Learning to Improve; Collective Learning Systems

September 4 & 5, 2014
SREE Conference

Alicia Grunow & Sandra Park
Carnegie Foundation for the Advancement of Teaching
Q: How do you achieve quality with reliability across complex systems?

A: By accelerating learning in and through practice to improve
Less than half of Community College students get a diploma within 6 years

“We need 5 million more Community College graduates by 2020”
- Obama 2009

Where to start?
“Developmental mathematics is where aspirations go to die.”

Uri Treisman
Dana Center, UT Austin
A Specific High-Leverage Problem

60-70% Students assigned to developmental math course.

80% Percent of these students that never get past this gate.

500,000 students in every cohort will never complete college math requirement.

If we continue to do what we have always done, we will continue to get what we have always gotten.
A learning to improve approach

44 Teams of Community College Faculty

Designers
Researchers

Carnegie Foundation for the Advancement of Teaching
A Learning System

Theory of Practice Improvement → Standard Work Processes (Change Ideas) → Practical Measurement → Quality Reliably At Scale

p. 116, Improving (draft)
A Common Aim

Improve developmental math

Double the number of developmental math students who achieve college math credit within one year of continuous enrollment

By June 2015, the number of developmental math students who achieve college math credit within one year of continuous enrollment will increase from 5% to 50%.
Aim Statements

What are we trying to accomplish?

What is the purpose of an AIM statement?
- Clearly defines success for an improvement effort
- **Scopes** the effort: defines the system that you will improve
Improve homework completion rates in a classroom
Design professional learning communities for a school
Design a new high school math curriculum in a district
Redesign developmental mathematics in CC nationwide

Improve the service in a school cafeteria
Improve the student discipline process in a school
Reengineer a school
Reengineer a school district

Scale of Complexity of Improvement Efforts

LEAST FORMAL & COMPLEX

Most Formal & Complex

Geography, number of people involved, new vs. existing, process vs. system

Less required
More required
Good AIM Statements…

…Answer the question:

WHAT ARE WE TRYING TO ACCOMPLISH?

- **How much?** (measureable, specific, numerical goals)
- **By when?** (time frame)
- **For what/whom?** (target population or setting or system/process)
By June 2013, the number of developmental math students who achieve college math credit within one year of continuous enrollment will increase from 5% to 50%.
Activity

- Write an aim statement for the problem you selected in the last session
  - Make choices about how to scope the effort and where to start
  - Define success for the improvement effort
A Learning System

- Theory of Practice Improvement
- Standard Work Processes (Change Ideas)
- Quality Reliably At Scale
- Practical Measurement

p. 116, *Improving* (draft)
Carnegie’s Community College Pathways 
Networked Improvement Community

What are we trying to accomplish?

Increase the number of Community College students achieving college math credit within one year of continuous enrollment from 5-50%

Current Performance
Increase the number of Community College students achieving college math credit within one year of continuous enrollment from 5-50%.

What are we trying to accomplish?

Theory of Practice Improvement

“Probably wrong and definitely incomplete”

Current Performance
A Driver Diagram

- Change
- Change
- Change

Probably wrong and definitely incomplete
A Learning System

Theory of Practice Improvement

Standard Work Processes (Change Ideas)

Quality Reliably At Scale

Practical Measurement

p. 116, Improving (draft)
Practical Measurement System

- Change
- Process Measure

AIM

Primary Driver

Secondary Drivers

Driver Measures

Outcome Measures

Less frequently

More frequently
How do you build this learning system?
Carnegie’s Community College Pathways

Increase the number of Community College students achieving college math credit within one year of continuous enrollment from 5-50%

Pathway through developmental math

Instructional System

“Student Success”

Language and Literacy

Advancing Teaching
## CHALLENGE SPACE

### Instructional System
- Reforming student COURSE PLACEMENT AND REGISTRATION PROTOCOLS
- Minimizing COURSE SEQUENCE HURDLES
- Articulating new LEARNING GOALS relevance + value
- Challenging student & faculty BELIEFS ABOUT LEARNING MATHEMATICS
- Targeting the SOCIAL ORGANIZATION OF CLASSROOMS to enhance student engagement
- Embracing EVIDENCE-ANCHORED INSTRUCTIONAL DESIGN
- Smoothing the path I: HS-CC ALIGNMENT
- Integrating SUPPORTS OUTSIDE OF CLASSROOM INSTRUCTION for student learning
- Smoothing the path II: TRANSFER REQUIREMENTS

### Information Infrastructure
- MONITORING IMPROVEMENT EFFORTS towards success
- Creating a universal STUDENT-CENTRIC DATA SYSTEM
- Focusing institutional RESEARCH ON INSTRUCTIONAL IMPROVEMENT
- Strengthening DATA on STUDENT ENGAGEMENT & LEARNING

### Student Support System
- Strengthening STUDENT CONNECTIONS to college and a future
- Integrating with ADVISING/ GUIDANCE FOR STUDENT SUCCESS Programs and processes
- Assuring OUT-OF CLASS SUPPORTS so that all students succeed
- Building on-ramps to effectively TRANSITION students into college

### Human Resource System
- Attending explicitly to LEARNING TEACHING
- ALLOCATING FACULTY RESOURCES for student success
- HIRING FOR EFFECTIVE TEACHING
- FACULTY EVALUATION for improving instruction

### Governance
- REFORMING INCENTIVES for improving teaching and learning
- ALIGNING RESOURCES for student success

### Challenges at the Classroom Level
- Challenges at the Organizational Level
- Challenges at the System/Field Level

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**Governance**
(affects all systems)
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Challenges at the Organizational Level
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Carnegie’s Community College Pathways

Increase the number of Community College students achieving college math credit within one year of continuous enrollment

Pathway through developmental math

Instructional System

“Student Success”

Language and Literacy

Advancing Teaching
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M?
Can pay for tuition, fees, supplies, and living expenses.

Choosing Courses

Study Skills

Financial Aid support

Navigating the college campus

Sense of self-efficacy

Self Regulated Learning

Peer tutors

Orienta.on

Ensuring placed into appropriate courses

Metacognitive monitoring of progress toward goals and of effectiveness of strategies

Creating student cohorts

Access to college services

Career planning

Counseling
Increase the number of Community College students achieving college math credit within one year of continuous enrollment.

1. Conceptual Task: reduce to 5 core ideas focus on underlying malleable causes.
Increase the number of Community College students achieving college math credit within one year of continuous enrollment.

**Productive Persistence**

- Institutional Structures
- Instructional System
- Language and Literacy
- Advancing Teaching

- Anxiety Regulation
- Study Skills
- Mindsets about potential to learn math
- Mindsets about the value of math
- Supportive social relationships

A quote from a student after taking a math quiz.
“I am embarrassed by how stupid I am and suddenly feeling very discouraged ... I can't even tell which fraction is bigger than another, or where they should fall on the number line. I feel like crying.”
Increase the number of Community College students achieving college math credit within one year of continuous enrollment.

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2. **Practical Measures:**
reduce 900 items to 26 “you have 3 minutes”

Practical Measurement (in press)
Anthony Bryk, David Yeager, Jane Munich, Hannah Hausma
Lawrence Morales
Aim: Increase the number of Community College students achieving college math credit within one year of continuous enrollment.

Developing a Measurement System

Productive Persistence

Overall Course Success (B- of better and passed both exams)

- Low on 0 factors: 78%
- Low on 2 factors: 42%
- Low on 4 factors: 21%
Aim: Increase the number of Community College students achieving college math credit within one year of continuous enrollment.
Increase the number of Community College students achieving college math credit within one year of continuous enrollment.

How to translate ideas into classroom activities

“Starting Strong” Package
Increase the number of Community College students achieving college math credit within one year of continuous enrollment. Do they change outcomes?

Institutional Structures

Instructional System

Language and Literacy

Advancing Teaching

Productive Persistence

“Starting Strong” Package
Starting Strong Package

Note: Values show differences between baseline (day 1) and week 3+ values of each cause of productive persistence. All effects significant at $p < .001$. 
Increase the number of Community College students achieving college math credit within one year of continuous enrollment.

Productive Persistence

Institutional Structures

Instructional System

Language and Literacy

Advancing Teaching

I-5-25-Network Wide

Absence Noticing routine

“Starting Strong” Package
“A Change Package”

Every situation is unique

Standard Work Processes

Undesirable variation
High leverage processes

Always requires local adaptation
A Learning System

Theory of Practice Improvement

Standard Work Processes (Change Ideas)

Quality Reliably At Scale

Practical Measurement

p. 116, Improving (draft)
Effects: Time to Complete a College Level Math Course

- Traditional Sequence
  - 1 Year: 6%
  - 2 Years: 15%

- Statway
  - 1 Year: 51%
The “Mario Kart Track”

Increase from 5% to 50%.

Reclaim the mathematical lives of 10,000 college students by July 1, 2015.

Theories & Ideas
Group Activity

- Return to your aim statement
  - How would you go about building a learning system to engage multiple experts in making progress?
  - What resources exist that you can build on?

- What would you need to do to build the learning system? What challenges would you face?
A Learning System

Theory of Practice Improvement

Standard Work Processes (Change Ideas)

Quality Reliably At Scale

Practical Measurement

p. 116, Improving (draft)
“Change will lead to insight far more often than insight will lead to change”

-Milton Erickson