In addition to positive results beyond what was expected, they found that the structures of improvement science helped them engage in research with their partners as part of their efforts to transform the field experiences of their candidates.

A third report regarding clinical experiences, by Cayton and Grady, shared strategies to support co-teaching endeavors in their clinical experiences. In this context co-teaching is shared teaching between mentor teacher and student teacher. They used PDSA cycles to implement and study these co-teaching strategies. Their data collection tools include pre-surveys, a co-teaching observation protocol, a survey of strategies used, just in time surveys, and exit surveys. Preliminary results show that clinical teachers and interns reported the benefits of the co-teaching strategies.

Recruitment and retention of teacher candidates

Martinez, Taylor, and Amick report the results of a survey of mathematics teachers in a teacher preparation program or serving in their first three years of teaching regarding how early career teachers are being supported. This preliminary data collection effort serves to launch the work of the newly emerging STRIDES RAC, results of which were analyzed at the conference and used to inform next steps for the community.

Ordorica reported on her recruiting efforts at CSU Chico, and in particular how she drew upon the recruiting modules of the MATH RAC. She concludes that the Implementation Guide produced by the MATH RAC provided the infrastructure to make recruitment tasks feel more manageable and also provided a system for tracking the efforts. Whitfield also was concerned with recruitment issues, curious to understand decisions to teach—especially with regards to the impact of competitive scholarships the are used to draw in mathematics teachers. She learned that many students who had obtained a Noyce scholarship made their decision to teach far earlier than others, while non-scholars were more influenced by external factors. Whitfield's survey study provided some insights on recruitment factors that differed between Noyce and non-Noyce scholars.

Summary

The MTE-Partnership has taken the time (five years) for participants to select, study, and own problems as described in Gomez, Russell, Bryk, LeMahieu, and Mejia (2016). At this fifth conference RACs were able to offer more complete ideas and more fully validated materials. Most RAC materials have been tested and validated at multiple sites and these products remain available for other partnerships.

RACs have been able to create useful strategies and materials by targeting specific challenges in the preparation of secondary mathematics teachers. The new challenge facing partnerships is to refocus attention on the change efforts of program transformation. Not only to re-engage the many different constituents involved in secondary mathematics teacher preparation, but more immediately determining which materials, from which RACs, should they incorporate in their programs. Partnership teams reported that part of the problem is finding additional participants in their local groups to assume leadership roles with respect to incorporating new RAC ideas and materials in their programs. Although much has been done, more effort is needed and it is needed faster.

The elements of these proceedings of the Fifth Annual Mathematics Teacher Education Partnership document the maturation of the research communities and the implementation of the NIC research design overall. This maturation has made apparent the need to return to the larger goal of program transformation toward the “gold standard” identified in the community’s guiding principles (Mathematics Teacher Education Partnership, 2012). Further, elements of program transformation that are present in the guiding Principles that are not explicit being addressed by a RAC or in the present RACs are becoming apparent, such as the complex challenges of equity and social justice. The opportunity to return to these broader issues at the conference has re-energized and the joint purpose and identity across the partnership. We believe you will find evidence in the proceedings that follow that the four goals of the conference were successfully achieved.

References

- Bryk, A. S., Gomez, L. M., & Grunow, A. (2011). Getting ideas into action: Building networked improvement communities in education. In M. Hallinan (Ed.), *Frontiers in Sociology of Education* (pp. 127-162). New York: Springer Publishing.
- Bryk, A. S., LeMahieu, P. G., Gomez, L. M., & Grunow, A. (2015). *Learning to improve: How America’s schools can get better at getting better*. Harvard Education Press.
- Gomez, L. M., Russell, J. L., Bryk, A. S., LeMahieu, P. G., & Meija, E. M. (2016) The right network for the right problem. *Phi Delta Kappan*, 98(3), 8-15.
- Martin, W. G., & Gobstein, H. (2015). Generating a networked improvement community to improve secondary mathematics teacher preparation: Network leadership, organization, and operation. *Journal of Teacher Education*, 66(5), 482-493.
- Mathematics Teacher Education Partnership. (2014). *Guiding principles for secondary mathematics teacher preparation. (Revised Draft)*. Washington, DC: Association of Public Land Grant Universities. Retrieved from http://www.aplu.org/projects-and-initiatives/stem-education/SMTI_Library/mte-partnership-guiding-principles-for-secondary-mathematics-teacher-preparation-programs/File
- O’Neill, C. (2016). *Weapons of math destruction: How big data increases inequality and threatens democracy*. New York: Crown.
- Lawler, B. R., Ronau, R. N., & Mohr-Schroeder, M. J. (Eds.). (2016). *Proceedings of the fifth annual Mathematics Teacher Education Partnership conference*. Washington, DC: Association of Public Land-grant Universities.