
Keeping the Course: Transforming Mathematics Teacher Preparation in Responsive, Responsible Ways

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

Suzanne Wilson
University of Connecticut
suzanne.wilson@uconn.edu

Efforts to improve teacher education programs to ensure that they have the knowledge and skills to be successful in today's schools is complicated not only by the layers of scrutiny by a wide variety of stakeholders such as: government agencies, private organizations, politicians, and individual citizens, but also with the myth that teaching ability is an innate gift. Attempts to ensure that every teacher can teach are hobbled by this myth that teachers are born, not made. For example, actions taken in respond to government policies reflect this myth when the policy focus is on raising teaching standards, but the actions mutate into efforts to recruit high-flying graduates to the profession and encourage 'bad' teachers to leave. Rarely do such policies emphasize providing the structural and financial supports that teachers need within the context of where they work.

Teacher preparation is a sprawling enterprise, and has only grown larger and more diverse. The emergence of a variety of certification paths has increased the complexity and inconsistency of how teachers enter the classrooms. Within this environment, a long list of criticisms of teacher preparation appear in the public discussions about teacher preparation, including:

- Divide between theory and practice
- Teacher preparation courses are anti-intellectual (Mickey Mouse courses)
- Unnecessary barriers
- Not enough teachers of color
- Not enough intellectually elite teachers
- Not enough content knowledge
- Not enough clinical experience
- Not enough attention to issues of equity and social justice

These criticisms may be legitimate for some parts of that landscape; however, hyperbole, oversimplification, and overgeneralization are rampant. Nevertheless, this

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.

seemingly constant din contains real messages about improving teacher education. We must find effective ways to be responsive to these calls for change. How should we move forward amid this storm of negative discourse and calls for change? Which issues should we prioritize? Which audiences should we address?

These questions are particularly important to this group, the Mathematics Teacher Education Partnership (MTE-P) because of its overarching goal: *To **transform** secondary mathematics teacher preparation in order to ensure an adequate supply of new teacher candidates prepared to support their students' college- and career-readiness.* MTE-P recognized the national need for more and better mathematics teachers and initiated efforts to address that need.

Before attempting to answer the questions above, we should recognize some additional realities associated with changing educational practice in classrooms. Changing teaching practice is expensive; sometimes in terms of dollars, sometimes in terms of time commitment for preservice and inservice teachers, and sometimes in terms of student opportunities to learn. We must use these resources wisely by focusing on effective strategies for change. Thus, we need to find, develop, and use research-based ways to support preservice and inservice teachers. In short, theory is important, research is critical.

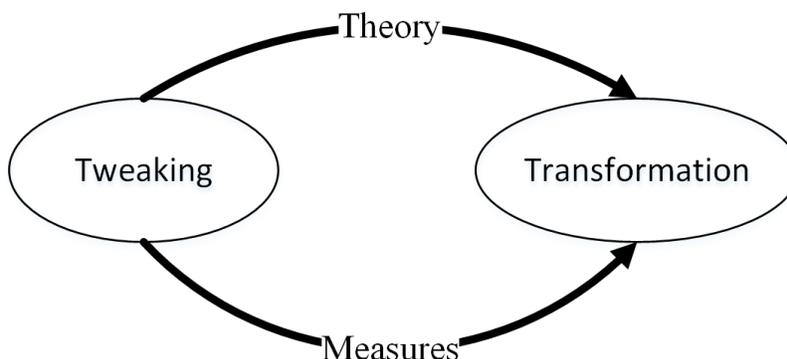


Figure 1. A Model to Support Consistent, Continuous Classroom Change

We also need instruments that address meaningful and agreed-upon outcomes before changes to educational preservice and inservice programs are launched. Finally, the process of transforming classrooms needs to take place in ways that are as least disruptive to the educational enterprise as possible. We can do this by taking small steps and producing incremental, but consistent change. Figure 1 shows one way to think about this idea. Innovation in classrooms should only be attempted with theoretical support and with measures that will demonstrate differences in the desired outcome. The point is to make small changes, tweaks, consistent and continuous over time, which allows for midcourse corrections and provides real change in the context of the work. In this way, we can approach classroom change responsibly with teachers as active leaders in the research.

Given this background, she returned to the two puzzles suggested earlier:

Puzzle 1: When and how to respond to criticism/new ideas?

Puzzle 2: What kind of evidence, arguments, and warrants do we need to muster?

Puzzle 1: When and how to respond to criticism/new ideas?

Teacher preparation programs have been criticized for lack of rigor, low productivity, lack of diversity, and as ineffective for preparing candidates to do the job of teaching. Few disagree that preservice teachers need robust and quality clinical practice, coursework, content knowledge for teaching, and knowledge and skills for culturally responsive/relevant teaching and to implement high leverage practices. On the other hand, many of these criticisms are based on anecdotal data, which works well for stirring up public sentiment but often fails to identify true challenges. To make progress in improving teacher education programs we need valid and reliable measures of mathematics teaching effectiveness and ways to implement those measures consistently and ubiquitously for comparisons within and across multiple groups. Otherwise we stumble blindly in our attempts at teacher education improvement as we react to symptoms not causes; exasperating the lives of the educators caught in the mix.

Recent research can provide help in instructional improvement, and to guide how to respond to such criticisms, over time, in responsible ways. Wilson drew from experiences with programs such as: Comprehensive School Reform, Chicago School Reform, The Silicon Valley Mathematics Initiative (SVMi), Long Beach Teacher Prep Alliance, and Reading First. Teacher education programs that seem to be successful use metrics specific to the context, such as: diversity of candidate pool, location of graduates across the state/country, retention rates, diversity of students taught by graduates, measures of content knowledge for teaching, progress charts on mastering high leverage practices, principal or supervising teacher ratings, and perseverance. From these research activities, we've compiled a list of effective strategies for instructional improvement:

- Mobilize and sustain support: Strong support matters. the absence of will leads to withering of reforms;
- Identify and deploy a set of policy instruments/institutions: Coordinated policy instruments matter;
- Implementation requires the balance of capability building and accountability;
- Provide teachers/teacher educators with opportunities to develop adaptive expertise: Policies must motivate and engage teachers while also building capability;
- Build and enable cultural and community support: Policy implementation depends on social relations among teacher educators, teachers, schools, state departments, and communities; and

- Produce outcomes with demonstrable effects: Persuasive demonstrated effects are needed for both teachers and other groups essential to policy implementation.
- p.s. None of this happens without relational trust....

Puzzle 2: What kind of evidence, arguments, and warrants do we need to muster?

We need valid and reliable sources of evidence/warrants/arguments for individual candidates as well as for our programs. We need to develop a database, an infrastructure, and a culture to manage, share, and interpret that data. We also need to identify those issues that are about values and are not about evidence. Evidence is important when entering the public discussion, but evidence is not ALL important. We also need stories. We must learn to persuade with data, stories, trust, and engagement with stakeholders. Finally, we should collaborate with others by sharing activities, measures, results, and data within and across educational institutions. We cannot change what we cannot measure, but our measures results are more valid and convincing if they span multiple populations and contexts. In research, (sample) size matters.

One way to engage stakeholders is through the development of strategies to present complex and numerous data (and stories) in attractive and understandable ways, that demonstrate our journey towards teacher preparation improvement. We must be clear about our approach to improvement by sharing our model of small, research-based, well-documented, teacher-led, reliably-measured trials in classrooms.

We need common metrics for teacher education programs that specifically address the concerns of the stakeholders such as: diversity of candidate pool, location of graduates across the state/country, retention rates, diversity of students taught by graduates, measures of content knowledge for teaching, progress charts on mastering high leverage practices, principal or supervising teacher ratings, and perseverance.

Putting it all together

If we are to keep the course, that is transform mathematics teacher preparation in responsive, responsible ways in the current turbulent environment, we must be transparent, systematic, and persistent in our efforts. As a community, we must agree on a vision that is neither too narrow nor too rigid, but nonetheless focused, democratically robust, mathematically-sound, and ambitious (both in terms of the mathematics and reaching the needs of all students). We also must understand that enabling that vision will take long-term, collective work in protected space with adequate resources (including time and trust). We need to take lessons from the past both within teacher education and more generally in education reform. We must address teacher educator capacity, will, and energy to develop, guide, and evaluate improvement-based programs. Infrastructure that enables the use of varied expertise and engagement, and a culture of trust and critique must be built and nurtured. Mathematics

teacher education programs need ways to gather information that allow for accurate accounts of progress and problems, including robust assessments that provide helpful information about both what students understand and what teachers do.

To approach teacher education in this way we need to:

- Conceptualize reforms as experiments that need sound research that unfolds over time and goes hand-in-hand with classroom practice,
- Create norms and values that embrace “steady work,”
- Invest in the development of social trust,
- Maintain the will and focus in a noisy, conflict-full environment,
- Include the broadest set of critical stakeholders possible,
- Invest in the development of a broad set of indicators that speak to multiple stakeholders.

MTE-P has a good start in this process as we are working toward a common vision for mathematics teacher preparation that spans 101 universities and 142 K-12 schools and districts across 30 states. Now in its fifth year, the community has learned to work together, to persist in this process, to look past the noise as we develop meaningful measures, and to continue to build partnerships and recruit collaborators. There is much at stake in the current politically charged environment in which we engage in mathematics teacher preparation. As educators, we can no longer work alone in our local district or community to create the impact needed for meaningful change. We must work together to pool our efforts and magnify our results. MTE-P is a good start for this endeavor.