

# Case Studies of Ambitious Mathematics Programs in High Need Settings

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With Jeff Choppin, Cindy Callard,  
Shaun Nelms and Charles Wilkes II



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What are the **demands** and corresponding **resources** related to implementing an ambitious mathematics program in a high need secondary school?

Successful secondary ambitious mathematics programs in high need schools

Public School(s) in urban area(s)  
successfully implementing  
Ambitious Math Program

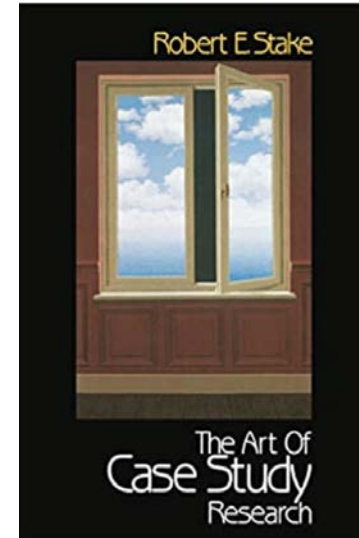
# How are we conceptualizing this case study research?

Robert Stake “The Art of Case Study Research”

Instrumental Case Study

Case Design Strategy: Identify the case and the issues that will allow us to make appropriate “particularizations”

Long-term Goal: Develop representations(s) of successful ambitious math programs to share with stakeholders (school leaders, community members, partners) in similar contexts with similar goals



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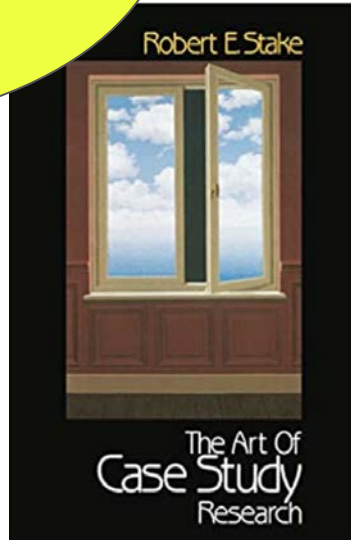
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**Tell the story of  
successful Ambitious  
Math Programs in  
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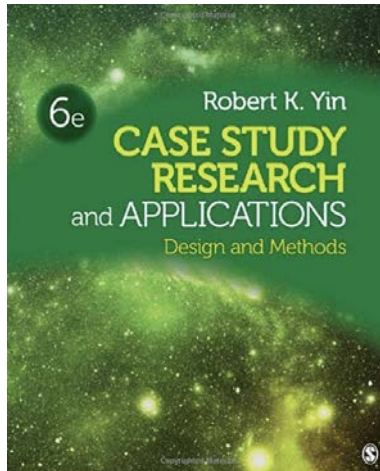
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Yin: “Case Study Research and Applications”

Goal of making “analytical generalizations”

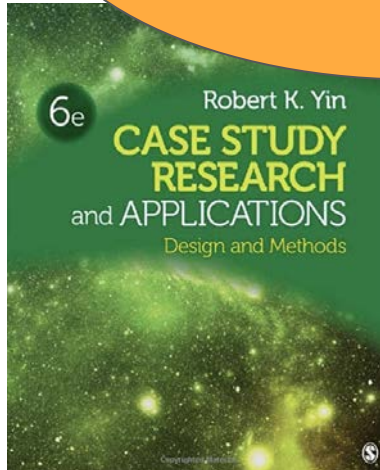
Study Design: Articulate propositions (claims) that can be used to develop a model for the phenomenon

E.g. a claim: If the demands induced by an ambitious mathematics program are not met with resources, then the program will not be successful or will not be sustainable.



# How are we conceptualizing this case study research?

Developing a **model** of the case(s) and “**test**” the **model** in varied settings



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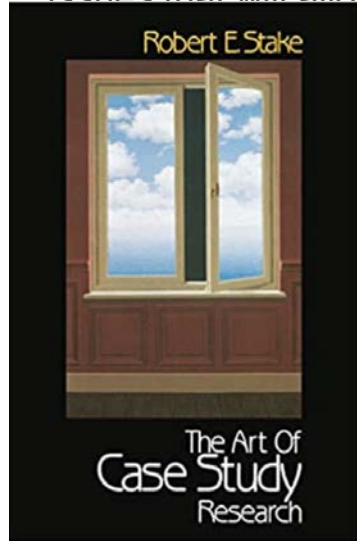
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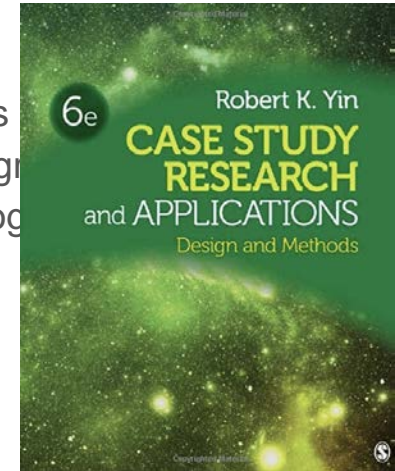
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Case Study with goal of making “analytical generalizations”

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successful or sustainable.



# ***Creating a Model for Sustainable Ambitious Mathematics Programs in High-Need Settings: a Researcher-Practitioner Collaboration***

- **PIs:** Jeffrey Choppin, Cynthia Callard, Shaun Nelms from University of Rochester, William Zahner from San Diego State University
- **Research Assistants from UR:** Saliha Al, Judy Van Alstyne, Junnan Li, Christine Green
- **Research assistants from SDSU:** Esperanza Ochoa, Kevin Pelaez, Kristin Tenney
- **Project coordinator:** Anna Rynski



# Project Background

- For over 5 years, the John Lewis School (JLS, a pseudonym) has utilized mathematics programs and instructional approaches that demand **active student participation in problem solving, collaboration, and communication**
  - Hallmarks of **Ambitious Mathematics Teaching**
- JLS serves a student population that is
  - >80% low income
  - Majority Black and Latinx students
  - >15% multilingual students designated as English Learners
- Doing a case study to develop a model of what it takes to sustain an implementation of AMT in a high-poverty context.

# Stories & *Particularizations*

At John Lewis School the teachers noticed that many students were hungry during class. In response, the teachers keep fresh fruit and healthy snacks in baskets in the back of the room so students can eat when they want to.

*Learning mathematics happens in a physical, embodied world. If students at JLS have physical needs that are not met, then the physical needs will interfere with intellectual goals of an ambitious mathematics program.*

The school leader at JLS described their job as “buffering” the staff from external pressures (such as district mandates) so the teachers could focus on their goals in the classroom.

*The teachers at JLS do their work embedded in a larger system. The larger system sometimes might inhibit their efforts to implement ambitious mathematics program.*

(“The district, in their infinite wisdom...”)

# Propositions & Model

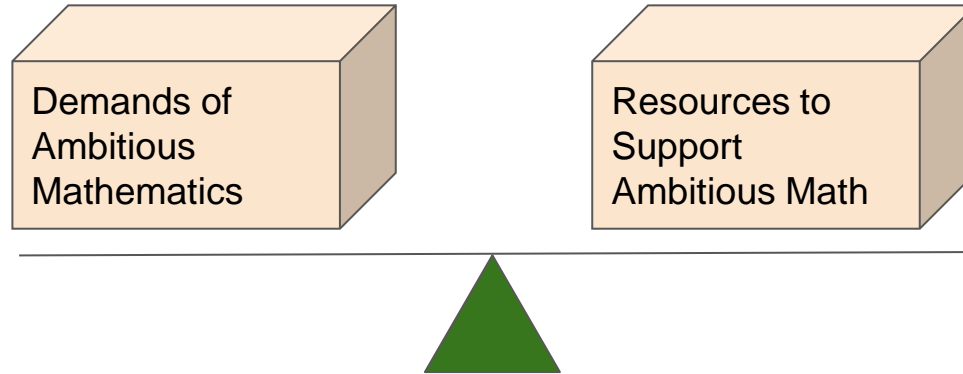
Proposition 1: The demands of implementing an ambitious mathematics program must be met with resources to balance the demands. Without resources, the demands will overwhelm the system.

Proposition 2: Providing the resources to meet a demand creates a new demand at a different level in the system.

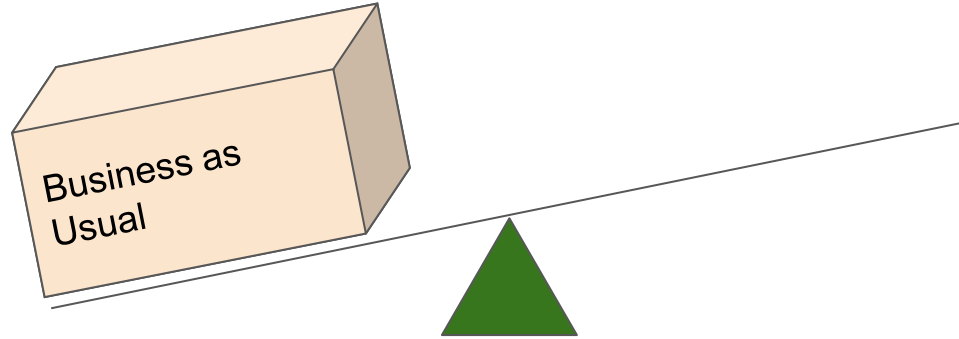
Example 1: Ambitious mathematics requires students to engage in high level discourse practices such as interpreting complex texts, crafting arguments, and evaluating mathematical ideas. Students will require linguistic support to meet these demands.

Example 2: For a mathematics teacher to provide linguistic support the teacher may need to modify or adapt instructional materials [the resource to meet the student demand puts a demand on the teacher].

# Propositions & Model



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# Propositions & Model – Nested Structure

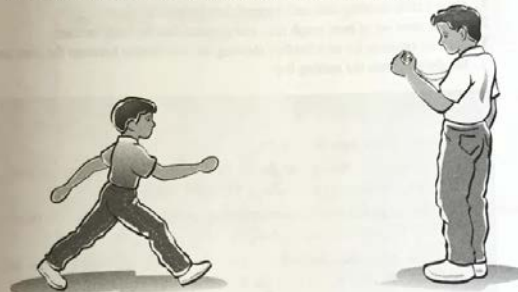
- Student - program
- Teacher - student
- Coach - teacher
- Administrator - Coach / teacher
- Administrator - state mandates

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**2.4 Walking to Win**

In Mr. Goldberg's gym class, Emile finds out that his walking rate is 2.5 meters per second. When he gets home from school, he times his little brother Henri, as Henri walks 100 meters. He figures out that Henri's walking rate is 1 meter per second.



Henri challenges Emile to a walking race. Because Emile's walking rate is faster, Emile gives Henri a 45-meter head start.

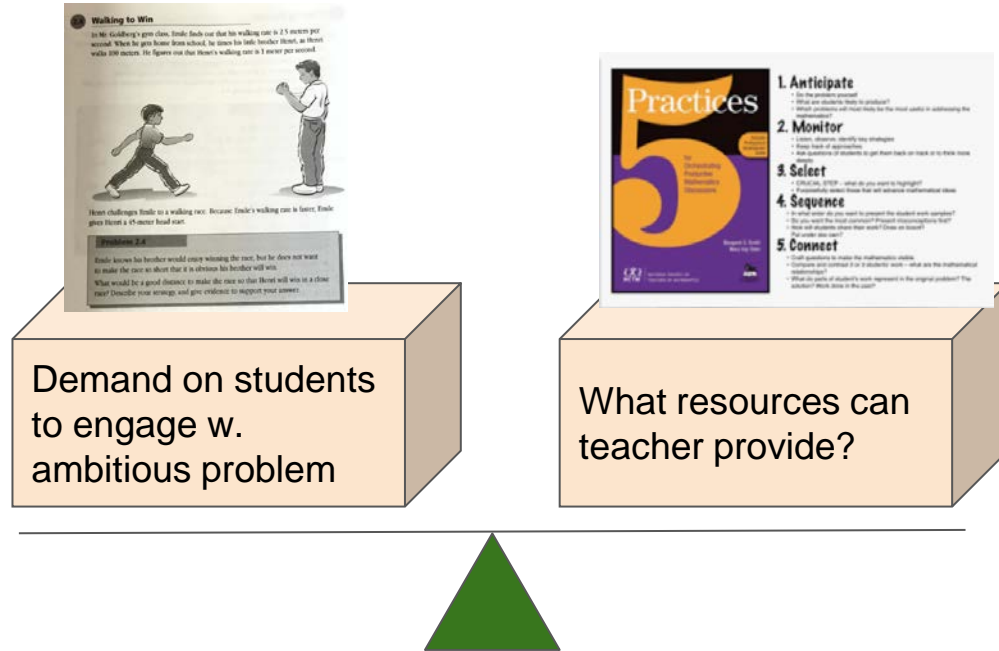
**Problem 2.4**

Emile knows his brother would enjoy winning the race, but he does not want to make the race so short that it is obvious his brother will win. What would be a good distance to make the race so that Henri will win in a close race? Describe your strategy, and give evidence to support your answer.

A word problem from CMP

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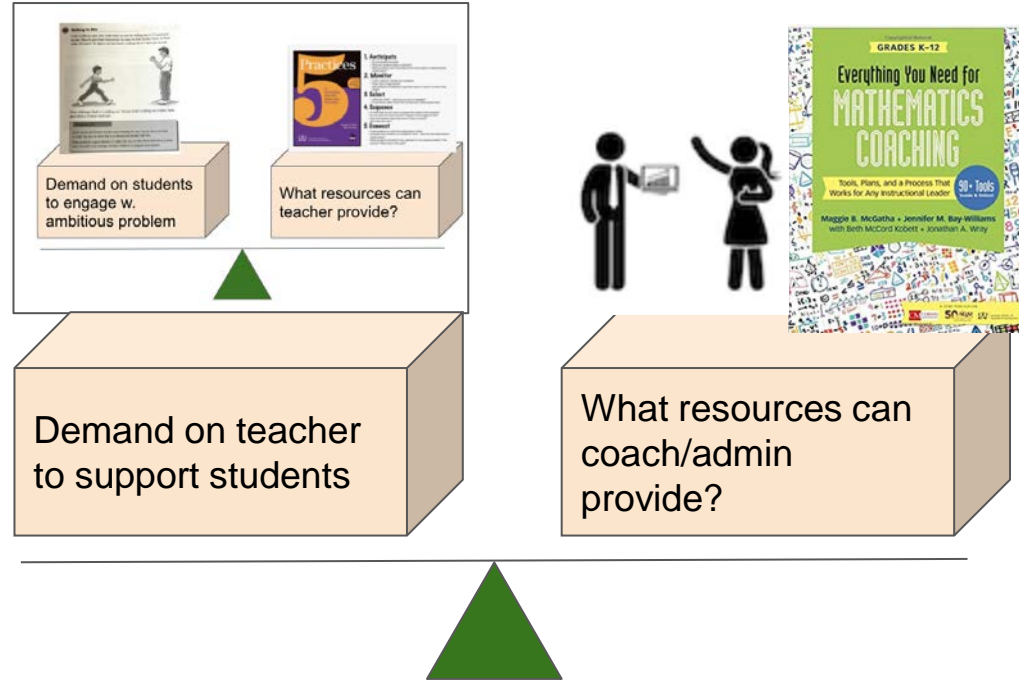
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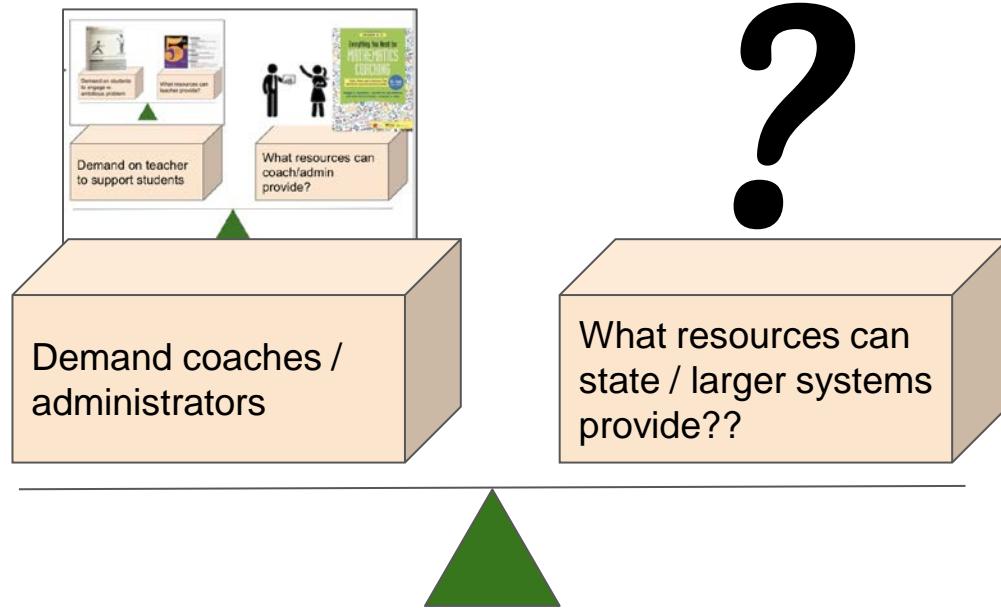
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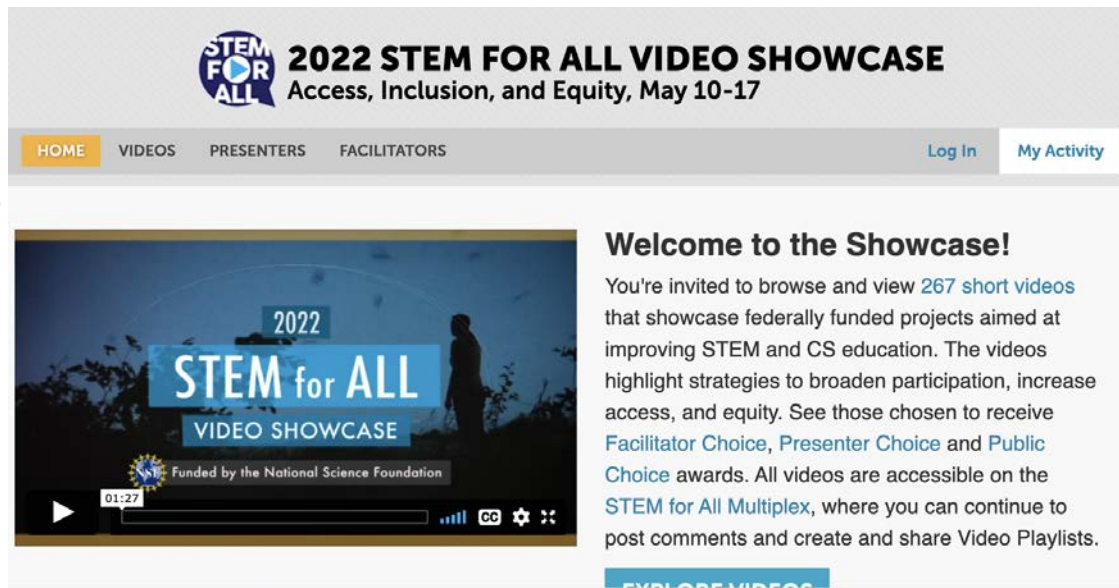
Public School(s) in urban area(s) successfully implementing Ambitious Math Program

**Tell the story of** successful Ambitious Math Programs in high need settings

# Why tell the stories?

Stories are **memorable**. There is **power** when cases that are told **in depth and vividly**. Stories are one way that humans pass on important information.

What makes for a good video showcase?



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Access, Inclusion, and Equity, May 10-17

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# Why develop models?

Models move from the case to analytical generalizations. If our goal is **broader impact** and **intellectual merit**, then the lessons from your case must extend beyond the particular.

*We have many of “islands of excellence,”  
but islands are not much compared to  
the sea!*



# Thank you!



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