



**Mathematics Reform**  
**POLICY BRIEF**

Using Evidence-Based Practices for Professional Development in an Urban Setting

**Embedding Evaluation to Enhance and Understand Impact in a Dynamic Learning Environment**

*This policy brief was developed by Public Works to support the Fremont Achievement in Mathematics for Excellence (FRAME) grant, a project of the UCLA Mathematics Project at Center X and Fremont High School in Los Angeles.*

**EVIDENCE-BASED PROFESSIONAL DEVELOPMENT**

Over the last several decades, researchers studying professional development (PD) for teachers have begun to place more attention on the importance of identifying and replicating effective techniques and strategies that help in-service teachers continue to learn and grow in the classroom. As a result, the term “evidence-based” professional development has been used to describe approaches that seek to maintain high levels of accountability and performance in professional development settings by evaluating their efforts with objective data. Indeed, by engaging in this process of refinement through evaluation, professional development practitioners hope to be able to learn from one another’s efforts and results, with the ultimate goal of enhancing ongoing learning in the teaching profession through programs that can be replicated in other settings.

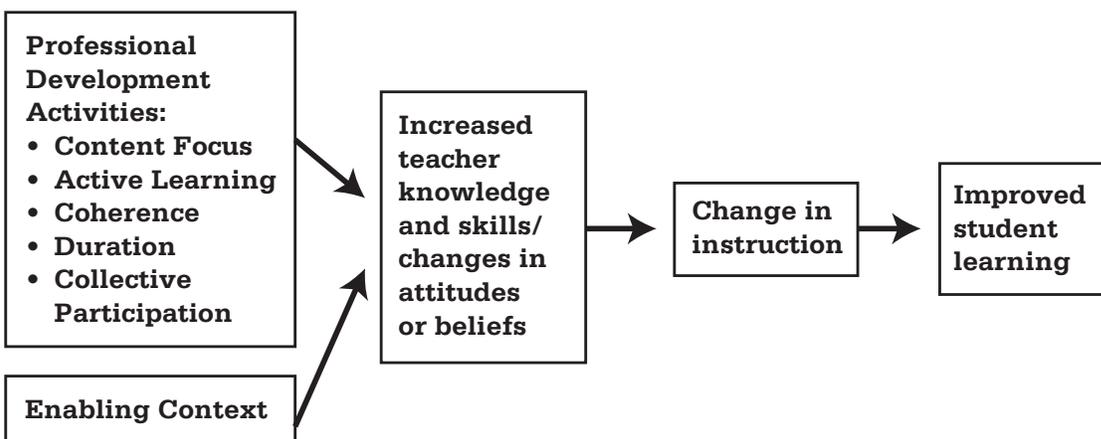
However, despite the intention to use evidence in introducing specific strategies to new settings, improving student outcomes does not usually follow a predictable and linear path in the typical timeframe of a professional development program or grant-funded initiative. This is because of limitations in both establishing reliable and valid measurements and on-the-ground implementation factors that have a substantial impact on how professional development results may be understood.

One example providing a lens on how these issues played out in an urban setting is the professional development program for teachers called the Fremont Achievement in Mathematics for Excellence (FRAME), which occurred over four years at Fremont High School in the Los Angeles Unified School District. FRAME was developed through a partnership of the school and district with the University of California at Los Angeles (UCLA) Mathematics Project at Center X and funded by the California Department of Education’s Improving Teacher Quality State Grants Program (ITQ) State Agency for Higher Education (formerly the California Postsecondary Education Commission).

**STUDY DESIGN**

One aspect of the FRAME project was to have a rigorous evaluation of the professional development initiative conducted by a third party evaluator, which was conducted by Public Works (PW) for the duration of the grant. In order to understand the conditions under which evidenced-based professional development (PD) produces the best results, this evaluation investigated not only the outcomes, but also the implementation of PD programs. This policy brief is designed to contribute to the ongoing discussion about which programmatic professional development conditions lead to effective implementation, and, ultimately, produce the best results in real-world urban settings.

To understand how professional development programs succeed or fail in real-world settings, PW broke down and examined the several-step process by which PD can affect student achievement. PW conceptualized this process as the logic model, derived from Desimone (2009) and Guskey (1986), illustrated in Figure 1 below, and used this model to guide the research design.<sup>1</sup>



<sup>1</sup> Guskey, T. R. (1986). Staff development and the process of teacher change. *Educational Researcher*, 15(5), 5–12; Desimone, L. M. (2009). Improving impact studies of teachers’ professional development: Toward better conceptualizations and measures. *Educational Researcher*, 38(3), 181–199.

## Elements of FRAME Professional Development Support

- **Institutes and In-Service Professional Development.** *Mathematics teachers at Fremont participated in annual professional development institutes and in-service days during the school year. These activities were customized each year by the UCLAMP project staff, along with other invited professional development providers.*
- **On-site mathematics coaching.** *A full-time mathematics coach from UCLAMP who developed additional strategies for supporting teachers was employed full-time at Fremont. Strategies developed by Fremont's full-time mathematics coach included individual classroom-based support, team planning, and an adaptation of lesson study.*
- **Supervision of Mathematics aligned to PD.** *Fremont High School hired a full-time administrator who was primarily responsible for supervising and supporting the Mathematics Department at the start of the grant, which was then later supported by grant funds.*

The boxes in the figure from left to right illustrate how several stages of measurable programmatic components and conditions are involved in the implementation of professional development programs before student outcomes are affected. First, teachers need to receive effective training that succeeds in increasing their knowledge or skills. The activities that comprise this training can be divided into five measurable core features: content focus, active learning, coherence, adequate duration, and collective participation.

Research has shown that, in addition to including these five research-based core features in its implementation, successful PD needs aspects of the school and district context to enable success. PW refers to this feature of implementation as enabling context. Derived from active implementation frameworks (AIF) used in implementation research predominately conducted in the field of public health, enabling context refers to how school and district rules, schedules, resources, staffing, and other policies can more or less enable the implementation of research-based practices with fidelity.<sup>2</sup>

Professional development activities that include these core features and are implemented in an enabling context should lead to measurable teacher learning. Armed with new skills, techniques, content and pedagogical knowledge—as well as possibly new attitudes or beliefs about how students learn—teachers can alter their classroom behavior or instructional practice, which, in turn, can lead to improved student learning.

Using this conceptual framework as a guide, PW collected a combination of documentary evidence, group interviews, observations, surveys and administrative student achievement and behavior data to assess the impact FRAME had on teaching and learning at Fremont High as the school changed over time in response to external factors.

## STUDY FINDINGS

Public Works evaluated FRAME both for implementation and effectiveness outcomes. Major findings are presented below.

### Evidence of Implementation Outcomes

- *FRAME's core professional development features – content focus, active learning, coherence, duration and collective participation – were implemented with a variable, but generally high level of quality and fidelity.*
- *Overall, the initiatives that occurred during FRAME – including school restructuring, the establishment of a traditional calendar, and a decrease in the school's population – probably enabled FRAME's implementation more than they hindered it.*
- *Despite challenges surrounding the grant's implementation, data collected throughout FRAME's evaluation suggests that it provided a sense of continuity that was valued by participating teachers.*

### Evidence of Effectiveness Outcomes

- *Teachers participating in FRAME increasingly perceived themselves to be fairly or very confident and prepared when it came to teaching almost all of the mathematical content areas and instructional strategies in the program.*

## Research Questions Guiding the Study

- *How did FRAME implementation (in terms of content focus, active learning, coherence, duration, and collective participation) and the context of implementation change over the course of the project?*
- *How did teacher mathematics content knowledge and pedagogical content knowledge at Fremont High School change?*
- *How did mathematics instructional practice at Fremont High School change?*
- *To what extent did FRAME have an impact on student mathematics achievement (California Standards Test and California High School Exit Exam)?*



2 Fixsen, D. L., Naoom, S. F., Blase, K. A., & Friedman, R. M. (2005). Implementation research: A synthesis of the literature.

- *Mathematics instruction changed at Fremont for the better.* There was evidence of substantial and important differences between Fremont mathematics classrooms in 2011, and those same classrooms two years later.
- *Year-to-year, students made progress.* From 2010-11 to 2011-12, 17% of students improved at least one proficiency level on the CST. And from 2011-12 to 2012-13 25% of Fremont students improved at least one proficiency level. The proportion who declined shrank substantially—from 43%, to 23%.
- *Number of professional development hours attended had a significant positive correlation with mathematics CST student scaled scores all three years.* Students of participating teachers could expect their mathematics CST scaled scores to increase about 2/3rds of one percent (.64%) for every additional hour of teacher participation in professional development.
- *Attendance improved.* The overall 96% Attendance Rate (students missing seven days of school or fewer) rose from 38% in 2010-11, to 43% in 2011-12, to 55% in 2012-13.

## **WHAT WE CAN LEARN FROM FRAME**

Evaluating FRAME's teacher learning and student achievement outcomes through the lens of the grant's implementation outcomes taught us several important lessons about how implementation factors impact the effectiveness of professional development activities.

*Identification of instructional priorities at the beginning of the project was important for subsequent implementation and data collection.* Identification of school and district instructional priorities supported the development of tools for data collection that consistently provided data to the project about the status of implementation, despite all of the unanticipated changes taking place at the school.

*The hiring of an administrator to support professional development and the math department, alongside an on-site coach, was critical to teacher engagement in the process.* FRAME created these two positions at Fremont to provide day-to-day support for participating teachers in their implementation of professional development priorities. In their survey responses, teachers indicated that both of these support structures were highly valued—especially for the extent to which they helped teachers feel prepared for their transition over to Common Core.

### **Fremont's Story as Context for Implementation**

*Enabling context refers to institutional and organizational factors surrounding a grant's implementation that are beyond the control of the grant staff. Thus, a grant's enabling context includes how school and district rules, schedules, resources, staffing, and other policies either enable or hinder grant activity. In many cases, shifts in the context for implementation can have impacts on school environments that should significantly influence how the results from those initiatives are understood.*

*In December 2009, Fremont High was among the first of several schools in the district to undergo reconstitution. The necessity of a drastic re-structuring was attributed to Fremont's "culture of failure," which had been characterized by persistently low student test scores, high rates of absenteeism, and low graduation rates. Fremont opened the school year in Fall 2010 with only 50% of the prior year's staff.*

*Within a year, staff layoffs during the economic recession removed many of the new teachers who were hired into the school. New administrative leadership in 2011-12 began to reinvigorate the school's Small Learning Communities (SLCs) emphasizing other instructional reforms.*

*In the years preceding FRAME, LAUSD launched an ambitious facilities campaign designed to ease crowding on its campuses. This campaign came to fruition during FRAME's grant period, resulting in the opening of two new high schools in the neighborhood. As a result, Fremont's enrollment declined from 4,337 students in 2010-11 to 2,515 students in 2012-13.*

*When FRAME began, Fremont was a year-round school organized around three tracks. The transition to a traditional 180-day school calendar during the last year of implementation was a welcomed change amongst FRAME participants and Fremont at large.*



*Impact on teaching was mixed—as one might expect.* Data analyzed for this project included valuable information from both teachers about how prepared they feel they are from the beginning to the end of the project, and from observations of teaching in the classroom. Because this project was designed as an intervention customized to the needs of a particular school, the data demonstrates how professional development is never “done,” but is part of an ongoing cycle of improvement that can be put in place.

*Professional development does not occur in a vacuum, and teacher morale is affected by school site shifts and budgetary constraints.* While teachers reported high levels of confidence related to their preparation for teaching various components of math content knowledge, declines in several other aspects of teacher morale show that results can fluctuate from year to year and are an important lens to ongoing implementation.

*Viewing student outcomes as only “slight successes” misses the larger point and the general trend toward improvement.* A robust research design will take into account how implementation factors influence teacher and student outcomes. Underperformance in urban schools like Fremont represents a large-scale societal issue; we should not expect complex, indirect interventions like teacher professional development to have a dramatic impact on student test scores. A modest improvement in achievement that is linked soundly to a grant’s professional development activities can be an indicator of success.

#### **About the UCLA Mathematics Project (UCLAMP)**

The UCLA Mathematics Project (UCLAMP) is part of a statewide program that strives to make a positive impact on math teachers and their students. The project’s goal is to enhance the skill sets of K-12 math teachers who can in turn increase their students’ ability to succeed. Based on twenty-five years of experience UCLAMP has developed a program that is helping to make significant differences in the quality of teaching in urban schools. More information can be found at <http://centerx.gseis.ucla.edu/math-project>.

#### **About Public Works**

Public Works is a non-profit corporation founded in 1998 dedicated to working with schools, government agencies and the non-profit sector by providing services and resources to organizations that educate and inform children, youth and families. Our mission is to put data into action, transforming statistics into information that informs decisions, improves accountability and communicates the impact of public policy. Public Works serves as an evaluator for many professional development initiatives. More information can be found at [www.publicworksinc.org](http://www.publicworksinc.org).



90 N. Daisy Ave.  
Pasadena, CA 91107  
626.564.9890