RESPONSIVE MATH TEACHING

Building Sustainable Math Instructional Leadership in Network of Elementary Schools

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Project Overview Video

Research and Development Goals

Context

Capacity-Building Model

Responsive Math Teaching

Research Questions

Emerging Findings

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Impact

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This project is funded by the National Science Foundation, grant # 1813048. Any opinions, findings, and conclusions or recommendations expressed in these materials are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

OVERVIEW

Four Year Research-Practice Partnership

- Development Goals:
  - Increase the capacity of school-based mathematics instructional leaders in a network of 14 public elementary schools
  - Develop tools and routines to support instructional improvement
  - Build a networked improvement community
- Research Goals:
  - Understand how teachers learn to take on instructional leadership roles
  - Test and improve a model for sustainable networked instructional leadership

THE SCHOOL DISTRICT OF PHILADELPHIA

Penn GSE
GRADUATE SCHOOL OF EDUCATION
UNIVERSITY of PENNSYLVANIA

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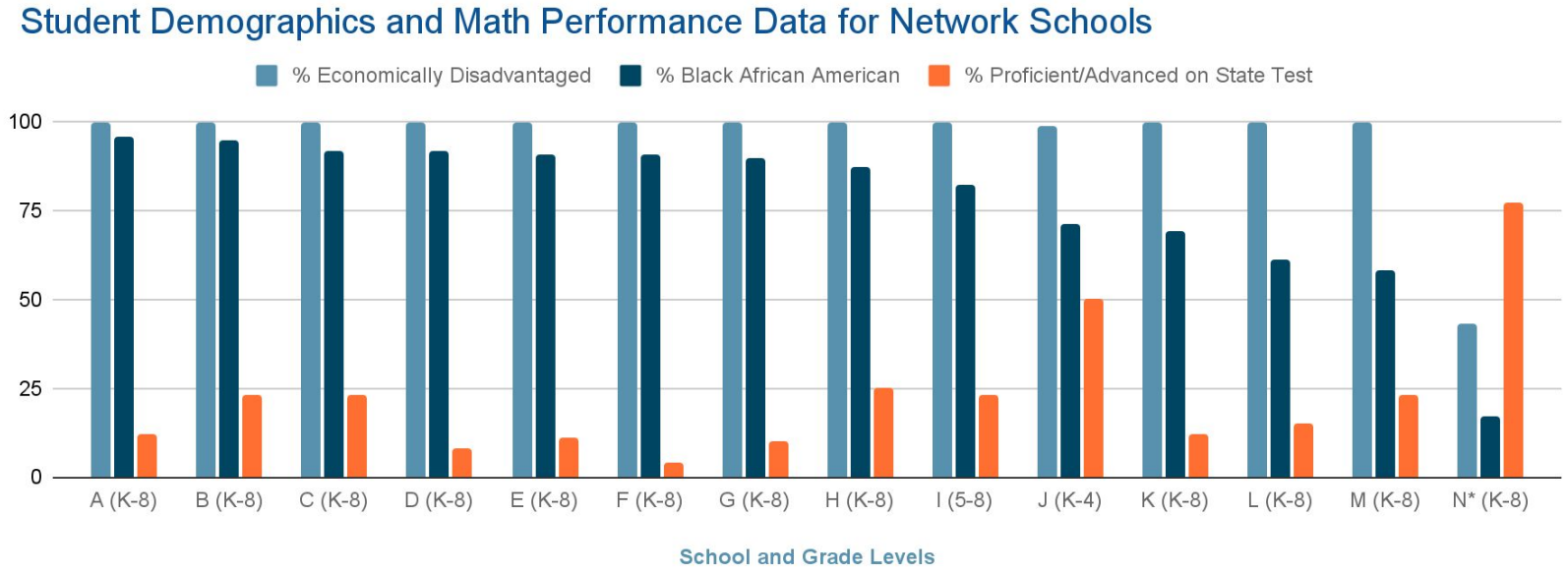
OVERVIEW

Context: Network of 14 Elementary Schools

13 out of 14 in economically disadvantaged neighborhoods



**School N is a university-assisted school benefitting from 20 yrs of investment in the neighborhood and school*

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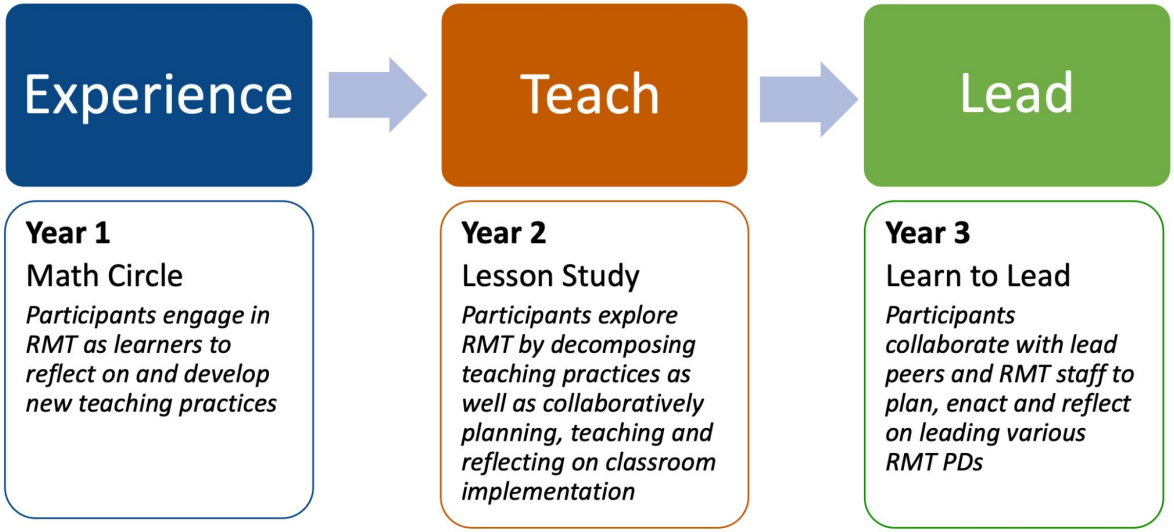
Capacity Building Model

- Developing a shared vision of high quality math instruction
- Providing ongoing professional development
- Support for classroom implementation
- Building a culture of instructional improvement
- Planning for sustainability



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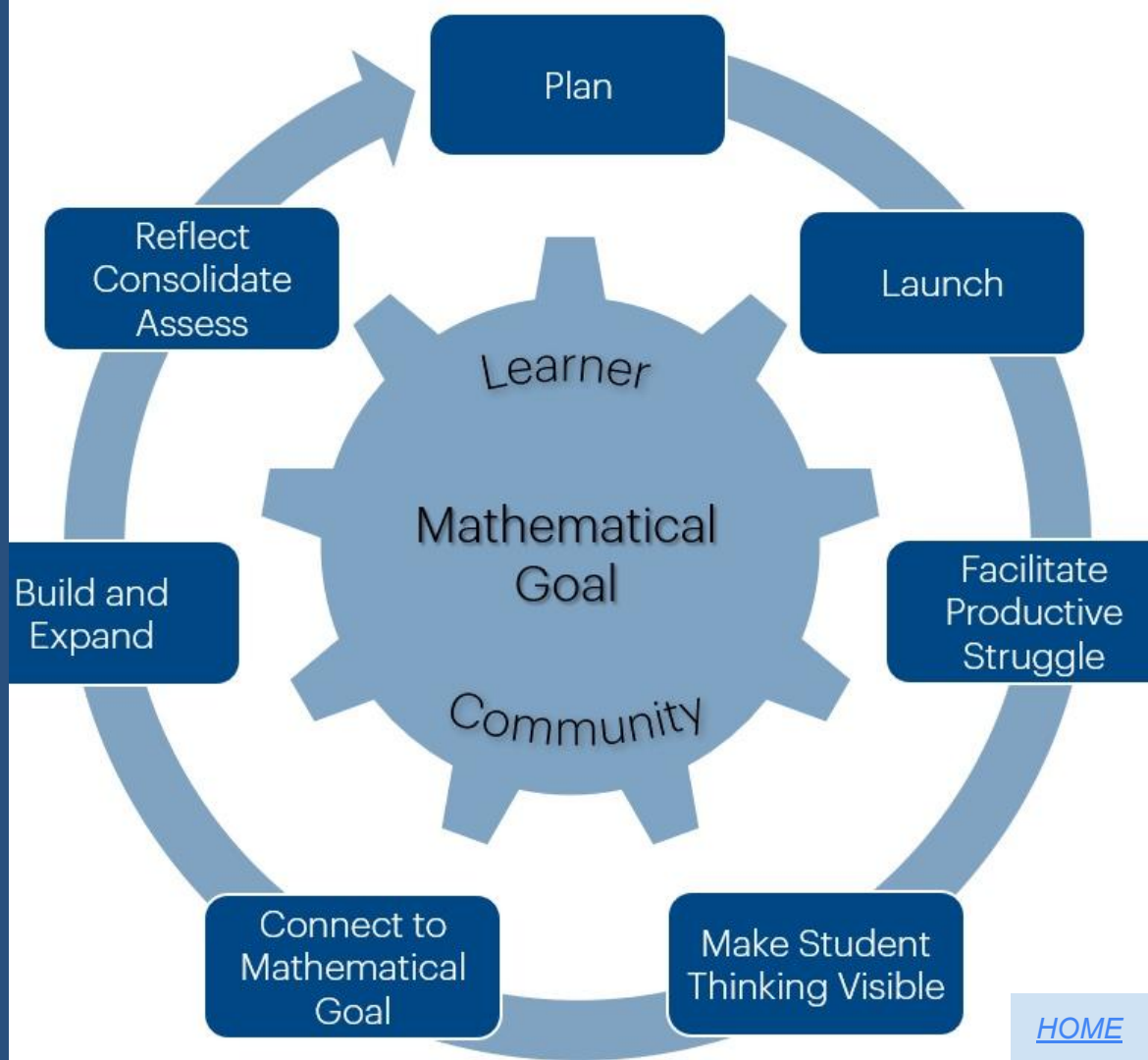
OVERVIEW

A Shared Vision

Responsive math teaching (RMT) is instruction where the teacher continuously elicits information about what students currently know and understand and responds in ways that move them forward in relation to developmental and grade-level mathematical goals.

This model serves as an anchor and provides common language for professional development, lesson design, coaching, and research.



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METHODS

Research Questions

- What do teacher leaders learn through experiencing and reflecting on responsive math teaching?
- What do teacher leaders learn through engaging in collaborative lesson design, implementation, and reflection?
- How does the instructional leadership capacity of math lead teachers change over time?

Data Sources

- End of year interviews
- Video recordings of PD sessions
- Analytic memos/reflections
- Surveys

Data Analysis

- Ongoing process of deductive and inductive coding
- Triangulation between interviews, video observations, and written reflections
- Identification of emergent themes
- Looking for disconfirming evidence

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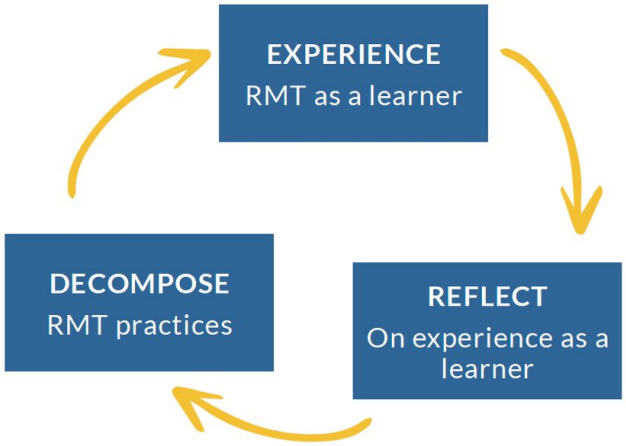
Year 1: Experiencing RMT as a Learner

When teachers experience responsive math teaching as learners, they develop an instructional vision that centers the students' learning experience

Experience PD Model



Shifts in Instructional Vision

- **Classroom Environment:** The classroom environment needs to allow students to feel comfortable taking risks and making mistakes
- **Nature of the Task:** Tasks should be open to multiple solution strategies and have multiple entry points
- **Teacher's Role:** Teachers can support students by facilitating productive struggle through monitoring, questioning, and supporting learners
- **Student Experience:** Students should take on the cognitive load, have opportunities for collaboration and engage in mathematical reasoning and argumentation
- **Equity:** We need to ensure that all students have opportunity to participate mathematically

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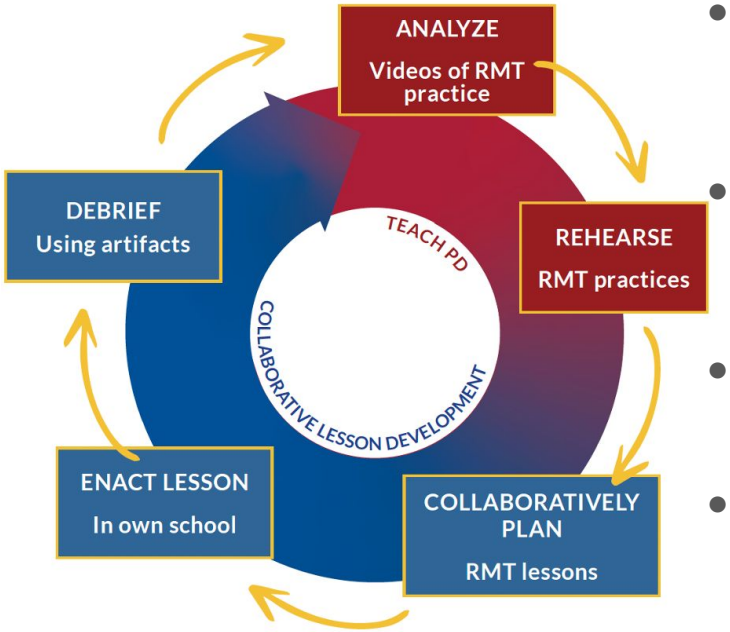
Year 2: Growth in Capacity for Classroom Implementation

When teachers engage in decomposition, rehearsal, and collaborative lesson design, it leads to an iterative cycle of building knowledge and utilizing it in their classrooms.

Teach PD & Collaborative Lesson Design



Implementation Growth

- **Adapting lessons to specific contexts:** Adjusting task parameters, lesson pacing, student work conditions, and lesson format to meet the needs of specific groups of students
- **Making sense of student thinking in real time:** Unpacking unanticipated, unclear, and/or incomplete student strategies, particularly strategies different from the teacher's own.
- **Finding the boundaries of productive struggle:** Providing just enough scaffolding to avoid fostering "learned helplessness" or frustration in students.
- **Structuring discussions around student work and the mathematical goal:** Crafting an accessible starting point and logical progression that moves towards the mathematics

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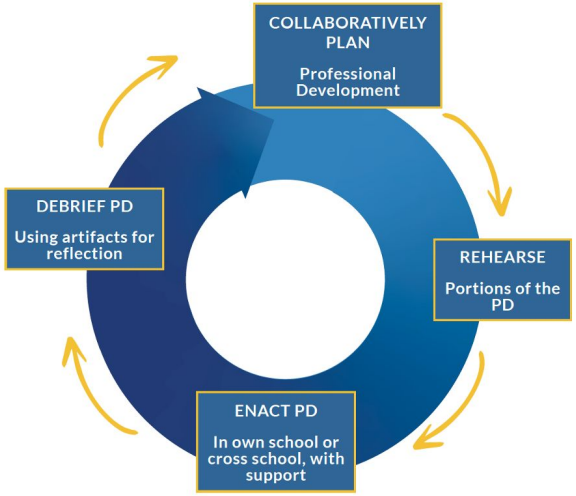
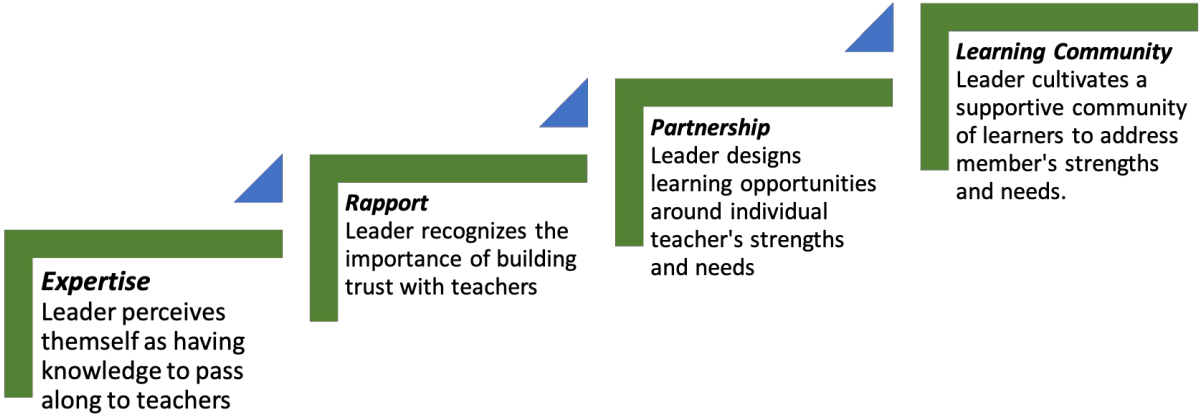
Year 3: Developing Leadership Visions

Teacher leaders who have participated in the project for multiple years have developed and refined their vision of how to best support teacher learning and growth—their vision of instructional leadership. This development occurs along the growth trajectory shown below.

Lead PD Model



Growth Trajectory in the Development of Instructional Leadership



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Products

- ★ RMT Instructional Model
- ★ Planning and Coaching Protocol
- ★ Bank of high-quality tasks (not public)

- ❖ Working Papers:
  - ➢ *"Teaching Them How to Fish": Learning to Learn and Teach Responsively*
  - ➢ *A Model for Developing Sustainable Math Instructional Leadership*

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IMPLICATIONS

- Professional development needs to be a sustained commitment over time, a process that can be built upon each year (not one-off)
- Focusing on vision development first then providing scaffolded opportunities for enactment (gradual implementation) leads to change in practice.
- Building leadership capacity and a networked community with varying levels of expertise within and across schools supports sustainability

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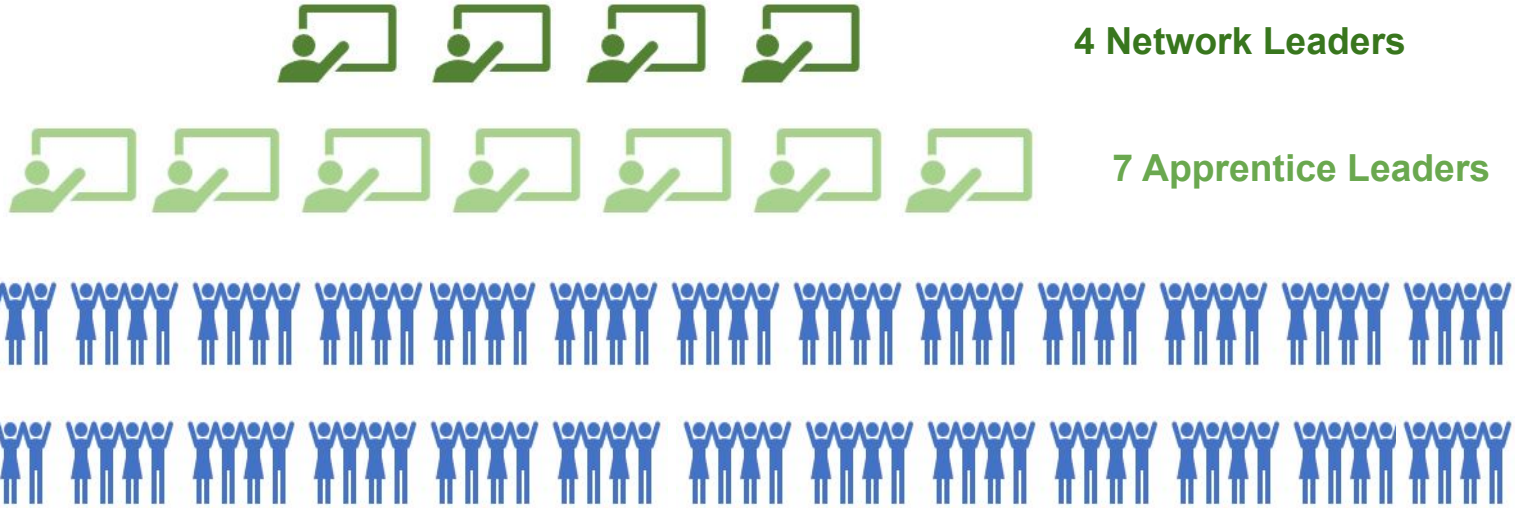
Year 3

11 school-based teacher leaders are facilitating professional development or collaborative lesson design sessions for teachers across schools, allowing the project to continue expanding its reach to over 100 educators



4 Network Leaders

7 Apprentice Leaders

112 teachers and leaders from 14 schools

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NEXT STEPS

Scale-Up

*Expansion in Year 4

*Instantiation of cross school collaborative lesson design

*Refinement of task bank

Research Analysis

*Learning from “TEACH” (year 2) and “LEAD” (year 3)

*Case studies of leader development

*Coherence within schools and across network

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