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## Transformations Working Group

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From its inception, the Mathematics Teacher Education Partnership (MTE-Partnership) has had as its goal of transforming secondary mathematics teacher preparation in alignment with the Common Core State Standards and other rigorous standards. More recently, the goal has expanded to encompass the Standards for Preparing Teachers of Mathematics (Association of Mathematics Teacher Educators [AMTE], 2017). As the MTE-Partnership adapted the Networked Improvement Community (NIC) design (Bryk, Gomez, Grunow, & LeMahieu, 2015), two aims were set: (a) increase the supply and (b) increase the quality of secondary mathematics candidates, and a set of four primary drivers was identified. The MTE-Partnership disaggregated its work into five Research Action Clusters (RACs) addressing various aspects of the primary drivers, thus allowing the MTE-Partnership to “accelerate learning” through the power of the network (p. 141). This separation, however, results in a conundrum: Each partnership team generally is only involved in one (or perhaps two) of these RACs—meaning that they are addressing only some of the areas of critical need. To fully meet the aim of the MTE-Partnership, teams must shift toward more holistic program transformation and integrate the work of the partnership across multiple RACs into their local improvement efforts. However, accomplishing this integration will, in many cases, raise a number of significant challenges, including capacity and human capital, issues with the “will” to improve mathematics teacher preparation across stakeholder groups, and issues with institutional resources and support structures.

The Transformations Working Group was formed in Spring 2016, including members nominated by teams across the MTE-Partnership, with the following charge: “To establish a foundation for the MTE-Partnership’s strategic focus on overall transformation of secondary mathematics teacher preparation programs.” The approach proposed by the MTE-Partnership Planning Committee was that the Working Group design ways to support teams in creating “strategic pathways” to scale up incorporation of the MTE-Partnership’s improvements, with the ultimate aim of comprehensive program transformation with a focus on building capacity and infrastructure, collaboration with K–12 and other stakeholders, and cross-team collaboration. The group has explored the literature on institutional change (e.g., Corbo, Reinholz, Dancy, Deetz, & Finkelstein, 2016; Elrod & Kezar, 2016), conducted several surveys of the membership, and done extensive brainstorming on how to best support transformational change across the MTE-Partnership teams. In Spring 2018, the group submitted a proposal to the National Science Foundation to study five cases of program transformation by five of the local MTE-Partnership teams, while also testing potential knowledge generation and management systems (KGMS). An effective KGMS will better support scaling up and sharing knowledge associated with local transformation efforts.

Table 1

*Active Members of the Transformation Working Group*

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| Pier Junor Clarke, Georgia State University        | Margaret Mohr Schroeder, University of Kentucky          |
| Mark Ellis, California State University, Fullerton | Jennifer Oloff-Lewis, California State University, Chico |
| Dana Franz, Mississippi State University           | Robert Ronau, National Science Foundation                |
| Judy Kysh, San Francisco State University          | Wendy Smith, University of Nebraska-Lincoln              |
| W. Gary Martin, Auburn University                  | Marilyn Strutchens, Auburn University                    |
|  | Diana Suddreth, Utah State Office of Education           |

**Analysis of the Problem**

Even as mathematics teacher educators are working to improve aspects of their teacher preparation programs, they may have difficulty enacting changes needed to transform their programs in ways aligned with the MTE-Partnership Guiding Principles and AMTE (2017) standards. As AMTE notes, “these standards are aspirational... rather than describing minimal levels of competency needed by beginning teachers” (p. xi).

**Aim**

Based on its analyses of the problem space, the following aim is proposed to guide the emerging work in this area:

In order to attain the overall MTE-Partnership aim (“gold standard” as expressed in its Guiding Principles and number of candidates produced), *N* teams will be engaged in an *explicitly defined* continuous improvement process of overall transformation of their secondary mathematics teacher preparation programs by June 2019, in collaboration with other teams engaged in that process.

Several notes are made to better understand this statement:

- “Program” as used here includes the continuum from recruitment of future teachers of mathematics, undergraduate content coursework, early fieldwork experiences, methods coursework, and fieldwork with mentor teachers in partner school districts, to early career induction support.
- To meet the condition, there must be an explicit plan for improvement for the program, including methods of documentation.
- Continued attention is needed as to whether the Guiding Principles sufficiently define the gold standard, particularly with respect to induction, in light of AMTE’s new standards; see [www.amte.net/standards](http://www.amte.net/standards).
- *N* will initially be somewhat small (5), but then expand to be more aggressive (perhaps up to 80), and then ultimately encompass all MTE-Partnership teams.

**Driver Diagram**

A driver diagram is a tool that visually represents a group’s working theory of action to drive program improvement. The driver diagram creates a common language and coordinates the effort among the many different individuals joined together in solving a shared problem; see Figure 1. The first column includes the primary drivers, a representation of a community’s hypotheses about the main areas of influence necessary to advance the improvement aim. The second column includes the secondary drivers, a small set of system components that are hypothesized to activate each primary driver. The final column includes change ideas, alterations to a system or process that are to be tested through a Plan-Do-Study-Act (PDSA) cycle to examine their efficacy in improving some driver(s) in working theory of improvement (see <https://www.carnegiefoundation.org/resources/learning-to-improve-glossary/> for more information). The

Transformation Working Group sees its driver diagram as helping to provide a common vision for program transformation efforts. Each local program may find the relative importance and need of each driver to be different, but likely will need to attend to all of the drivers across program transformation efforts.

### **Current Progress**

Over the past year, the Working Group has engaged in two primary lines of activity: (1) engaging stakeholders, and (2) building a system to generate and manage knowledge across the MTE-Partnership.

#### **Engaging Stakeholders**

The local partnership teams represented in the Transformations Working Group met regularly across the past year (via video-conferencing). We collectively chose to focus on the first change idea:

*Engage stakeholders in developing common vision, values, and beliefs—important to get all stakeholders to buy-in, to develop a shared urgency for the need for transformation.*

Each team initiated PDSA cycles to track their progress in addressing this change idea. Having regular group meetings helped promote accountability: Knowing the working group would be meeting helped members make time for transformation efforts in between meetings and to remember to complete brief PDSA cycle reports. Regular conversations also helped members to learn from one another's efforts. Whole program transformation efforts can be daunting; members of the Transformations Working Group value starting small and have come to see that even setting a meeting with relevant stakeholders can be progress. For example, setting up a meeting with a new dean, and sharing the local team's vision and progress toward program transformation, thus getting the new dean on board with efforts, is a valuable step in the transformation process. As another example, convening a set of local stakeholders involved in secondary mathematics teacher preparation supports progress by building channels of communication. These first steps may seem small but building a foundation of a common vision among a broader range of stakeholders provides a launching point for transformation efforts.

#### **Knowledge Generation and Management System (KGMS)**

A second major change idea identified by the working group is the development of a system to manage the generation and management of knowledge across the RACs and working groups of the MTE-Partnership. This is essential to achieving the working group's aim and the MTE-Partnership goal of program transformation, by helping to manage the creation of emerging products and approaches developed by the RACs so that these are accessible across the partnership teams. "By formalizing the identification, capture, and organization of practical knowledge, a hub can accelerate the spread and use of the products of past improvement research" (Bryk et al., 2015, p. 158).

Over the past year, the Transformations Working Group spent considerable time investigating potential KGMS platforms. The group found quite a bit of research (mostly in the business sector) on knowledge management systems. However, such systems tend to focus on creating a library of resources. Our vision is a dynamic system that is not only a repository of collective knowledge, but also supports the generation and propagation of knowledge. As users try strategies in the KGMS, they will further add to the knowledge base about that strategy, thus enriching the information known about the strategy for the next user. Thus, a KGMS platform needs to not only store and organize files, but also allow discussion and iteration of these files. Based on our research, we seek a KGMS with the following features:

- Has an accessible front-end to support both retrieval and sharing functions;
- Includes a system to organize and codify content, such as tagging, to increase usefulness in retrieving information;
- Supports knowledge sharing through integrating editing, annotating, and commenting;
- Includes levels of access to support maintenance of standards of quality;
- Supports tools for collaboration, such as threaded discussions or chats; and
- Integrates with and captures in-person collaborations.

The working group has submitted a proposal to the National Science Foundation (NSF) to support work on program transformation, particularly the development of a KGMS. Funding for PDSA cycles to try out several platforms is part of that proposal, which supports trying out several different platforms to evaluate their relative usefulness. The top potential platforms under consideration are Trellis (MTE-Partnership's current platform), Google Sites/Google Drive, and Open Canvas. We suspect no single platform will suffice and meet the needs of all local partnership teams. And, if a team already has a functioning collaborative space online, we will not ask them to move over to a new system unless there is significant value added.

### Next Steps

The Transformation Working Group provided several opportunities to engage teams in discussion about program transformation at the 2018 MTE-Partnership Conference:

1. A working dinner included remarks from Susan Elrod, a leader in thinking about institutional change (cf. Elrod & Kezar, 2017), in conjunction with Marilyn Strutchens, who focused on equity issues.
2. A plenary session featured a panel presentation by five representatives of local teams working on different dimensions of program transformation. Each panelist shared a challenge faced, and how that challenge was addressed.
3. A discussion session was organized Monday evening to provide interested team members with an opportunity to discuss the work that has been done by the working group and prospects for participation in program transformation.

People interested in launching program transformation efforts for their local program are encouraged to use a common aim and driver diagram to help position initial change strategies; the driver diagram developed by the Transformation Working Group (see Figure 1) may be a useful resource for local teams in thinking what they might do within their local context. The discussion of a process for improving mathematics teacher preparation in the AMTE standards (2017, pp. 164–165) may also be of use. Change agents are encouraged to start small, and document efforts via PDSA cycles. Finally, change agents can encouraged to participate in monthly video-conference meetings with the Transformations Working Group, to share progress and learn from one another.

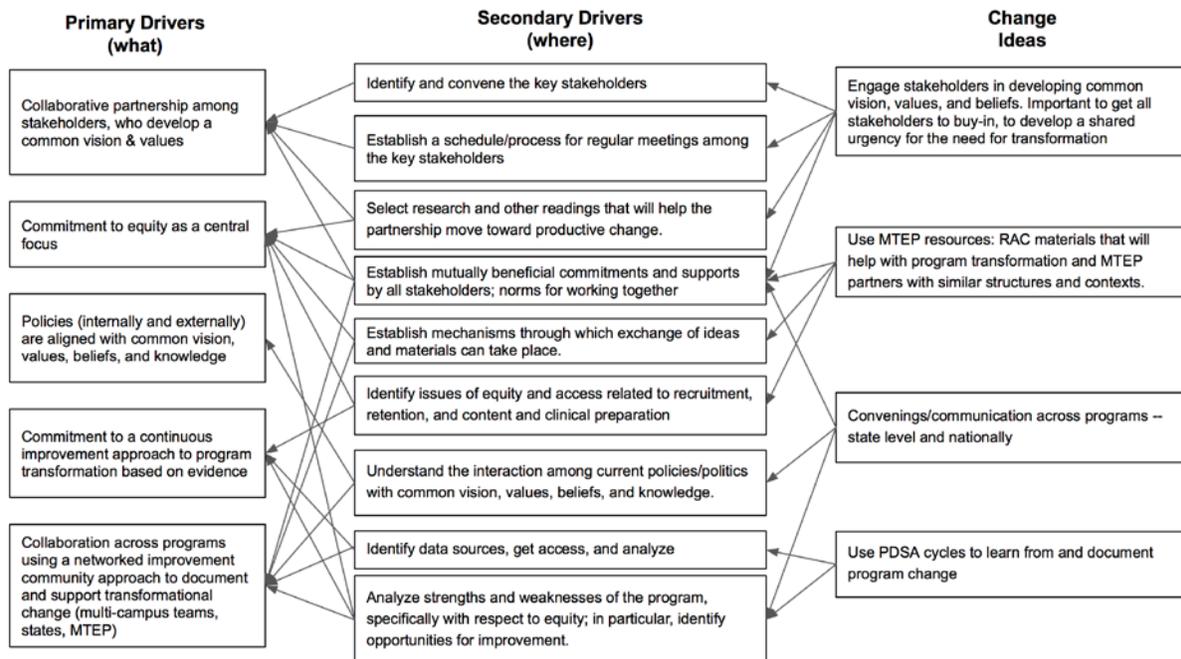


Figure 1. Driver diagram to guide progress toward the aim of program transformation.

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