



# Systems Thinking to Improve Student Outcomes: Introduction to Improvement Science

NYCOSS Thought Leadership Summit  
Fairport, New York  
March 22-23, 2018

# Agenda Outline

- Introductions (10 minutes)
- Improvement Science Overview (20 minutes)
- Small Group Discussions (25 minutes)
- Large Group Share-out (15 minutes)
- Take-aways & Resources (10 minutes)
- Q & A (10 minutes)

## WestEd overview

- Making a quality difference in the lives of children, youth, and adults.
- WestEd is a research, development, and service agency that works with education and other communities to promote excellence, achieve equity, and improve learning for children, youth, and adults.

# Introductions

## Facilitator



**Terry Hofer, Ed.D.**

Director, New York School &  
District Services

## Presenters



**Tran Keys, Ph.D.**

Senior Researcher



**Joe Sassone**

Development Director, School  
& District Services

# Show of fingers – How familiar are you with Improvement Science?



- 1- **Brand new**
- 2- **Familiar** with key concepts and tools
- 3- **Experience *applying*** concepts and tools
- 4- **Experience *leading*** and/or coaching others
- 5- "I am an Improvement Science **expert!**"

# Learning Objectives

Participants will understand...

1. Three key ideas behind an organizational learning approach to improvement
2. Components of a learning system
3. Improvement Science = Continuous Improvement

# Flying

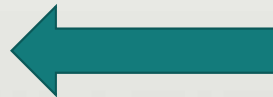
On average, how many FAA monitored flights happened each day in 2016?

- 1) 0 – 10,000
- 2) 10,000 – 20,000
- 3) 20,001 – 30,000
- 4) 30,001 – 40,000
- 5) More than 40,000

# Flying

On average, how many FAA monitored flights happened each day in 2016?

- 1) 0 – 10,000
- 2) 10,000 – 20,000
- 3) 20,001 – 30,000
- 4) 30,001 – 40,000
- 5) **More than 40,000**



**42,700**  
**average daily**  
**flights**  
**handled by the**  
**FAA in 2016.**



## Flying, cont'd

In 2016, how many people flew on FAA monitored flights (Millions)

- 1) 0 – 250 M
- 2) 250 – 500 M
- 3) 500 – 750 M
- 4) 750 – 1,000 M
- 5) More than a billion passengers

## Flying, cont'd

In 2017, how many people flew on FAA monitored flights (Millions)

- 1) 0 – 250 M
- 2) 250 – 500 M
- 3) 500 – 750 M
- 4) **750 – 1,000 M** ←
- 5) More than a billion passengers

**In 2017, about 841 million people flew on commercial airlines in the United States.**


## Flying, cont'd

How many people died in commercial plane crashes last year in the United States?

- 1) 0
- 2) 1-10
- 3) 11-100
- 4) More than 100

## Flying, cont'd

How many people died in commercial plane crashes last year in the United States?

- 1) 0 
- 2) 1-10
- 3) 11-100
- 4) More than 100

# Why is flying so safe?



# Thoughts?

# Why is flying so safe?

**RESEARCH**

ACCOUNTABILITY

LEARNING



# Why is flying so safe?

RESEARCH

**ACCOUNTABILITY**

LEARNING



# Why is flying so safe?

RESEARCH

ACCOUNTABILITY

**LEARNING**





# Why is flying so safe?

## RESEARCH



## ACCOUNTABILITY



## LEARNING



# Reading

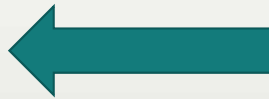
Approximately how many fourth graders are there in the United States?

- 1) 0 – 1,500,000
- 2) 1,500,001 – 3,000,000
- 3) 3,000,001 – 4,500,000
- 4) 4,500,001 – 6,000,000
- 5) More than 6,000,000

# Reading

Approximately how many fourth graders are there in the United States?

- 1) 0 – 1,500,000
- 2) 1,500,001 – 3,000,000
- 3) **3,000,001 – 4,500,000**
- 4) 4,500,001 – 6,000,000
- 5) More than 6,000,000



**~3,840,000  
fourth  
graders**

## Reading, cont'd

In 2017, according to standardized assessments, how many can read at or above grade level?

- 1) 0 – 20 percent
- 2) 21 – 40 percent
- 3) 41 – 60 percent
- 4) 61 – 80 percent
- 5) 81 – 100 percent

## Reading, cont'd

In 2017, according to standardized assessments, how many can read at or above grade level?

1) 0 – 20 percent

2) **21 – 40 percent**



**~35%**

3) 41 – 60 percent

4) 61 – 80 percent

5) 81 – 100 percent

# Reading – Why only 35%?

Turn  
and  
TALK

## RESEARCH



## ACCOUNTABILITY



## LEARNING



# Reading – Why only 35%?

## RESEARCH



## ACCOUNTABILITY



## LEARNING



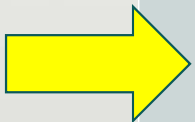
# Three Ways Data Support Improvement

	Primary Audience	Purpose	Measurement Criteria
<b>Research</b>	<ul style="list-style-type: none"> <li>• Scientific community</li> <li>• Policymakers</li> <li>• Decision makers</li> </ul>	<ul style="list-style-type: none"> <li>• New knowledge, irrespective of applicability</li> </ul>	<ul style="list-style-type: none"> <li>• Many</li> <li>• Complex collection</li> </ul>
<b>Accountability</b>	<ul style="list-style-type: none"> <li>• Parents</li> <li>• Students</li> <li>• Taxpayers</li> </ul>	<ul style="list-style-type: none"> <li>• Basis for choice</li> <li>• Reassurance</li> <li>• Spur for change</li> </ul>	<ul style="list-style-type: none"> <li>• Very few</li> <li>• Complex collection</li> </ul>
<b>Organizational Learning</b>	<ul style="list-style-type: none"> <li>• Teachers</li> <li>• Principals</li> <li>• District Leaders</li> <li>• Managers</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding of process or student learning</li> <li>• Motivation and focus</li> <li>• Baseline</li> <li>• Evaluation of changes</li> </ul>	<ul style="list-style-type: none"> <li>• Few</li> <li>• Easy to collect</li> <li>• Frequent</li> </ul>



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# How does organizational learning lead to improvement?

Three key ideas...

*(Adapted from Berwick, 1996)*

**All improvement begins with dissatisfaction with the status quo.**

**Every system is perfectly designed to  
get the results it gets.**

**All improvement requires change, but not every change is an improvement.**

## How does organizational learning lead to improvement?

1. All improvement begins with dissatisfaction with the status quo.
2. Every system is perfectly designed to get the results it gets.
3. All improvement requires change, but not every change is an improvement.

# Example: Reading Recovery

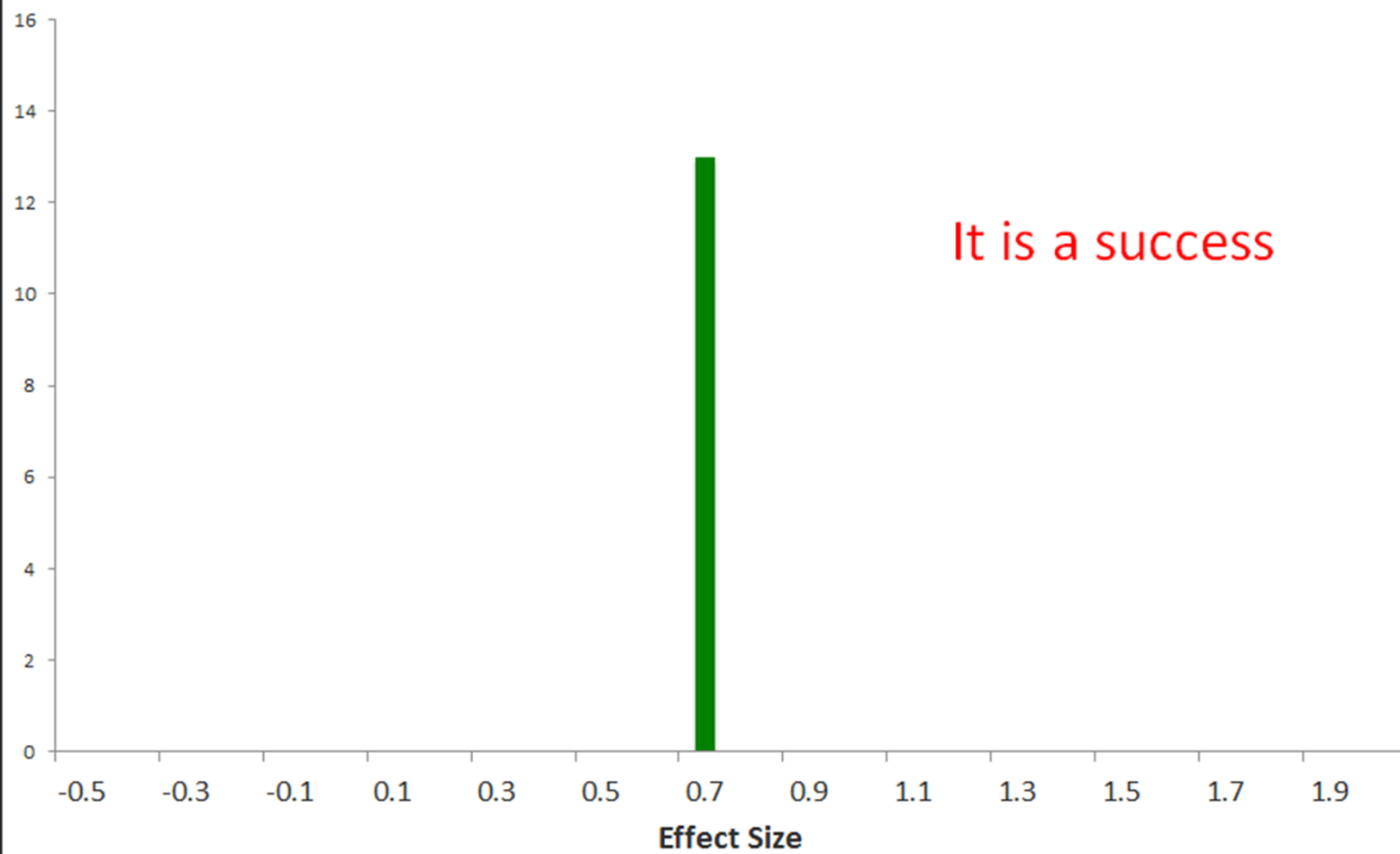


We open doors to a literate future for children who initially struggle in learning to read and write.

**Evidence-based intervention**  
**Huge experiment (141 schools)**  
**Results after year one of a randomized field trial (i3)**

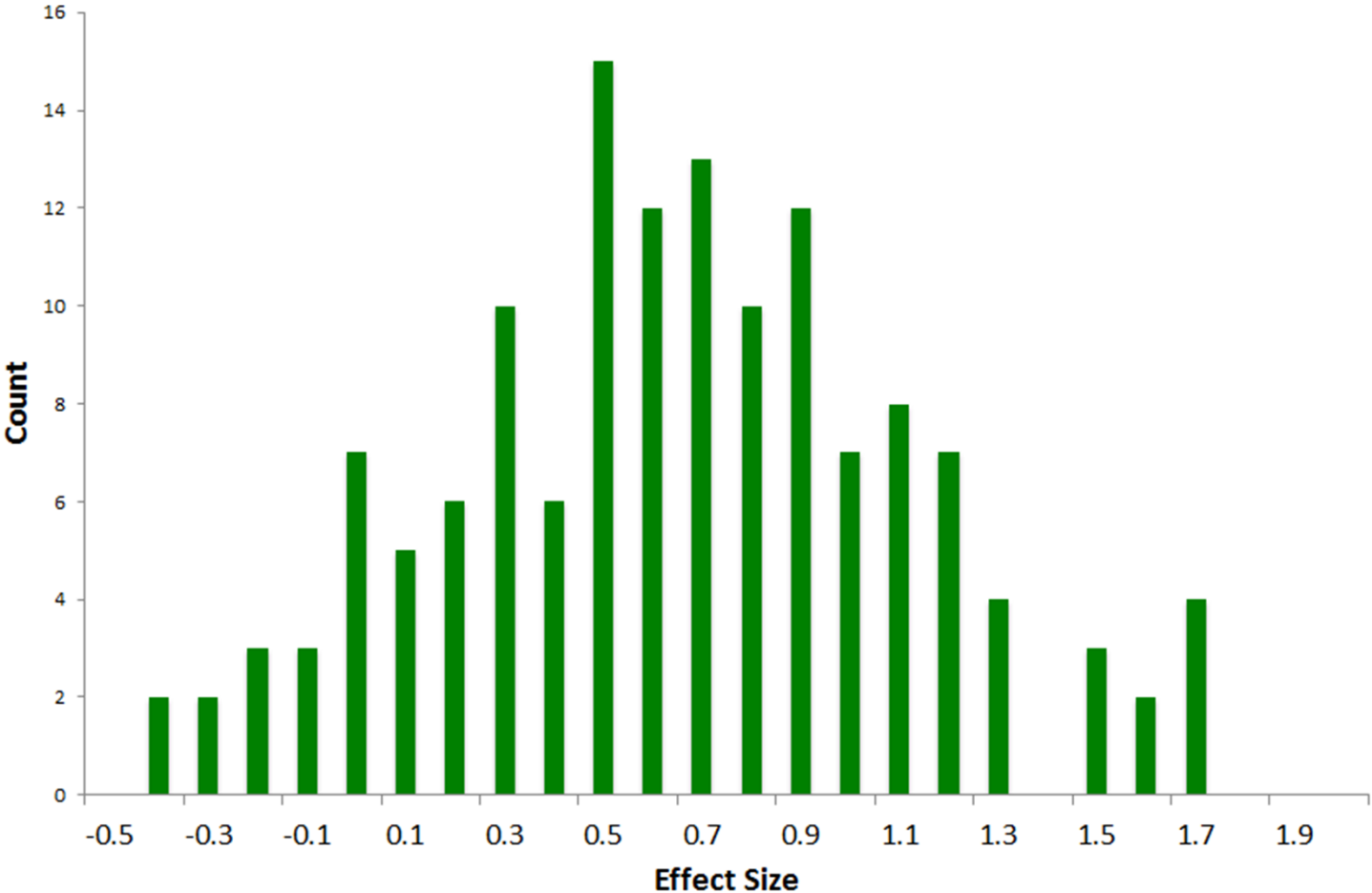
*Example adapted from the Carnegie Foundation for the Advancement of Teaching*

RCT (average) Treatment Effect: Reading Recovery  
N=141 schools

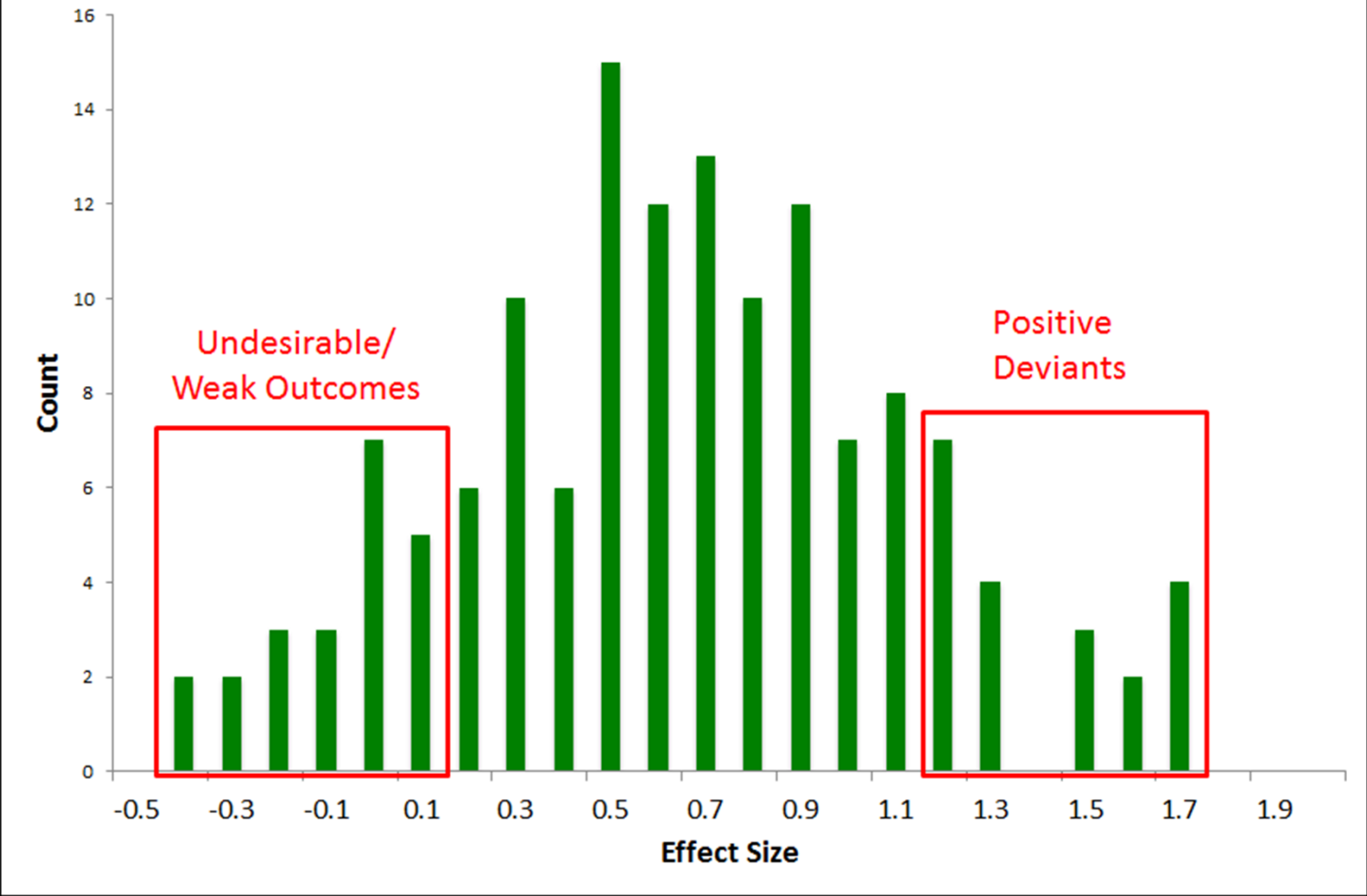




Distribution of RCT Treatment Effects: Reading Recovery  
N=141 schools



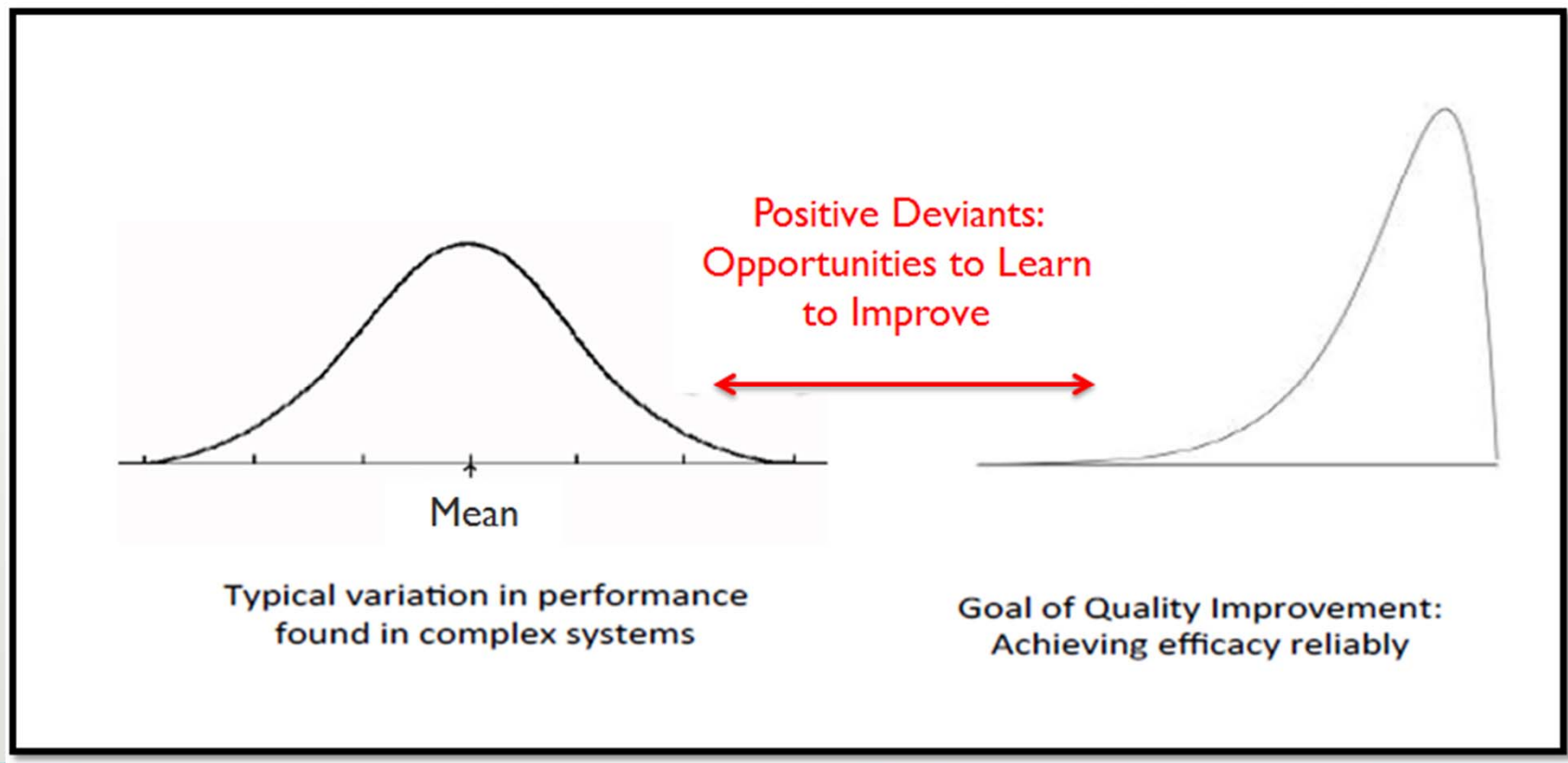
Distribution of RCT Treatment Effects: Reading Recovery  
N=141 schools



*How does organizational learning  
lead to improvement?*

**To achieve an ambitious improvement goal,  
you need robust mechanisms for learning  
that influence the *processes, structures,* and  
*norms* of the organization.**

# Goal of Improvement: Replicate Positive Results over Diverse Contexts



# The Model for Improvement

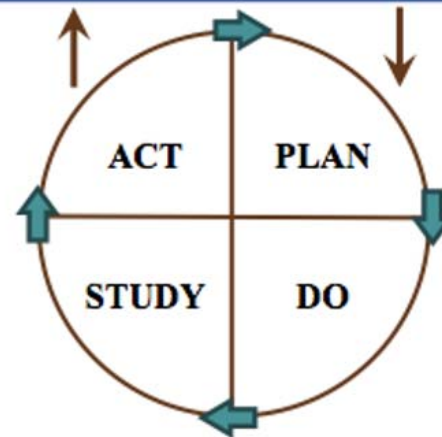
Making your aim  
and theory explicit

Learning  
through testing

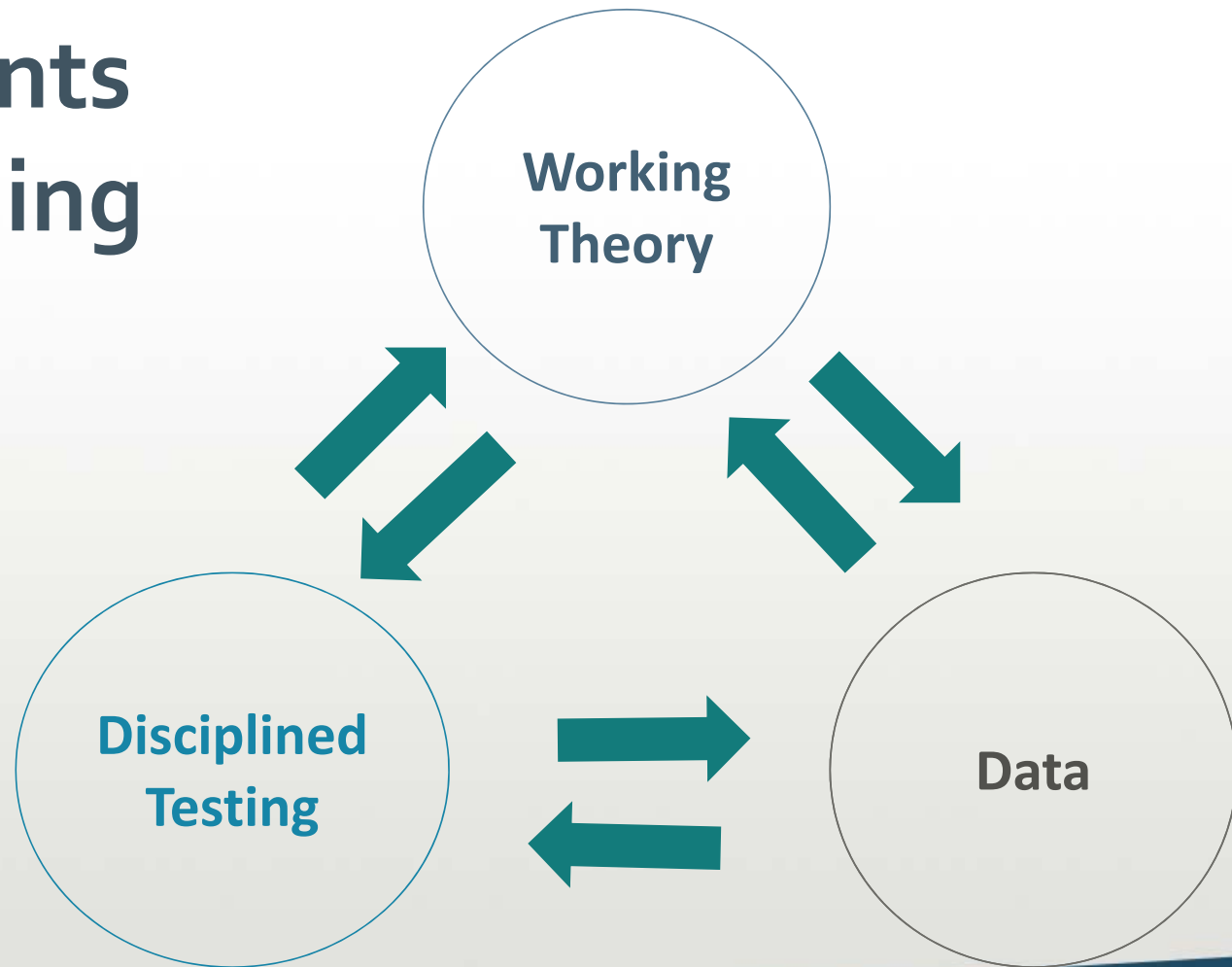
What specifically are we trying to accomplish?

What change(s) might we make and why?

How will we know that a change is an  
improvement?



# Components of a Learning System



## Small group discussions (25 minutes)

Outline a **problem of practice** in your district that could benefit from applying an Improvement Science methodology?

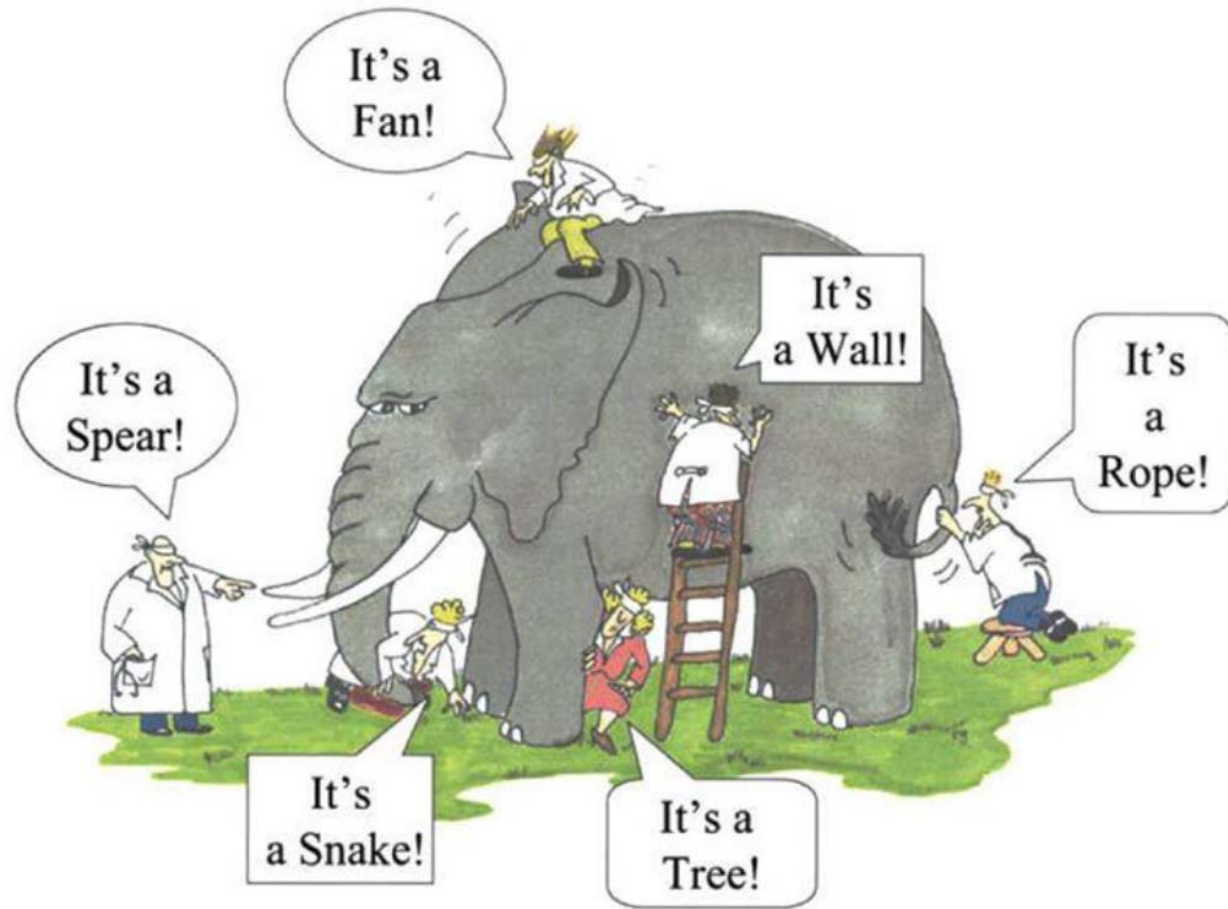
**Review: How does learning lead to improvement?**

1. All improvement begins with dissatisfaction with the status quo.
2. Every system is perfectly designed to get the results it gets.
3. All improvement requires change, but not every change is an improvement.

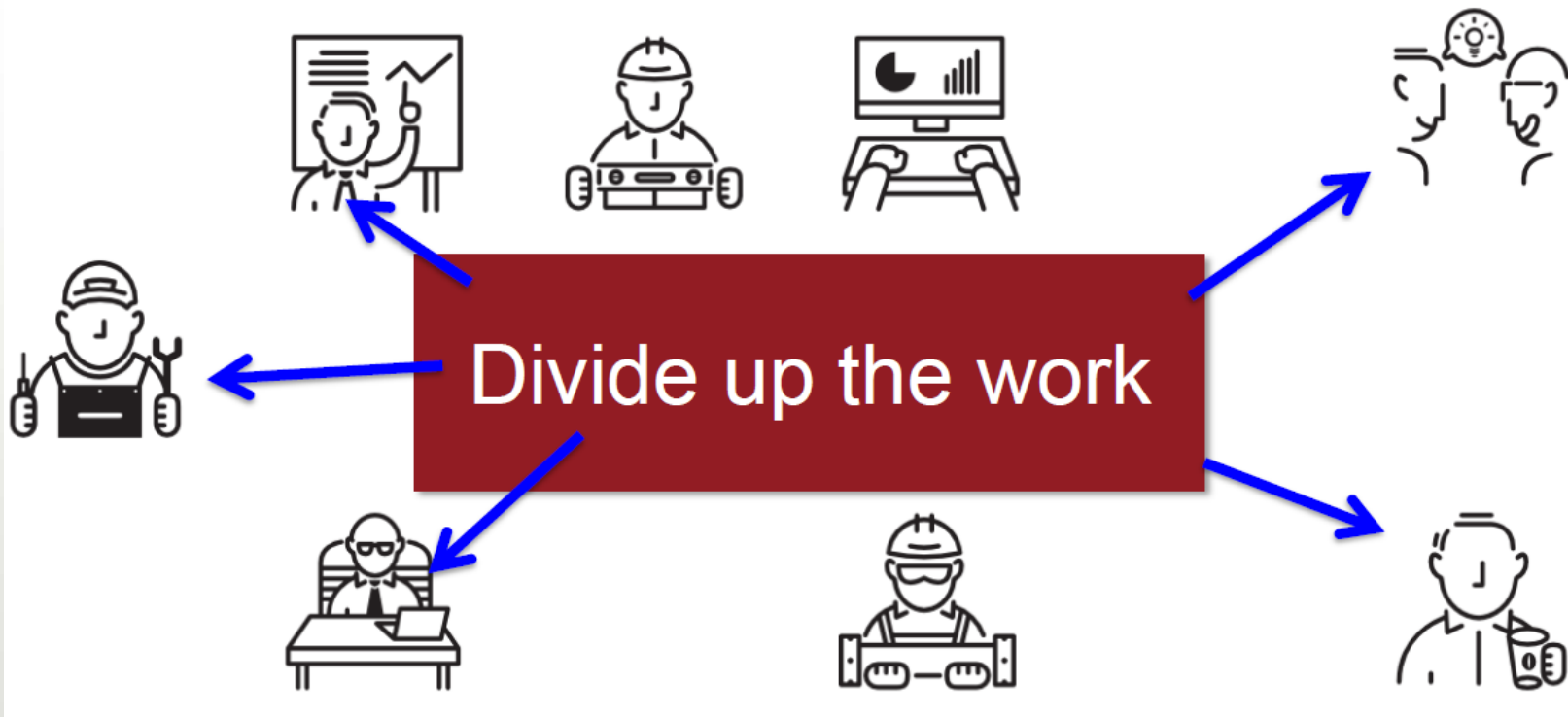
# Large Group Share-out (15 minutes)



# Take-aways



# Investigating a Problem as a Team



# Learning as a Team



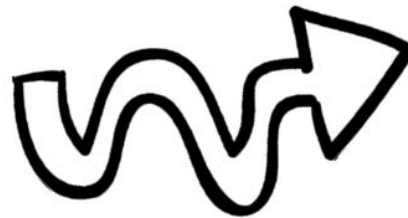
# Improvement Science



**Social learning**



**Systems-focused**



**Non-Linear**



**Disciplined**

# Improvement Science = Continuous Improvement

- Improvement Science supports the education field to “get better at getting better”
- Continuous improvement entails ongoing cycles of analysis and adjustment of practice involving all stakeholders
- Data-based analysis and decision making is the foundation of continuous improvement



# Resources



# WestEd main page

The screenshot shows the WestEd website main page. At the top right is the WestEd logo and the URL WestEd.org. Below the logo is a navigation bar with links for News, Events, Careers, Contact Us, Subscribe, and Follow Us, along with a search bar. The main content area features a large banner with the text "Improving education through research, development, and service." and a navigation menu with links for About Us, Areas of Work, Research & Evaluation, Services We Provide, and Publications & Resources. On the left side, there is a vertical menu titled "AREAS OF WORK" with links for College & Career, Early Childhood Development & Learning, English Language Learners, Health, Safety, & Well-Being, Literacy, Schools, Districts, & State Education Systems, Science, Technology, Engineering, & Mathematics, Special Education, Standards, Assessment, & Accountability, and Teachers & Leaders. Below this menu is another section titled "SERVICES WE PROVIDE". The main content area also features a large image of two students working on laptops, with the text "RDALERT ONLINE" overlaid. To the right of this image is a dark blue box with the text "Toward a Transformation of Science Education: Simulation-Based Formative Assessment" and a sub-headline "Research is illuminating how to make the most of simulations to monitor progress, provide feedback, and adjust instruction." Below the main content area, there are two columns: "NEWS" and "RESEARCH BLOG". The "NEWS" column features a link for "MARCH 12, 2018 Four Domains for Rapid School Improvement: Indicators of Effective Practice" with a sub-headline "Learn how to take and track action for the practices within each of the four domains." The "RESEARCH BLOG" column features a link for "MARCH 7, 2018 Join WestEd at AERA 2018" with a sub-headline "WestEd staff will be involved in more than 20 sessions, chairing, presenting, or serving as discussant." The AERA logo and "2018 ANNUAL MEETING" are also visible.



## Resources, cont'd

- Carnegie Foundation for the Advancement of Teaching  
<https://www.carnegiefoundation.org/>

# Thank you!

- Carnegie Foundation for the Advancement of Teaching
- Jonathan Dolle, WestEd
- Sola Takahashi, WestEd

**Thank you!**

**Questions?**

## Contact Information

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Tran Keys, Ph.D.: [tkeys@wested.org](mailto:tkeys@wested.org)

Senior Researcher

Joe Sassone: [jsasson@wested.org](mailto:jsasson@wested.org)

Development Director, School and District Services

# Backup Slides

Be problem-focused  
and user-centered



Attend to  
variability



See  
the system



**6**  
CORE PRINCIPLES OF  
IMPROVEMENT



Embrace  
measurement

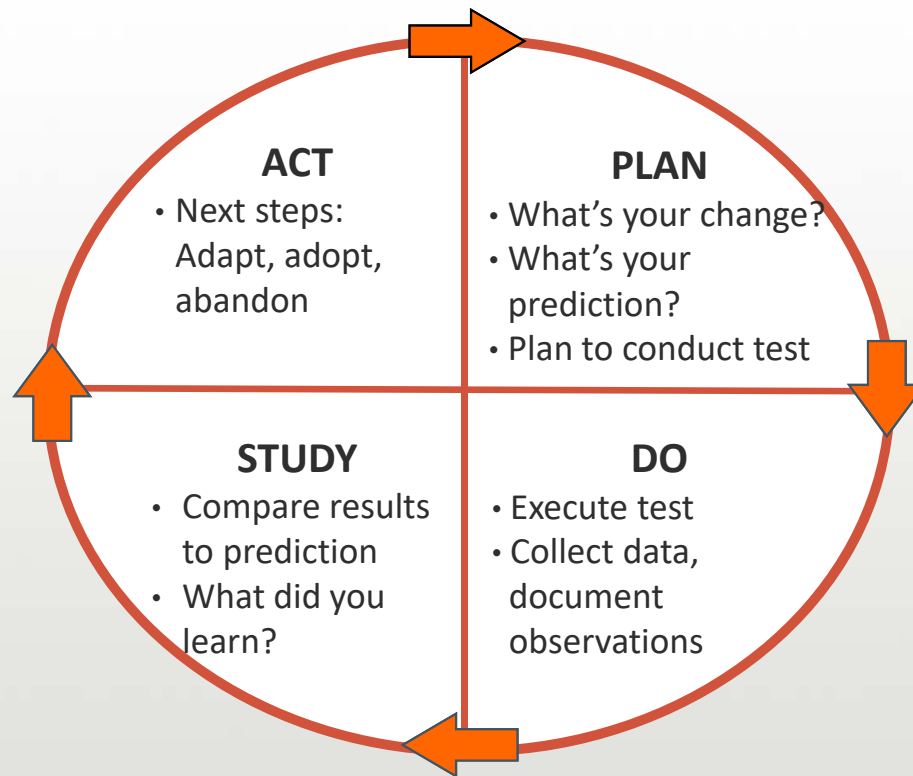
Organize as  
networks



Learn through  
disciplined  
inquiry



# Engine for Learning: The PDSA Cycle



# Practical Measurement

Practical measures are measures that act as sensing mechanisms at the level at which work is carried out. They are “practical” in that they can be collected, analyzed, and used **within the daily work lives** of practitioners. They are also “practical” in that they **reflect practice**. Practical measures are used to identify improvement targets and to learn continuously whether the changes we introduce are improvements.