Deep Learning and the Connection to STEM Integration

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Keynote
GE Summit: Building a STEM Leadership Alliance

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3 BIG IDEAS

Systemness   Pedagogy   Impact

NEW LEADERSHIP

- Cycles of trying things and making meaning
- Co-learning among all dominates
- Leaders listen, learn and ask questions
- Leaders help crystallize, articulate and feed back what they see
- Leaders act on what they see including assessing impact

STEM: FAILURE TO INTEGRATE RE

- Transformation of Learning
- Character and Citizenship (the 6Cs)
- Attack Inequity with Deep Learning
- Change Culture not just Programs and Standards
- World is Awry: Stress, Anxiety, Unpredictability
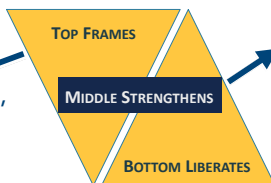
LEADERSHIP FROM THE MIDDLE

A strategy that increases the capacity of the middle as it becomes a better partner laterally, upward and downward.

GENERAL PRINCIPLES:
EXPLOIT UPWARD; LIBERATE DOWNWARD; LATERALIZE EVERYWHERE

Shapes, Messaging, Invests, Interacts, Intervenes

TOP FRAMES

MIDDLE STRENGTHENS

Strengthens, Builds Capacity, Trusts and Interacts
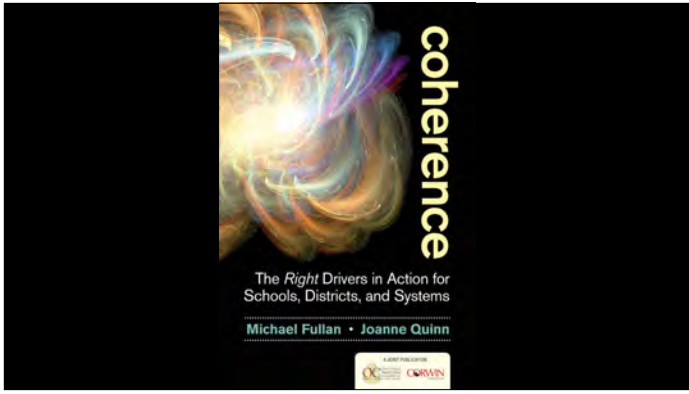
BOTTOM LIBERATES

Liberates as it interacts laterally and vertically
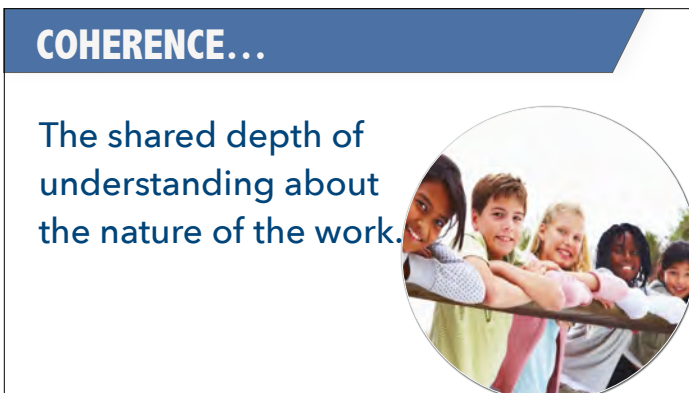

BENEFITS OF LEADERSHIP FROM THE MIDDLE

Unleashes badly needed innovation on a large scale while at the same time helping to assess and sort out what should be retained and spread.

coherence

The *Right* Drivers in Action for
Schools, Districts, and Systems

Michael Fullan • Joanne Quinn

The Coherence Framework

Focusing Direction

Creating Collaborative Cultures

LEADERSHIP

Securing Accountability

Deepening Learning

COHERENCE…

The shared depth of understanding about the nature of the work.

The Coherence Framework

Focusing Direction
- Purpose Driven
- Goals That Impact
- Clarity of Strategy
- Change Leadership

Creating Collaborative Cultures

LEADERSHIP

Securing Accountability

Deepening Learning

PURPOSE DRIVEN: QUICK WRITE

▸ Clarify your own moral purpose by reflecting and recording your thoughts about these four questions using the quick write protocol.

▸ Share your thoughts with other members of your team and discuss themes that emerge.

What is my moral purpose?

What actions do I take to realize this moral purpose?

How do I help others clarify their moral purpose?

Am I making progress in realizing my moral purpose?

CLARITY OF STRATEGY

Successful change processes are a function of shaping and reshaping good ideas as they build capacity and ownership.

The Coherence Framework

Creating Collaborative Cultures
- Culture of Growth
- Learning Leadership
- Capacity Building
- Collaborative Work

Focusing Direction

LEADERSHIP

Securing Accountability

Deepening Learning

THREE KEYS TO MAXIMIZING IMPACT

System Player

Change Agent

Maximizing Change

Leading Learning

THE PRINCIPAL'S NEW ROLE

To lead the school's teachers in a process of learning to improve their teaching, while learning alongside them about what works and what doesn't.
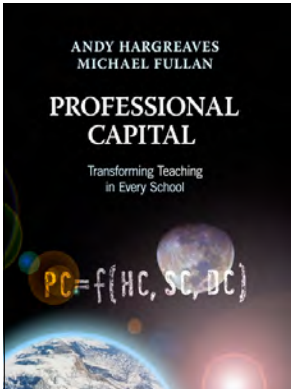
INTRINSIC MOTIVATORS

- ‣ Sense of purpose
- ‣ Mastery
- ‣ Degree of autonomy
- ‣ Connectedness

ANDY HARGREAVES
MICHAEL FULLAN

PROFESSIONAL CAPITAL

Transforming Teaching in Every School

PC=f(HC, SC, DC)

PC IS A FUNCTION OF:

- ‣ Human Capital
- ‣ Social Capital
- ‣ Decisional Capital

WITHIN SCHOOL VARIABILITY

Variability of performance between schools is 36%, while variability within schools is 64%.

OECD

THE STRUGGLE BETWEEN AUTONOMY AND COLLABORATION

‣ Autonomy is not isolation

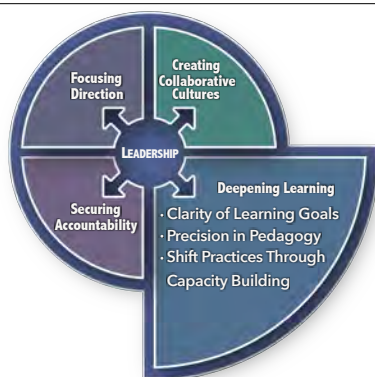‣ Connected autonomy is essential

‣ Collaborative professionalism

The Coherence Framework

Securing Accountability
· Internal Accountability
· External Accountability

The Coherence Framework

Deepening Learning
· Clarity of Learning Goals
· Precision in Pedagogy
· Shift Practices Through Capacity Building

STICKY PHRASES

1. Go Slow to Go Fast
2. Talk the Walk
3. Use the Group to Change the Group
4. Precison not Prescription
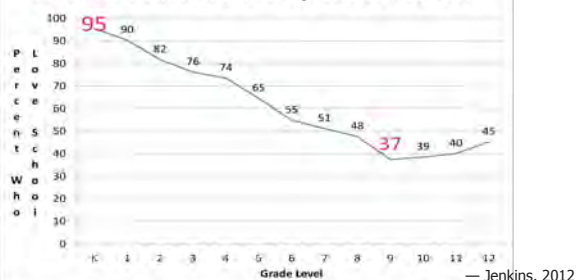5. Trust and Interact/Candour and Autonomy
6. Go Outside to Learn Inside

IT'S GETTING WORSE ...

Loss of Enthusiasm by Grade Level

— Jenkins, 2012

EXCITING NEW LEARNING NEEDS TO BE:

- ‣ Irresistibly engaging
- ‣ Elegantly efficient
- ‣ Technologically ubiquitous
- ‣ Steeped in real life problem solving
- ‣ Involve deep learning

QUOTE WALKABOUT (SEE HANDOUT)
Read the quotes below and select the one that most connects for you and why (see handout)

1. Resolving the equity- excellence miasma is at the heart of societal survival, and deep learning is capable of bring together excellence and equity for all… p.xvii	2. Some students arrive on the doorsteps of schools every day without the readiness to learn… The stance and mindset of teachers is crucial: Do they connect or correct? Do they see this as an opportunity to build communication or interpret it as defiance or apathy. p.23
3. We take the position that learning is the foundational driver and technology can be a great accelerator. p.xiii	4. Make deep learning the pull factor of the decade- people are ready for it even if they don't know until they experience it. p.10
5. The change lesson here is that we need to change the culture of learning not imply the trappings or structures. p.26	6. Students have untapped potential but given voice and choice through deep learning we see them influencing dramatic changes to organizations, society and pedagogy. p.48
7. Deep learning occurs when we use the competencies to engage in issues and tasks of value to students and the world. p. 18	8. Quite often things that look "cool" are not deep with respect to learning. p.69
9. Making the walls of the school transparent is not just about redesigning space but requires taking stock of the ways we can connect inside and outside the classroom. p.80	10. We cannot rely on individual teachers to turn the tide one by one, but rather we need an approach that mobilizes whole schools, districts and systems. p.97
11. If the teachers and leaders are not thinking deeply, its unlikely they will create those conditions for their students. p.98	12. Go outside to get better inside. p.118

Deep Learning: Engage the World Change the World. Fullan, Quinn & McEachen, Corwin, 2017

MICHAEL FULLAN

JOANNE QUINN

JOANNE MCEACHEN

DEEP LEARNING
Engage the World Change the World

A JOINT PUBLICATION
CORWIN

WHAT IS DEEP LEARNING?

- Quality learning that sticks with you the rest of your life
- Learning that Engages the World Changes the World

New Pedagogies for Deep Learning
A Global Innovation Partnership
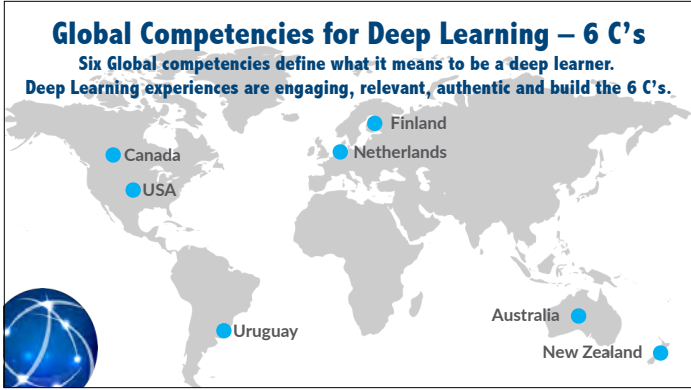
New Pedagogies for
Deep Learning
A GLOBAL PARTNERSHIP

OUR PURPOSE

To foster deep learning so that all learners contribute to the common good, address global challenges and flourish in a complex world.
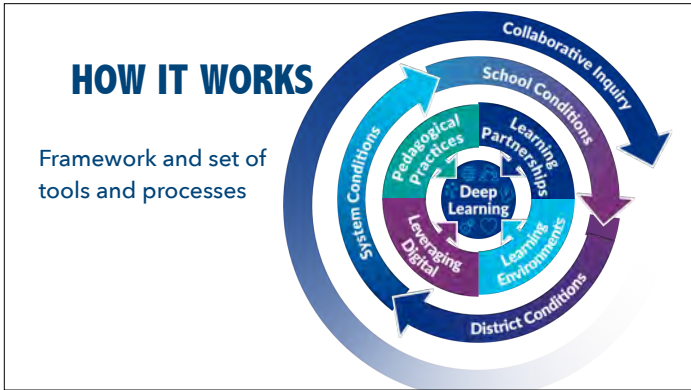
Global Competencies for Deep Learning – 6 C's

Six Global competencies define what it means to be a deep learner.
Deep Learning experiences are engaging, relevant, authentic and build the 6 C's.

Finland
Canada
Netherlands
USA
Uruguay
Australia
New Zealand

31

WHAT WE DO

We build knowledge and practices that foster deep learning and whole system change

32

HOW IT WORKS

Framework and set of tools and processes

Collaborative Inquiry
School Conditions
Learning Partnerships
Pedagogical Practices
System Conditions
Deep Learning
Leveraging Digital
Learning Environments
District Conditions

33

GLOBAL COMPETENCIES FOR DEEP LEARNING – 6 C'S
SIX GLOBAL COMPETENCIES DEFINE WHAT IT MEANS TO BE A DEEP LEARNER.DEEP LEARNING EXPERIENCES ARE ENGAGING, RELEVANT, AUTHENTIC AND BUILD THE 6 C'S.

CREATIVITY
Having an 'entrepreneurial eye' for economic and social opportunities, asking the right inquiry questions to generate novel ideas, and leadership to pursue those ideas and turn them into action.

CRITICAL THINKING
Critically evaluating information and arguments, seeing patterns and connections, constructing meaningful knowledge, and applying it in the real world.

COMMUNICATION
Communicating effectively with a variety of styles, modes, and tools (including digital tools), tailored for a range of audiences.

CHARACTER
Learning to deep learn, armed with the essential character traits of grit, tenacity, perseverance, and resilience; and the ability to make learning an integral part of living.

CITIZENSHIP
Thinking like global citizens, considering global issues based on a deep understanding of diverse values and worldviews, and with a genuine interest and ability to solve ambiguous and complex real-world problems that impact human and environmental sustainability.

COLLABORATION
Work interdependently and synergistically in teams with strong interpersonal and team-related skills including effective management of team dynamics and challenges, making substantive decisions together, and learning from and contributing to the learning of others.

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YOUNG MINDS OF THE FUTURE

Make a note of any 6Cs you see in the Young Minds video
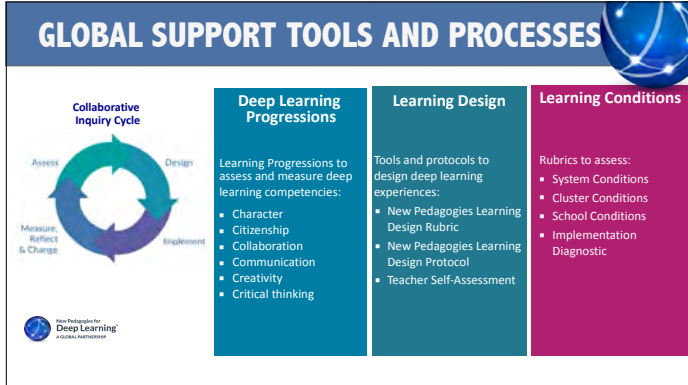
PRECISION IN PEDAGOGY: VIDEO CASE STUDY (SEE HANDOUT)

Observe the video and identify evidence of your assigned element of learning design.

Pedagogical Practices	
Learning Partnerships	
Learning Environment	
Leveraging Digital	

GLOBAL SUPPORT TOOLS AND PROCESSES

Collaborative Inquiry Cycle

Assess — Design — Implement — Measure, Reflect & Change

New Pedagogies for Deep Learning
A GLOBAL PARTNERSHIP

Deep Learning Progressions

Learning Progressions to assess and measure deep learning competencies:
- Character
- Citizenship
- Collaboration
- Communication
- Creativity
- Critical thinking

Learning Design

Tools and protocols to design deep learning experiences:
- New Pedagogies Learning Design Rubric
- New Pedagogies Learning Design Protocol
- Teacher Self-Assessment

Learning Conditions

Rubrics to assess:
- System Conditions
- Cluster Conditions
- School Conditions
- Implementation Diagnostic

LOGISTICS - WHAT DO SCHOOLS DO?

- Identify a school lead as contact
- Assess current capacity using rubrics
- Support teachers to participate in collaborative inquiry cycles using the progressions and tools at least twice annually
- Support teachers to submit ratings on one progression annually
- Select and submit one exemplar to the cluster annually

LOGISTICS - WHAT DO CLUSTERS DO?

▸ Develop a plan to select and support schools and School Leads

▸ Plan professional learning and resources to support implementation

▸ Facilitate a moderation of exemplars of Deep Learning from schools and submit up to 10 to the global team

▸ Participate in the monthly Cluster Team Calls

▸ Attend the NPDL Global Events and Regional events as possible

WHAT IS DEEP LEARNING

▸ Learning that sticks with you the rest of your life

▸ Learning that connects with passion

▸ Learning that is team related

▸ Learning that has significance (Engage Change the World)

▸ Learning that involves higher order skills

EMERGENT DISCOVERIES

▸ Helping humanity

▸ Life and learning merge

▸ Students as change agents

▸ Working with others is an intrinsic motivator

▸ Character, citizenship and creativity are catalytic

▸ Attack inequity with excellence

ATTACK INEQUITY

▸ Attack inequity with excellence and the rest will be covered.
▸ Don't dumb-down; Smarten-up.

CANARY CHILDREN

▸ Signs of imminent danger
▸ Miners trained to react; teachers not
▸ Attack inequity with Deep Learning
▸ Turned on Canary Children benefit themselves and society

(Thanks to Rebecca Wells for the idea)

STEM: FAILURE TO INTEGRATE RE

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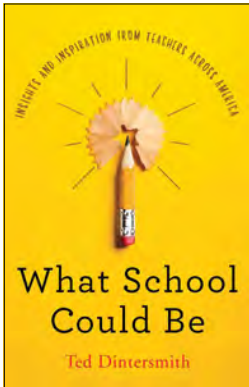
INTEGRATION VS ADAPTING

1. Pedagogy vs Content Tasks
2. Practice vs Standards
   (standards are catalysts for changing culture)
3. Interpreting and Adapting to the World vs
   Engaging and Changing the World
4. Reculturing vs Restructuring Schools
5. Redefining vs Perpetuating Schools
6. Changing Systems vs Changing Schools
7. Attacking Inequity vs Incentivizing Individuals

INTEGRATION VS ADAPTING

"Most young girls are enthusiastic about science in elementary school but seldom pursue STEM careers…

Young women are far more interested in pursuing STEM to solve big challenging problems " (p. 133).

INTEGRATION VS ADAPTING

"Over and over educators relate to me their delight in seeing under achieving kids spring into accomplishment when taking on something they believe is important that aligns with their sense of purpose" (p. 104-105).

QUOTES

"Across the country, poor and working-class people are targeted by new tools of digital poverty management and face life-threatening consequences as a result" (p. 1).

"Automated tools for classifying the poor, left on their own, will produce towering inequalities unless we make an explicit commitment to forge another path" (p. 200).

AUTOMATING INEQUALITY

HOW HIGH-TECH TOOLS PROFILE, POLICE, AND PUNISH THE POOR
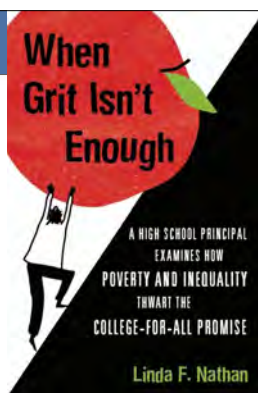
VIRGINIA EUBANKS
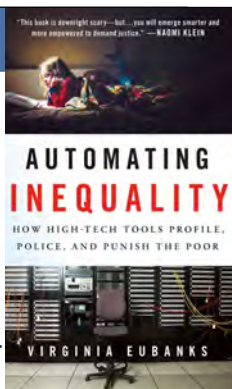
QUOTES

"Because STEM fields are stereotypically associated with men and masculinity, women perceive them as antithetical to themselves as female and that they do not belong in those contexts" (p. 84).
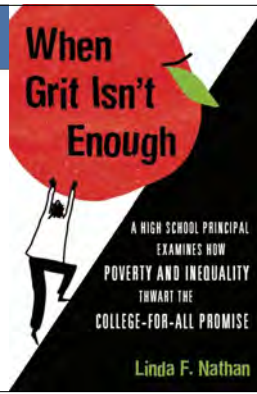— Meredith Broussard, Artificial Unintelligence

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QUOTES

"It's frustrating to know that the kind of learning involved to pass standardized tests does not bolster students' sense of agency or belonging, and there is little room for the kind of learning that would – the kind where students deeply feel they can make change" (p. 158).

When Grit Isn't Enough

A HIGH SCHOOL PRINCIPAL EXAMINES HOW POVERTY AND INEQUALITY THWART THE COLLEGE-FOR-ALL PROMISE

Linda F. Nathan

QUOTES

"When the emphasis on grit ends up as a stand-alone pedagogy, the context of students' family life and family circumstances is ignored" (p.76).

When Grit Isn't Enough

A HIGH SCHOOL PRINCIPAL EXAMINES HOW POVERTY AND INEQUALITY THWART THE COLLEGE-FOR-ALL PROMISE

Linda F. Nathan

IT'S TIME TO TRANSFORM LEARNING

Purpose Driven: Quickwrite

- Clarify your own moral purpose by reflecting and recording your thought about these four question using the quick write protocol.
- Share your thoughts with other members of your team and discuss themes that emerge.

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What actions do I take to realize this moral purpose?	
How do I help others clarify their moral purpose?	
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Quote Walkabout

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Precision in Pedagogy

Observe the video and identify evidence of your assigned element of learning design.

Pedagogical Practices	
Learning Partnerships	
Learning Environments	
Leveraging Digital	

Canary Child – A Catalyst for Deep Learning
Adapted from Rebecca Wells, 2018

The term *canary down the mine* has been used in many contexts, but no term better describes the warning signals given to teachers by students as they disengage from learning. Just as the canary was a good indicator of imminent danger to the miner, our canary children are sending constant warnings about the state of education in our classrooms, schools and systems. The difference is, however, that where workers in mines were taught to look for distress signals in their birds, teachers are taught no such thing. When a student is not behaviourally or cognitively engaged in the learning, the problem is thought to lie with the student, rather than the environment, content or mechanisms of the teaching. There are myriad reasons given for this, from learning disabilities, poverty or disadvantaged home situations, to laziness and poor attitude. In short the child is scrutinised for not fitting the pedagogy, rather than the other way round.

Canaries and students, it turns out, are not too dissimilar in how they show their distress. Canaries ruffle their feathers, hide their heads beneath their wings and jump to other perches in their cage to try and escape unfavourable conditions. How many students, unable to follow the learning, falling behind, disinterested and disempowered, will also ruffle their feathers and create a scene, or hide away quietly, hoping not to be noticed?

Every classroom has at least one canary child, if not several. They are the students whose sense of purpose and self-esteem is slowly eroded through exposure to systems they are not compatible with, or learning they are not connected to. They are the children who don't fit, don't belong, can't keep up or can't see any meaningful purpose in the tasks and work they are asked to do. They are victims of their environment and a system that increasingly values competition over personal best, a system that strives to churn out ever higher scores to compete on local and global rankings, rather than striving to produce productive, empowered and creative citizens.

These students eventually become the youth who disengage. They leave our schooling systems in increasing numbers worldwide, at great personal cost to their own futures, and diminishing the potential talent pool and contribution to the wellbeing of the entire human race. This same group remain marginalised beyond age 19, undereducated and underemployed. The proportion of canary children is at least 25%, and much more if we include all children who are not engaged in learning.

However rather than cause for concern, the canary child should be viewed as a gift. They offer teachers, schools, districts and policy makers an opportunity to reset the direction of education, and rewrite the journey. They demand discussion and debate about who exactly education is for, simply by showing that it isn't working for them. They are the proof that things must change so that the educational experience is relevant, meaningful, authentic and purposeful. They are the catalyst to awaken us to the realisation that success must be attainable for every single child, and that learning be intentionally designed, system-wide, to engage, challenge, excite and provide the conditions for all children to thrive.

Underground, miners watched their birds diligently. They were acutely aware that any discomfort or signs of distress in their birds could result in their own deaths. There was an urgency to their relationship. For teachers, schools and systems there is no real threat to their existence if a student falls through the cracks. In many cases there is even a benefit to the disengagement from schooling from underperforming students. One less underachieving student increases overall scores in measures that rank students, schools, systems and even countries, from high school certificates and tertiary entry rankings in secondary schools to global PISA rankings.

As long as we sustain education systems that value the end result over the journey, we fail our children. When we fail our children, we fail our society. We fail as human beings. Yet there is plenty of reason for hope. Right across the world Deep Learning is 'attacking inequity' by engaging canary children. Still it is not enough. We need to make this a social movement of grand proportions.

Canary Child Worksheet
Rebecca Wells and Michael Fullan

Name a Canary Child you encountered (pseudonym) and his/her age.

_____

1. What were indicators of being disconnected?	
2. What was the degree of engagement at the beginning? (Scale of 1-10 with 1 being lowest.)	
3. What actions did you take to respond to the student?	
4. How did the student respond over time?	
5. What progress did you make over what time frame?	
6. What was the degree of engagement at this later stage? (Scale of 1-10 with 1 being lowest.)	
7. What single action do you think had the biggest impact on this student?	
8. How did the leadership of your school or system enable or empower you to respond to there needs of this child?	
9. Were there any conditions that you felt unable to change for this child in your context?	