Efficacy of *Prime Online*:
Teacher Professional Development for Inclusive Elementary Mathematics Classrooms

Project Summary/ Abstract

Purpose, Goal, and Topic. The purpose of this Goal 3 efficacy study in the Mathematics and Science Education topic is to assess the impact of an online teacher professional development (PD) intervention, *Prime Online*, on teacher learning, teacher practice, and students' mathematics achievement. Convincing research evidence suggests that a substantial portion of the variability in students' mathematics achievement gains is due to the *teacher*, suggesting a need for effective PD for teachers of mathematics.

Setting. This research will take place in elementary schools across the state of Florida.

Sample. We will recruit 120, 4th grade teachers with general and/or special education certification who teach the general education, grade-level, mathematics curriculum to students with and without mathematics learning disabilities (MLD) and other struggling mathematics learners. Approximately 1,800 students will also participate in the study.

Intervention. *Prime Online* is year long, fully-online, PD intervention composed of 35 learning modules for building 4th grade teachers' (a) content knowledge for teaching mathematics, (b) understanding of the learning needs of students with MLD and other struggling mathematics learners, and (c) knowledge of and skill in using mathematics evidence-based practices and progress monitoring within a model of classroom-based teacher research.

Control Condition. Teachers in the business-as-usual (BAU) comparison condition will receive mathematics PD as established by their school districts. After completion of the study, comparison teachers will have access to *Prime Online*, including all materials.

Research Design and Methods. The proposed design will be a pretest-posttest, randomized efficacy trial with one fixed, between-subjects factor. The between-subjects factor comprises two conditions: (a) the *Prime Online* PD intervention, and (b) the BAU comparison. The study will involve two cohorts of 120 teachers—one for each of the two implementation years of the study. In each cohort, teachers will be randomly assigned to either the *Prime Online* PD or BAU condition. For the student-level variables, the design is a two-level randomized efficacy trial with Level-1 comprising students and Level-2 comprising teachers. For teacher-level dependent variables, the design is a person-level randomized efficacy trial. Moderators and mediators will also be investigated. Fidelity of implementation will be assessed using an observational checklist and a survey of practices in both the intervention and comparison conditions.

Key Measures. Teacher measures include the *Content Knowledge for Teaching Mathematics* (CKTM) measures, the *Prime Online Beliefs Questionnaire*, the *Prime Online Practices Questionnaire*, the *Mathematics Teaching Efficacy Belief Instrument* (MTEBI), and we will collect classroom video recordings using the *Mathematical Quality of Instruction* (MQI) with both intervention and comparison group teachers. Student outcomes include the *Test for Understanding Fractions* (TUF) and the *Florida Standards Assessment* (FSA) in mathematics.

Data Analytic Strategy. This study will employ multilevel modeling to test for the effects of study condition while controlling for variance associated with teacher and class effects. Structural equation modeling (SEM) will be used to test the moderation of the treatment effect on the CKTM by teacher beliefs, and the moderation of the treatment effect on students' mathematics achievement by teachers' pretest scores on the MTEBI. SEM will also be used to explore the mediation of the treatment effect on students' mathematics achievement by teacher-level variables (i.e., the CKTM and the MQI).