

# Improvement Science and Education Reform: "Getting Better at Betting Better"

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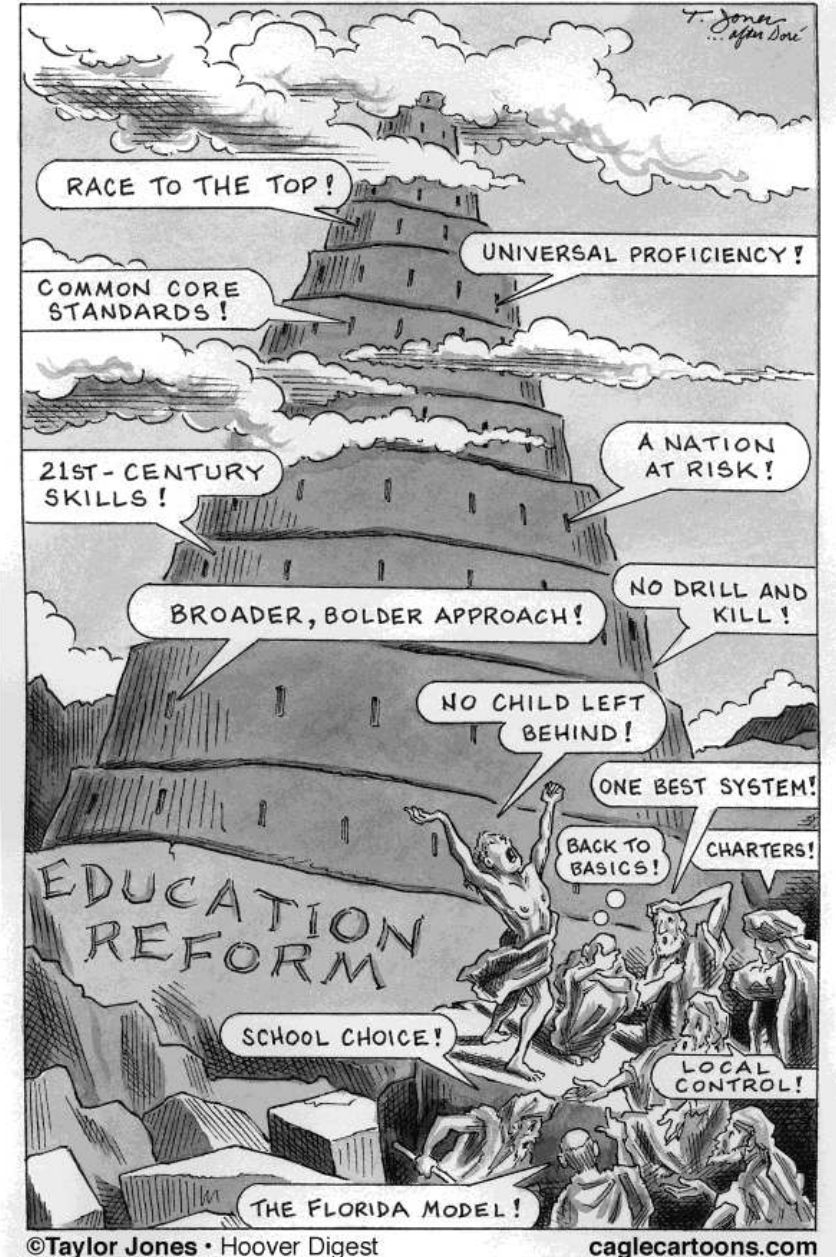
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"Implementing fast and learning slow"

As a field, education has largely failed to learn from experience. Time after time, promising education reforms fall short of their goals and are abandoned as other promising ideas take their place.



# What is Improvement Science?

- Improvement science is explicitly designed to accelerate learning-by-doing. It's a more user-centered and problem-specific approach to improving teaching and learning.
- Improvement science is quite different from the traditional pilot program that seeks to offer a proof of concept.
- Improvement research, in contrast, is a focused learning journey. The overall goal is to develop the necessary *know-how* for a reform idea ultimately to spread faster and more effectively.

(Carnegie Foundation for the Advancement of Teaching, 2018)

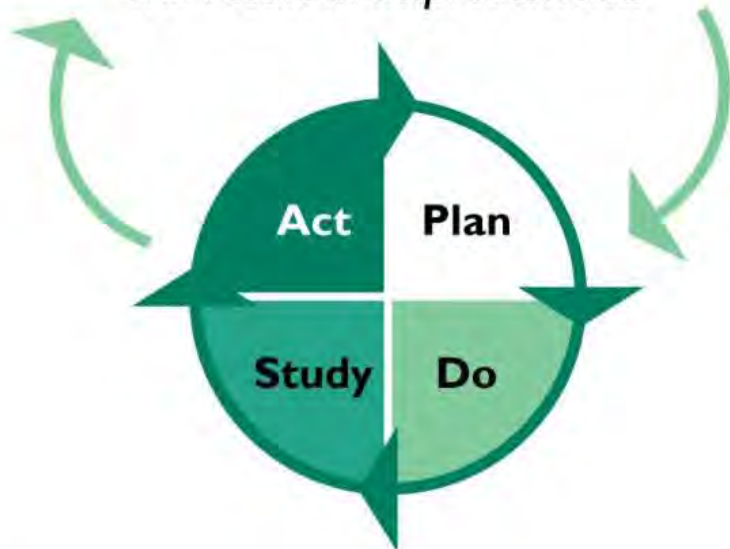
# Model for Improvement

## **Model for Improvement**

*What are we trying to accomplish?*

*How will we know that a change is an improvement?*

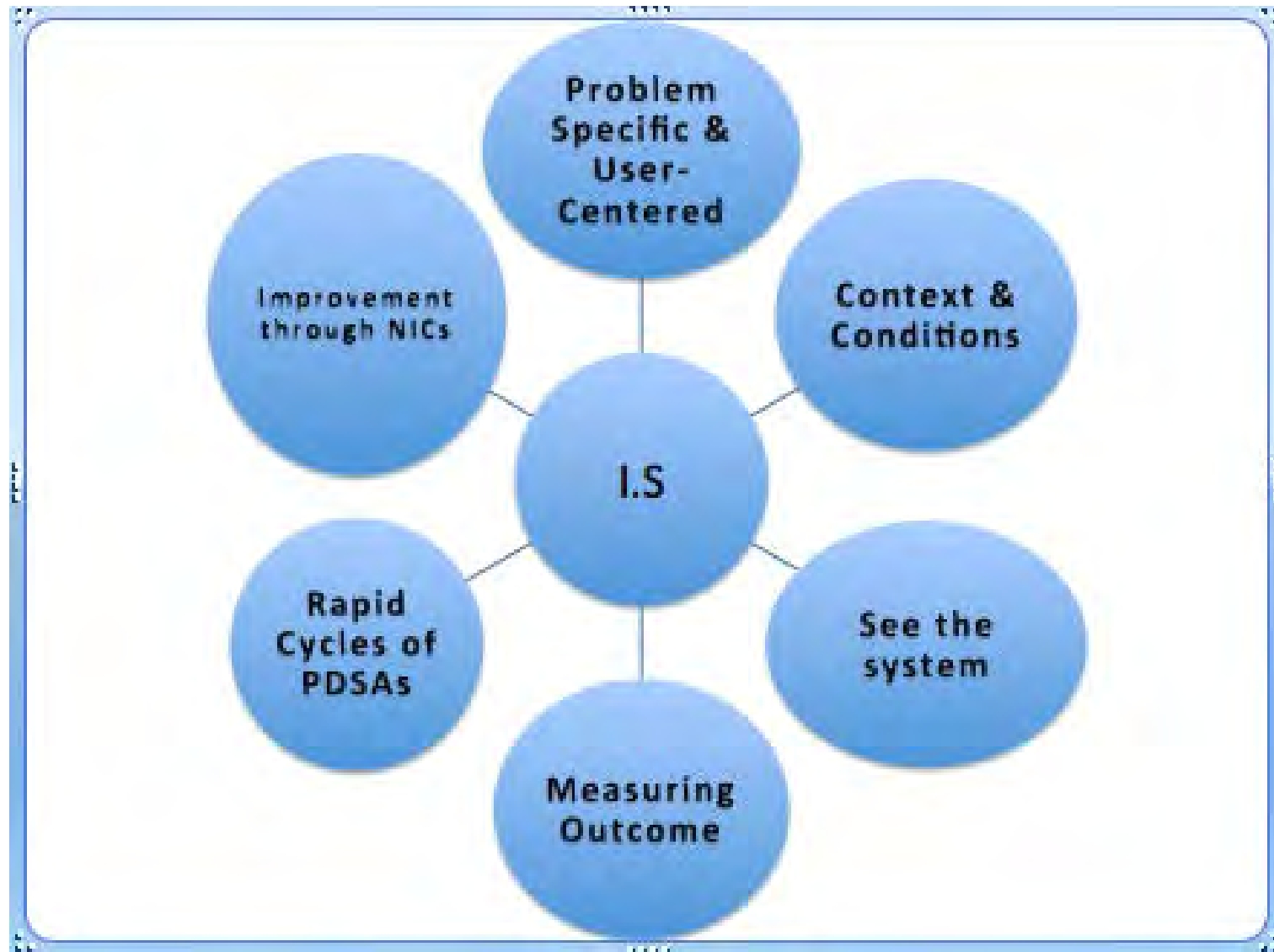
*What changes can we make that will result in improvement?*



“We need smarter systems, organizations capable of learning and improving, that see learning and change as what it means to be vital, to be alive.”

**TONY BRYK, PRESIDENT OF THE CARNEGIE FOUNDATION FOR THE ADVANCEMENT OF TEACHING**

# Six Core Principles of Improvement Science



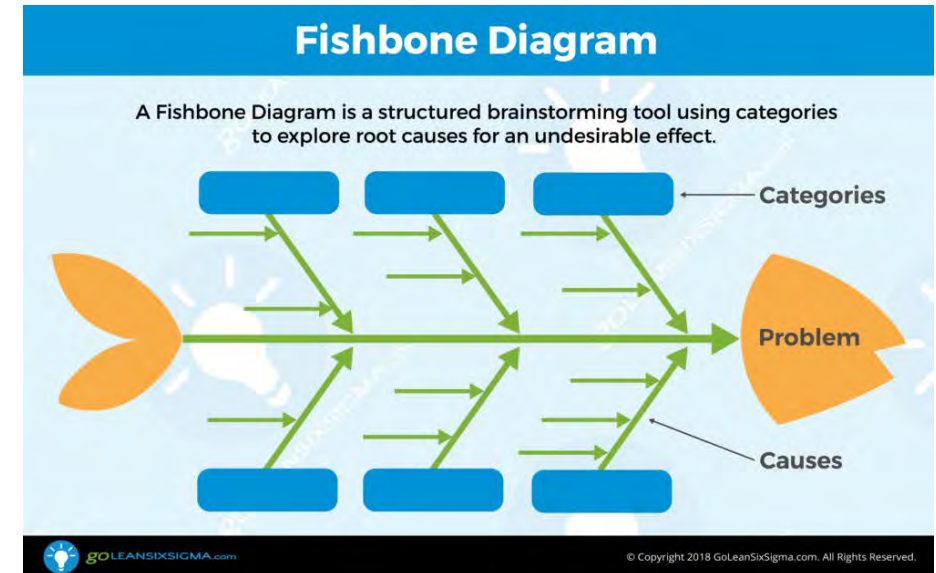
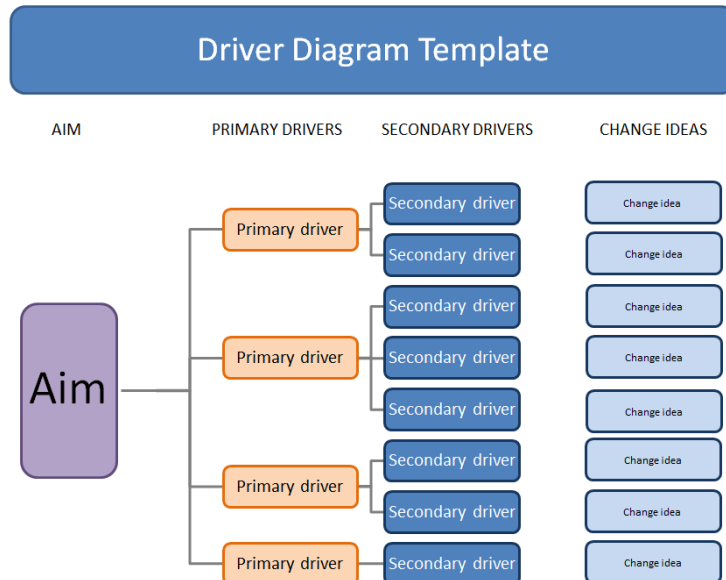
# Improvement Science: PDSA



(Langley et al., 2009)

# Improvement Science Tools

Identify Root Causes;  
Use 5 WHYS;  
The Fishbone Diagram  
Identify DRIVERS (high leverage areas)  
to impact the root cause of the  
problem



# Improvement Science: Networked Improvement Community

A NIC is marked by four essential characteristics. It is:

- Focused on a well-specified common aim
- Guided by a deep understanding of the problem, the system that produces it, and a shared working theory to improve it
- Disciplined by the methods of improvement research to develop, test, and refine interventions
- Organized to accelerate their diffusion out into the field and effective integration into varied educational contexts.



## PLCs

Can have peripheral participants

Not outcomes driven

Personal/  
professional growth

No drivers of change

## NICs

All active participants

Outcomes driven

Measurement

Problem of Practice  
& Specific aim

Has an evaluation component

Drivers of change

Shared  
visions  
Shared  
goals  
Community

# Example: Michigan Focus NIC

- 5 focus schools from 2 school districts
- Address disparities in student achievement within 5 schools
- Participants included state education agency representatives, intermediate school district administrators, district representatives, and school principals

(Proger, Bhatt, Cirks, & Gurke, 2017)



Plan

**PoP:** Disparities in student achievements  
**Root Cause Analysis:** Math achievement gaps in focus schools  
**One cause:** Lack of math fluency skills  
**Fishbone Diagram** identified these 5 major bones contributing to problem of low math fluency skills: time, priority, skill, commitment, and ownership  
**Aim:** Students in the bottom 30% of math achievement will achieve mastery on grade-level benchmarks in math fluency by the end of the school year.

Act

Do

What **changes in practice** would drive improvement needed to achieve its aim?

- Time
- Data use for continuous improvement
- Teachers' skills for differentiating instruction
- Lack of coherence in curriculum & support structures
- Family & student engagement

Study

**\*\*Focused on TIME.**  
**Intervention:** Students would practice math fluency skills for at least 15 minutes/day.  
**Measurement tools** included: Teacher logs, principal observation protocols to monitor how students and teachers spent those 15 mins.

Implemented the modified practice and tested it again!

Examined evidence and determined what tweaks were needed

# Implications

- Shift from "what works" to "how and/or why" educational interventions succeed
- Moves educational innovation out of the realm of “fad” and into the realm of research-based, evidence-driven continuous improvement, with the goal of increasing the effectiveness of educational practice
- PLCs and NICs can and do co-exist;
  - PLCs—as sharing networks are more suited to tame problems and are organized to help individuals improve.
  - NICs—implementation/execution networks operate more like professional scientific communities in which participants bring their expertise to bear to solve large-scale, multi-faceted problems.