

## Designing Learning Organizations for Instructional Improvement in Mathematics

### Background

The overall goal of this research project is to understand what it takes to support mathematics teachers in improving the quality of their mathematics instruction at the scale of large, urban US districts. The project has two major phases.

### *Phase 1: 2007–2011*

The first phase of the research project was conducted in collaboration with four large, urban districts that serve a total of 360,000 students. The districts were all implementing inquiry-oriented instructional improvement initiatives in middle-grades mathematics (e.g., three of the four districts adopted the *Connected Mathematics Project 2* text). The participants were:

- 6–10 schools in each of 4 districts
- 30 middle school mathematics teachers in each district
- 15–20 school and district leaders in each district

The data we collect (in both phases) allow us to document (1) teachers' instructional practices, visions of high-quality instruction, mathematical knowledge for teaching, and views of students' mathematical capabilities; (2) mathematics coaches' practices, visions of high-quality instruction, mathematical knowledge for teaching, and views of students' mathematical capabilities; (3) school and district leaders' instructional leadership practices, visions of high-quality instruction, and views of students' mathematical capabilities; and (4) supports for teachers', mathematics coaches', and school leaders' development of effective practices (e.g., district professional development, interactions with more accomplished peers). In addition, we have access to district student achievement data.

Each year, we provided the four districts with feedback on how their instructional improvement efforts in middle-grades mathematics were playing out in their schools, and made actionable recommendations about how their strategies might be revised to make them more effective. During Phase 1, the leaders in all four districts acted on our recommendations and, as a consequence, we became co-designers of their improvement strategies.

The primary product of the first phase was a provisional theory of action that can inform instructional improvement efforts in mathematics at the level of large urban districts.

### *Phase 2: 2011–2015*

The second phase of the project involves a continued four-year collaboration with two of the districts that participated in Phase 1. The primary goal in this phase is to test, revise, and elaborate conjectures inherent in the theory of action for district-wide instructional improvement developed in Phase 1. To this end, we are collaborating with district leaders to co-design and co-lead coordinated professional development for teachers, coaches, and school leaders. The participants are:

- 12 schools in each of 2 districts
- 60 middle school mathematics teachers in each district
- 25–30 school and district leaders in each district

During Phase 2 we will continue to provide feedback to districts every year on how their instructional improvement efforts in mathematics are playing out in their schools, and we will continue to make actionable recommendations about how their strategies might be revised to make them more effective.

## **Theory of Action for Instructional Improvement in Mathematics at the Scale of a Large Urban District**

In its current iteration, the theory of action includes five interrelated components: (a) coherent system of supports for inquiry-oriented teaching that include curriculum materials and instructional guidance instruments such as curriculum frameworks; (b) pull-out teacher professional development and teacher collaborative meetings; (c) mathematics coaches' provision of job-embedded support for teachers' learning; (d) school instructional leadership in mathematics; and (e) school system leadership to support the development of schools' capacity for instructional improvement. A central aspect of the theory of action concerns the coordination of professional development across contexts (district-based and school-based) *and* across role groups (teachers, mathematics coaches, and school leaders). We are currently investigating conjectures about coordinated professional development for teachers, coaches, and school leaders that focuses on high-leverage instructional practices in Phase 2 of the research project.

### **For more information, including publications:**

Please see the project's website <http://www.peabody.vanderbilt.edu/mist.xml>

### **Contact Information:**

Erin Henrick, Project Manager and Co-PI, Vanderbilt University  
[erin.henrick@vanderbilt.edu](mailto:erin.henrick@vanderbilt.edu)

Kara Jackson, Assistant Professor of Mathematics Education, McGill University  
[kara.jackson@mcgill.ca](mailto:kara.jackson@mcgill.ca)

Paul Cobb, Professor of Mathematics Education, Vanderbilt University  
[paul.cobb@vanderbilt.edu](mailto:paul.cobb@vanderbilt.edu)

Thomas Smith, Associate Professor of Public Policy and Education, Vanderbilt University  
[thomas.smith@vanderbilt.edu](mailto:thomas.smith@vanderbilt.edu)

Ilana Horn, Associate Professor of Mathematics Education, Vanderbilt University  
[ilana.s.horn@vanderbilt.edu](mailto:ilana.s.horn@vanderbilt.edu)