Blunt Observations and Practical Strategies for Orchestrating Far More Impactful PD in Mathematics

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Tell them what you believe

It is clear that what passes for "Professional" Development of teachers of mathematics is seriously underperforming. Rarely does typical PD change teacher knowledge or classroom practice, which is why it so rarely improves student achievement.

This afternoon I plan to take a careful look at why this is so and how we need to make accessible, but radical, changes in what passes for PD.

That is…

…building a game plan for trying out, advocating for, and demanding consistent opportunities for effective, collegial, professional growth.

Ask them to reflect

Thinking about my last PD, in the 2 to 3 weeks following the “event”:

- **I did nothing differently.**
- **I tried one or two things once.**
- **I made minor changes that are still being practiced.**
- **I made a major change and it is still being practiced.**

Why so little impact?

- One size fits all
- One-shot
- Thrown together as part of a smorgasbord of options
- No opportunity to practice
- Rarely done collaboratively
- Often only marginally connected to teaching math
- Only tenuously connected to real needs
- Other???

Last spring in an unnamed FL district

PD Day for all K-5 teachers!!

- **Morning: Active shooter training (I kid you not)**
- **Afternoon: 1:15 – 4:00 pm – ME – "Strengthening the Teaching and Learning of Mathematics in our Elementary Schools**

PD as something done to us, to fix us, where the expectations for change have no connection to how little impact it has.

Familiar??

Garet, Porter, Desimone, (2001)

Three core features of professional development activities that have significant, positive effects on teachers' self-reported increases in knowledge and skills and changes in classroom practice:

(a) focus on content knowledge;

(b) opportunities for active learning; and

(c) coherence with other learning activities.

What we know from 2 major random controlled PD impact study:

Even incredibly well planned and delivered PD results in:

- **No change in teacher knowledge;**
- **No change in teacher classroom practice; and**
- **Therefore, no change in student achievement.**

Ergo: it is not “professional” and it doesn’t “develop.”

And we all know it.

When it comes to most PD

- **What is typical is done TO us, not with us.**
- **What is typical ignores common sense and research.**
- **What is typical hasn’t worked and needs to change.**

An irreverent question to ponder:

Which is a bigger waste of time:

- **assigning, completing, reviewing homework**

or

- **Sitting through another after-school, one-shot PD session where we check e-mail and grade papers?**

Hmmm…
How far off am I?
What are come alternatives?
But 1st, let's ensure we share a common vision.

Come with me to Grade 6 SA Harlem Central Tues Dec 8, 2015

- **Lesson 6 in the Expressions unit (6.EE standards)**
- **Ally and Mabubar co-teaching**
- **19 Scholars**
- **Driven by a number strings mini-lesson, a Math Workshop task and an exit ticket**
- **“Our goal for today is to “identify, create and understand equivalent expressions.”**
- **“Zayasia, can you please repeat our learning goal?”**
- **“Let’s begin with out number strings.”**

Number strings for today's Mini Lesson

Are they equivalent? How do you know?

1. **4(8) = 4(3 + 5)**

2. **4(8) = 4(a + 5)**

3. **4(8) = 4(3 + b)**

4. **3x + 3y = 3(x + y)**

Let's summarize: For each: Always, sometimes, never equivalent?

Math Workshop Task

Jan normally rides her bike to and from work.

Her normal route is 18 miles from home to work.

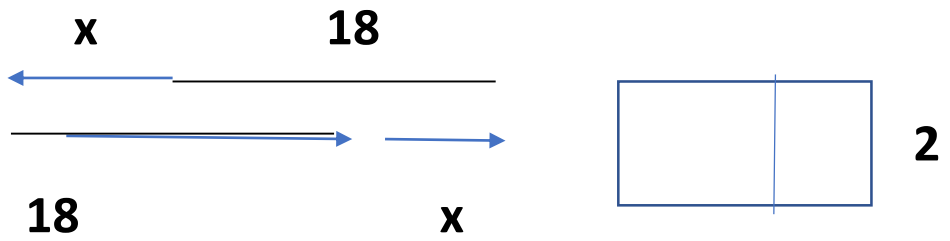
One day she goes to a coffee shop on her way to work and on her way home.

This adds x miles to her trip each way.

(“What do you notice?” “What’s the question?”)

Great: Write and show the distance Jan travels using a diagram or picture and two different, but equivalent, expressions.

Resulting in:



- **18 + x + 18 + x**
- **2(18 + x)**
- **2(x + 18)**
- **x + x + 18 + 18**
- **36 + 2x**

“Is everyone correct? Turn and tell your partner why?”

“What do the numbers and variables represent?”

“Which expression is simplest or easiest to use? Why?”

Lesson 6 Exit Ticket

Which of the following represent equivalent expressions?

Explain or show your process of determining which expressions ARE equivalent.

Select all that apply:

a. $x + x + x + x = 4x$

b. $15\ y + 5x = 3(5y + x)$

c. $6(2 + x) = 12 + 6$

d. $3(x + y) = 3x + y$

Principles to Actions:
Ensuring Mathematical Success for All

Mathematics Teaching Practices

- **Establish mathematics goals to focus learning.**
- **Implement tasks that promote reasoning and problem solving.**
- **Use and connect mathematical representations.**
- **Facilitate meaningful mathematical discourse.**
- **Pose purposeful questions.**
- **Build procedural fluency from conceptual understanding.**
- **Support productive struggle in learning mathematics.**
- **Elicit and use evidence of student thinking.**

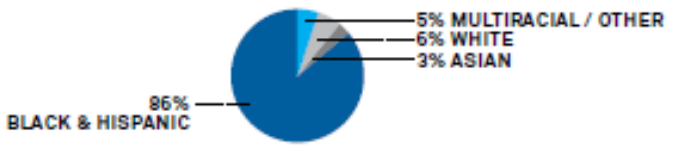
Elements of Quality or Why so Effective?

- **Clarity of goals (not Lesson 4.5 or pages 214-217)**
- **Context (not naked)**
- **Rich tasks (not exercises)**
- **Focused intentional questions (not punting)**
- **Opportunities for discourse (not just telling)**
- **Gradual reveal (not just a dumping)**
- **Multiple representations (not one way)**
- **Alternative approaches (not one way)**
- **Explanations and justifications (not just answers)**
- **Common errors and misconceptions (not just right correct approaches)**
- **Sense-making by students (not lecture)**
- **Evidence (not I taught it and let the chips….)**

And the result?

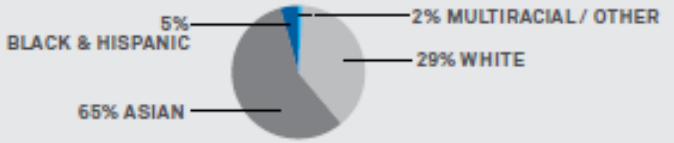
The State's Top School Districts

#1 Success Academy
Enrollment: 14,000*
Household Income: $32,191
Funding per pupil: $14,027
* 2016–17



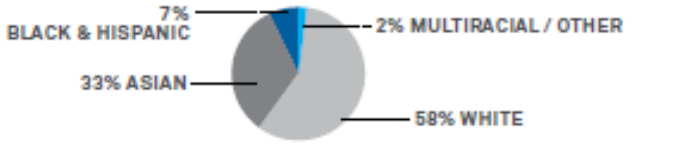
95% Passed Math
84% Passed ELA

#2 Jericho
Enrollment: 2,999
Household Income: $151,729
Funding per pupil: $40,832



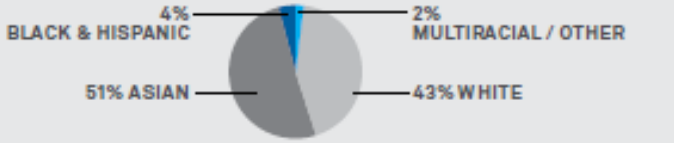
85% Passed Math
81% Passed ELA

#3 East Williston
Enrollment: 1,711
Household Income: $161,750
Funding per pupil: $33,650



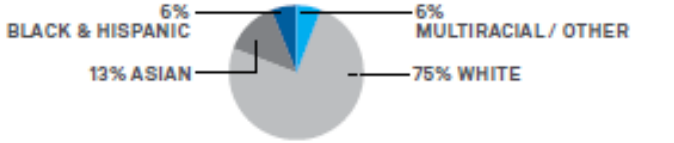
84% Passed Math
77% Passed ELA

#4 Syosset
Enrollment: 6,247
Household Income: $165,360
Funding per pupil: $32,962



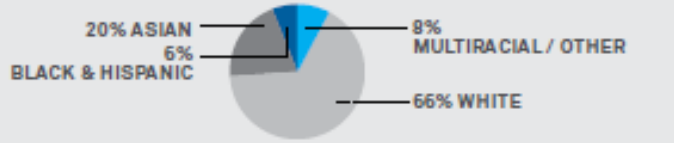
82% Passed Math
76% Passed ELA

#5 Chappaqua
Enrollment: 3,840
Household Income: $129,375
Funding per pupil: $29,339



82% Passed Math
75% Passed ELA

#6 Scarsdale
Enrollment: 4,775
Household Income: $291,542
Funding per pupil: $29,251



82% Passed Math
74% Passed ELA

So if this approximates an attainable gold standard:

The question we all face is:

What forms and structures of professional development can bring such teaching and learning to scale in your classroom, school and district?

The key things we know

People won't do what they can't envision,

People push back if they don't believe,

People can't do what they don't understand,

People can't do well what isn't practiced,

But practice without feedback results in little change, and

Work without collaboration is not sustaining.

Ergo: Our job, as professionals, at its core, is to help people envision, shift beliefs, understand, practice, receive feedback and collaborate.

So all professional development opportunities:

- Must help us envision the shifts
- Must address beliefs and mindsets
- Must link opportunities for practice and feedback
- Must involve collaborative work

More specifically:

More effective strategy #1: Collegial visits with respectful debriefs

- The answers to nearly all of our challenges reside to one degree or another within our schools.
- No one knows all and no one is perfect – we're teachers – but someone knows and does things that we don't.
- Why do we act as though there were dragon-infested moats around our classooms?
- The best schools I know have a system of at least one collegial classroom visit every other week.
- Prep periods, test periods with coverage, substitute enabled, during specials – don't tell me you go non-stop from 8 to 3 M-F.
- Followed up ASAP with a truly collegial and professional discussion…

I have visited your math class earlier today.

- **What really impressed me (and why)…was…**
- **The questions I have about what you/I did are… (let's talk and consider these things you might want to consider)**
- **The two things that I will consider doing differently starting tomorrow are… (BOTH the observer and the one being observed)**

More effective strategy #2: Videotaping

- Have you ever videotaped yourself teaching?
- Have you critically reviewed the video by yourself?
- Have you done it with others?
- Have you considered the power of building a video library of powerful teaching?
- Have you considered the difference between an observation and capturing the observation on start-pause-go back video?

Why not?

Westport, CT many years ago

- Staples HS, Bedford MS, Coleytown MS
- “We’re good, even very good. But we are not great. Help us get there.”
- Why don’t each of us videotape one lesson each month?
- Observe oneself and write up a few paragraphs on “What I learned, what amazed me, and what changes will I make?”
- Upload all videos and select one for collegial viewing and discussion during a department meeting.

For the video we are watching:

- **What really impressed me (and why) was…**
- **The questions I have about what you did are… (let's talk and consider these things you might want to consider)**
- **The two things that I will consider doing differently starting tomorrow are…**

Deeper Analysis

- The richness and appropriateness of the **tasks, problems and examples**
  - tasks are aligned with the overall learning goal or objective
  - mathematically meaningful tasks are selected
  - relevant contexts are used
  - tasks are appropriately sequenced
- The quality and clarity of the **explanations**
  - accurate definitions are used
  - the focus is on why procedures and processes work
  - explanations are clear and make sense
  - alternative approaches are used and valued
  - attention is given to misconceptions and mistakes
- The effectiveness and appropriateness of **representations**
  - multiple representations are used
  - different representations are connected
  - representations are chosen for their appropriateness

Deeper Analysis

- The frequency with which students are asked **“why?”**
  - “why?”, “can you explain that?”, “how do you know?” are commonplace
  - questions consistently probe for understanding and student thinking
- The gathering of **evidence of learning**, i.e., formative assessment
  - lessons conclude with summary and/or debrief
  - lessons conclude with an appropriate “exit slip” that reveals the degree to which the learning goal has been met
- The maintenance of a focus on the **big mathematical ideas**
  - connections are made to how concepts are related
  - explanations for procedures are grounded in concepts

More effective strategy #3: Seminars

- **Think about your last grade level, grade band or department meeting.**
- **What was the balance between teaching and learning on the one hand and administrivia on the other?**
- **When did you last engage in a collegial seminar about a critical topic or issue?**
- **When was one person assigned the responsibility to orchestrate such a seminar on such topics or issues as:**

Potential topics or issues

- Desmos apps
- Equivalent fractions grades 3-4
- Re-testing
- Emergent math
- Grade 7 statistics
- Graham Fletcher’s 3-act lessons
- Readings, articles, e.g. Fluency without Fear

So that’s a cost-free start:

- Collegial visits
- Videotaping
- Topical seminars

Which can’t you do? Why not?

And then there is #4

More effective strategy #4: Micro-PD

Algebra 1: A Day to Plan, Share, Reflect and Grow with Steve Leinwand

1. Let's Stipulate:

- This teaching math so it works for far more students is HARD to do.
- In many ways, we have been set up and provided for too little useful guidance.
- Consistent quality of instruction requires collaboration and change.

2. Challenges:

- When you think about teaching Algebra 3-4 this year, what are the biggest challenges you know or think you will face?
- Which chapters/units/topics are most challenging for you/for your students?

My Micro-PD Agenda

3. Today's Agenda:

Introductions and Challenges
Lesson Planning
Steve teaches lesson
Debrief (what worked and why?, what questions do you have?,
what changes can/will you make starting tomorrow?)
Lunch
Co-teach a lesson
Concluding debrief and discussion

My Micro-PD – Elements of Quality

6. Elements of Quality:

- Clarity of goals (not Lesson 4.5 or pages 214-217)
- Context (not naked)
- Rich tasks (not exercises)
- Focused intentional questions (not punting)
- Opportunities for discourse (not just telling)
- Gradual release (not just a dumping)
- Multiple representations (not one way)
- Alternative approaches (not one way)
- Sense-making by students (not lecture)
- Evidence (not I taught it and let the chips….)

My Micro-PD – Lesson Design

7. Lesson Design Questions:

- What are you trying to accomplish in this lesson? OK frame your opening lesson goal slide.
- What would students be able to do to convince us the lesson worked. OK build your exit ticket slide with a pause for What Did You Learn Today.
- What tasks, examples, problems, activities will students be engaged in to maximize the chance they will successfully meet the lesson goals and complete the exit ticket? OK craft your core lesson slides with embedded questions.
- What pre-requisite understandings are likely to be essential for the tasks, examples, etc. to work? OK craft your warm-up slides.

Acting on What we Know

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People push back if they don't believe,

People can't do what they don't understand,

People can't do well what isn't practiced,

But practice without feedback results in little change, and

Work without collaboration is not sustaining.

Ergo: Our job, as professionals, at its core, is to help people envision, shift beliefs, understand, practice, receive feedback and collaborate. Let's go home and just do it!

Thank you!