The Transformation of U.S. Education: from a low to a high(er)-reliability system

Presented to
Connecticut Vision Taskforce
September 14, 2010

By
Tim Waters, Ed.D.

Mid-continent Research for Education and Learning
The Transformation of U.S. Education: from a low to a high(er)-reliability system

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McREL’s mission
Making a difference in the quality of education & learning for all through excellence in applied research, product development, & service.

www.mcrel.org
Presentation Objectives

• Challenge current beliefs and practices
• Make the case that district reliability can increase with existing resources
• Promote the idea that superior execution of existing know-how would be the innovation with the biggest impact on student learning and achievement
• Motivate Connecticut commitment to high-reliability as a key construct in your vision of the future

Presentation Overview

• Premises about school districts and HROs
• McREL conclusions from our research
• Examples of HROs & HRO-like organizations
• Characteristics of HROs
• McREL research findings
• Pithy and highly inspirational closing
4 Premises for this presentation

1. The **primary reason** for adopting content & performance standards, quality assessment and data systems, human capital strategies, and all other improvement initiatives is to increase system reliability.

2. We know enough to transform U.S. education from a low to a higher-reliability system.

3. Schools and districts become higher-reliability organizations through superior execution of existing know-how.

4. Transforming U.S. education from a low to a higher-reliability system will change the odds for children everywhere.

What will it take to increase system reliability and change the odds for our children?
To change the odds for our children, we must examine our practices and the beliefs in which they are grounded.

This may require suspending disbelief long enough to consider new possibilities.

Even when routine ways don’t work, they (educators) simply do more of the same in the belief that more is the key to fixing the problem.

The trouble begins when individuals fail to notice that they only see what is consistent with their beliefs and is only acerbated by the belief that “seeing is believing.”

_Theoretical and Empirical Foundations of Mindful Schools_. Hoy, Gage, and Tarter, 2004
Think – pair – share

Which policies and practices in Connecticut (and perhaps beliefs or values in which they are grounded) need to be most critically and thoughtfully examined?

High Reliability Organizations

Vs

Tightly Coupled Organizations

There is much we can learn from High Reliability Organizations
High-Reliability Organizations (HROs)

High reliability organizations operate in a context where failures are simply too significant to be tolerated, where failures make headlines.


HROs operate under high-risk conditions and take a variety of steps in pursuit of error free performance.

Weick, Sutcliffe, & Obstfeld. 1999

Examples of high-reliability organizations

Air traffic control centers
NASA Shuttle Command Center

Nuclear power plants
Chemical processing plants

The electric power grid
The consequences of failure in these organizations (or systems)?

Catastrophic!

Superior execution of existing know-how is the difference between life and death
Characteristics high-reliability organizations (HROs) share that might inform the transformation of U.S. education from a low to a high-reliability system.

They look for and correct errors & mistakes to prevent failure.
HROs celebrate their successes but are not seduced by them.

*They do not take success for granted and assume that success last time means success the next time.*

They are reluctant to simplify. They identify root causes.
Root cause analysis of failure to master reading

Source: The Center for Data-Driven Reform in Education, Johns Hopkins University

Pareto analysis of errors patterns in writing

District writing process

Cumulative percentage of highly proficient papers

Percentage of papers with errors
They are resilient, refusing to be discouraged by errors & mistakes.

HROs seek an ideal of perfection but never expect to achieve it... They deliver reliability but never take it for granted.

*New Challenges To Understanding Organizations*. 1993. Roberts

They live by the book but are unwilling to die by it.

They defer to those people in the organization with the greatest expertise... rather than title or authority.
They are sensitive to operations at every level of the organization.

They are committed to extensive & effective staff training.
Is **High-Reliability** performance only found in **highly regulated settings** like Air Traffic Control, chemical processing plants, aircraft carriers, and NASA Space Command?

**Medicine...**

New laboratory science is not the key to saving lives. The infant science of improving performance—of *implementing our existing know-how* —is.

Using existing know-how about data-based decisions... better than ever.

$48 million in payroll $209 million in payroll

$640,000 per win $2.3 million per win
Maintaining high-reliability while lowering costs...

An example of reducing costs while maintaining reliability

$12 million saved
“The top performing school systems recognize that the only way to improve outcomes is to improve instruction...”

How the World’s Best-Performing School Systems Came out on Top

High(er) reliability education systems

What these high performing systems do is focus relentlessly on ensuring high instructional quality while reducing variability in the quality of instruction for every student.

Andreas Schleicher, Head of Indicators Division Directorate for Education, OECD
June 24, 2008 presentation in Dover, DE
To improve system reliability we have examined

Quantitative Research

Teaching  Schooling  Leadership
Develop data-driven, “high-reliability” systems

Create high-performance school cultures

Provide whole-child student supports

Guarantee challenging, engaging, & intentional instruction

Ensure curricular pathways to success

What Matters Most
Research & guidance that focuses on what makes the most difference for students
Guarantee challenging, engaging, & intentional instruction

The touchstones

• Setting high expectations and delivering challenging instruction
• Fostering engaging learning environments and meaningful relationships with students
• Intentionally matching instructional strategies to learning goals

Powerful teacher-student relationship variables

• Non-directivity
• Empathy
• Warmth
• Encouraging critical thinking
• Encouraging learning
• Adapting to differences

Kleinfeld, J. (1972). Effective teachers of Indian and Eskimo high school students. Classroom Instruction that Works | Why It Works

<table>
<thead>
<tr>
<th>Classroom Instruction that Works</th>
<th>Why It Works</th>
</tr>
</thead>
</table>
| Identifying similarities & differences | Helps students access prior knowledge  
Develops critical thinking skills (analysis)  
Deepens understanding of new information |
| Summarizing & note taking | Supports acquisition of new knowledge  
Supports critical thinking (analysis, synthesis)  
Deepens knowledge through review and revision  
Identifies misconceptions |
| Reinforcing effort & providing recognition | Motivates learning through positive reinforcement  
Helps students understand importance of effort |
| Homework & practice | Develops good work habits  
Develops automaticity with new skills & knowledge  
Develops critical thinking (application)  
Demonstrates understanding & identifies misconceptions |
| Nonlinguistic representations | Accesses imagery mode of learning  
Supports memorization / recall of acquired knowledge  
Elaborates on and deepens knowledge |
| Cooperative learning | Develops interpersonal skills  
Motivate learning through “positive interdependence” |
| Setting objectives & providing feedback | Focuses learning on important content  
Motivates by personalizing learning  
Helps to identify & correct misconceptions |
| Generating & testing hypotheses | Develops critical thinking skills (evaluating, creating)  
Motivates by accessing “mental set” for problem-solving |
| Questions, cues, and advance organizers | Activates prior knowledge  
Supports critical thinking (analyzing, evaluating)  
Increases curiosity, interest in topic  
Focusses learning |
WHAT MATTERS MOST
Research & guidance that focuses on what makes the most difference for students

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Create high-performance school cultures

Provide whole-child student supports

Guarantee challenging, engaging, & intentional instruction

Ensure curricular pathways to success

Ensure curricular pathways to success

The touchstones

• Providing all students with high-expectations curricula.

• Providing all students with personalized learning opportunities.
Uses text organizers to determine the main ideas and to locate information in a text.

Read the contract, blueprints, specifications, and standards and codes specific to the contract.

Estimate the materials needed, check figures, order the equipment and materials.

Describe and demonstrate how to set up a wall.
Develop data-driven, “high-reliability” systems

Create high-performance school cultures

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Ensure curricular pathways to success

WHAT MATTERS MOST
Research & guidance that focuses on what makes the most difference for students

The touchstones

• Providing real-time supports in keeping with the ounce-of-prevention principle.

• Addressing the deep causes of student performance: home environment, prior knowledge, interest, and motivation.
Factors Related to Student Success
(% variance in achievement)

<table>
<thead>
<tr>
<th>School-readiness skill</th>
<th>Lowest SES</th>
<th>Highest SES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognizes letters of alphabet</td>
<td>39%</td>
<td>85%</td>
</tr>
<tr>
<td>Identifies beginning sounds of words</td>
<td>10%</td>
<td>51%</td>
</tr>
<tr>
<td>Counts to twenty</td>
<td>48%</td>
<td>68%</td>
</tr>
<tr>
<td>Identifies primary colors</td>
<td>69%</td>
<td>90%</td>
</tr>
<tr>
<td>Writes own name</td>
<td>54%</td>
<td>76%</td>
</tr>
<tr>
<td>Amount of time read to prior to kindergarten</td>
<td>25 hours</td>
<td>1,000 hours</td>
</tr>
<tr>
<td>Accumulated experience with words</td>
<td>13 million</td>
<td>45 million</td>
</tr>
</tbody>
</table>

Source: Neuman, 2003
The good news: Early reading intervention works

The power of imaginative play
What works in afterschool?

- One-to-one tutoring in reading
- Combining recreation with learning (e.g., field trips, cultural activities, sports)
- Developing student motivation (e.g., students attending classes on a college campus)

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Create high-performance school cultures
Provide whole-child student supports
Guarantee challenging, engaging & intentional instruction
Ensure curricular pathways to success
Create high-performance school cultures

**The touchstones**

- Raising instructional quality and reducing variability in the quality of instruction within the school.
- Creating a culture of high expectations for academics and behavior.

**Key job of school leaders:**
Reduce variability of instructional quality within their schools
## Selected school-level influences on student achievement

<table>
<thead>
<tr>
<th>Influence</th>
<th>Strong influence (Effect sizes above $d = .40$)</th>
<th>Moderate influence (Effect sizes between $d = .20$ and $.40$)</th>
<th>Weak influence (Effect sizes below $d = .20$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity to learn</td>
<td>.86 (aligning curriculum to assessments and monitoring its use in classrooms)$^1$</td>
<td>.39 (class size (reducing classes from 25 to 15 students)$^2$</td>
<td>.13 (none listed)</td>
</tr>
<tr>
<td>Decreasing disruptive behavior</td>
<td>.85 (programs to address behavior issues)$^2$</td>
<td>.30 (ability grouping (tracking students into different classes by ability)$^2$</td>
<td>.12 (none listed)</td>
</tr>
<tr>
<td>Leadership</td>
<td>.52 (schools with leaders that receive high teacher ratings on key leadership behaviors)$^3$</td>
<td>.27 (after-school programs (out-of-school-time learning experiences, on average)$^4$</td>
<td>.09 (none listed)</td>
</tr>
<tr>
<td>School size</td>
<td>.43 (high school size between 600 and 900 students)$^2$</td>
<td>.26 (cooperation (encouraging professionalism among teachers)$^1$</td>
<td>.06 (none listed)</td>
</tr>
<tr>
<td>School climate</td>
<td>.22 (clearly articulating and enforcing rules of behavior)$^1$</td>
<td>.22 (multi-age classrooms (placing students of different ages/grade-levels in the same classroom)$^2$</td>
<td>.04 (none listed)</td>
</tr>
<tr>
<td>Parental involvement</td>
<td>.43 (involving parents in setting &amp; enforcing policies)$^1$</td>
<td>.26 (cooperation (encouraging professionalism among teachers)$^1$</td>
<td>.06 (none listed)</td>
</tr>
<tr>
<td>Multi-age classrooms</td>
<td>.22 (placements done according to age/grade-level in the same classroom)$^2$</td>
<td>.22 (multi-age classrooms (placing students of different ages/grade-levels in the same classroom)$^2$</td>
<td>.04 (none listed)</td>
</tr>
<tr>
<td>Open classrooms</td>
<td>.11 (open classroom architecture and individualized instruction)$^1$</td>
<td>.11 (open classroom architecture and individualized instruction)$^1$</td>
<td>.01 (none listed)</td>
</tr>
</tbody>
</table>


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What’s the “secret sauce” of improvement?

**School Culture**
We have to think about demoralized schools as if they were \textit{clinically depressed individuals}, people whose emotional state makes every task, even the smallest, seem overwhelmingly difficult ...

Charles Payne
\textit{So Much Reform, So Little Change}
WHAT MATTERS MOST
Research & guidance that focuses on what makes the most difference for students

Develop data-driven, “high-reliability” systems
Create high-performance school cultures
Provide whole-child student supports
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Ensure curricular pathways to success

Develop high-reliability district systems

The touchstones
• Superior execution of “value added” district-level leadership responsibilities.
• Translate HRO characteristics into district policy and practice.
Key job of district leaders: Reduce variability in the quality of instruction between schools

“The top performing school systems recognize that the only way to improve outcomes is to improve instruction…”

How the World’s Best-Performing School Systems Came out on Top
6 value-added district-level leadership responsibilities

1. Engaging in collaborative goal-setting
2. Establishing non-negotiable goals for achievement and instruction
3. Ensuring board alignment and support of district goals
4. Monitoring goals for achievement and instruction
5. Using resources to support instruction and achievement goals
6. Define, differentiate, and extend autonomy to schools

HOW McREL HELPS SCHOOL SYSTEMS

CHANGE THE ODDS

FOR STUDENT SUCCESS

FOCUSED ON
WHAT MATTERS MOST
Focusing on what makes the most difference for students with research & thought partnerships

DELIVERING
WHAT WORKS
Translating research into action through professional development

ANTICIPATING AND CREATING
WHAT’S NEXT
Helping school systems stay ahead of the curve with custom design services
The challenge for educational leaders in Connecticut?

Suspending disbelief about what is possible

- and -

superior execution of existing know-how

For more information

• Visit the McREL Web site
  - www.mcrel.org

• E-mail Tim Waters at:
  - twaters@mcrel.org