Developing A System of Practical Measures, Routines and Representations to Inform and Enhance Middle-Grades Mathematics Instructional Improvement Initiatives

**System of Practical Measures, Routines & Representations**

**Measures of Key Aspects of High-Quality Mathematics Instruction**
- rigor of the task
- launch of the task
- small-group work
- whole-class discussion

**Measures of Key Aspects of High-Quality Professional Learning (in progress)**
- one-on-one coaching
- collaborative professional learning

**Infrastructure for Storing, Analyzing, and Representing Data**
- Edsight.io

Our team is comprised of three Research-Practice Partnerships (RPPs) between U.S. school districts and universities.

**Goal**
To develop a system of measures, routines, and representations that can support the implementation of strategies aimed at improving the quality of middle-grades mathematics teaching, and thus student learning.

**Theory of System-Wide Improvement**
Prior research: Identify potentially productive instructional improvement strategies
- Coherent instructional system
- School leadership
- District leadership

Current research: Reliably implement improvement strategies

**Practical Measures for Improvement**
- Unobtrusive and minimally burdensome to users
  - Quick to administer (< 3 minutes)
  - Easy to analyze
  - Enable practitioners to assess and adjust their practices
  - Intended for improvement work, not for accountability purposes
  - Used to determine whether a deliberate change in practice is an improvement
  - Analyses indicate the use of the measures can enhance the quality of supports for teachers’ learning

**Partnerships**
Our team is comprised of three Research-Practice Partnerships (RPPs) between U.S. school districts and universities.

**Multiple Users and Routines of Use**
The measures & representations have been used to inform the implementation of a range of improvement strategies in our partner districts, including:
1. curriculum guide writing initiative
2. one-on-one coaching
3. professional development program

Routines (e.g., protocols) have been developed to support using the resulting data to guide inquiry into mathematics teaching and professional learning

**Attending to Validity**
The measures were developed through multiple rounds of design, analysis and revision:
- Initial design
- Review existing items
- Meet with partners
- Meet with users
- Observe use of measures in practice
- Collect data to guide inquiry
- Conduct quantitative and qualitative analyses
- Revise survey items
- Conduct follow-up interviews & surveys

**In Design**
- Observe a range of instructional contexts: classroom, whole-class, whole-group, collaborative
- Interview students, teachers, and PD facilitators
- Formal qualitative analyses of interviews & survey responses

**In Use**
Systematically investigating the inferences made and actions taken by the various users in relationship to the specific purposes, key aspects of school and district contexts, and users’ current perspectives and practices.

This work is supported by the National Science Foundation (grants #1719744, #1640852, #1622238, and #1640863). Any opinions, findings, and conclusions or recommendations expressed in these materials are those of the authors and do not necessarily reflect the views of the National Science Foundation.