Transformative Professional Learning: Practical Strategies and Approaches

Joyce Tugel

GACIS Winter Conference
Greensboro, GA, December 2009

Maine MATHEMATICS and SCIENCE Alliance

Note: Due to copyright restrictions, some images have been removed.

Just because you taught it doesn't mean they learned it!
"I taught my dog how to whistle" cartoon here ….

Goal: Quality Learning for All

Why do we need "PD"? What the research says ….

- **Effective teachers (Rowan, Correnti, & Miller, 2002).**
- **Ineffective teachers (Sanders & Rivers, 1996).**

How to Get There?

- **Teaching Matters**
  - "Building the capacity of teachers to improve their **instructional practice**" (Wei et al., 2009).

"Opportunity Equation"

- "Excellence and equity in math and science education"
- Common standards (fewer, clearer, higher) and aligned assessments.
- Improved professional learning.
- New designs for schools - high expectations for learning in the school culture

Focus on Subject Matter and How to Teach It

- Effective “PD” programs focus on building teachers’ content knowledge and **understanding of how students learn content**
- Teachers need understanding of content they teach: “adult literacy”.

Content and Pedagogical Content Knowledge and Skills

- Teachers need to know how students typically think about content ideas, and how to help students deepen their understanding (Weiss et al).

What Teachers Need to Know: Pedagogical Content

- Research on student learning
- Instructional strategies that support learning
  - Formative assessment strategies
  - Multiple instructional strategies

ADDITIVE vs TRANSFORMATINVE PROFESSIONAL DEVELOPMENT: Reflection on Practice in Learning Communities

- Teachers examine and critique lessons, student work based on protocols and standards. They use accountable talk.
- Teachers have time and structures to engage as a professional community to reflect on their practice.

NCLB: "Effective PD" Meets Five Criteria

- Sustained, content focused.
- Aligned with standards, achievement.
- Improves teachers' content knowledge.
- Advances teachers' understanding of effective instructional strategies.
- Regularly evaluated.

Window of Intentionality

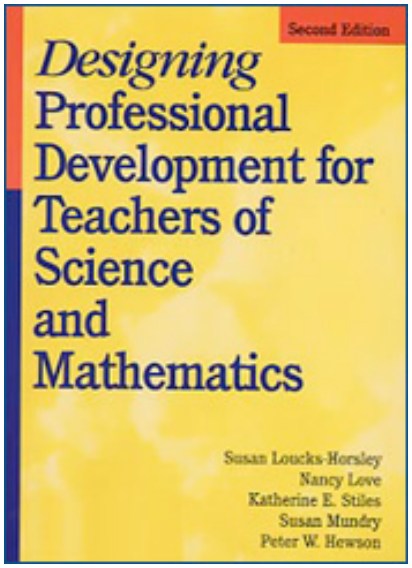
	Don't Know	Know
Can't Do	Miracle	Theory
Can Do	Magic	Intentionality

Source: Adapted from: *Mentoring: A Resource and Training Guide for Educators.* Stoneham, MA: Learning Innovations at WestEd

2 Minute Summary

Summarize your thinking so far….

Teaching and PD strategy: 10-2

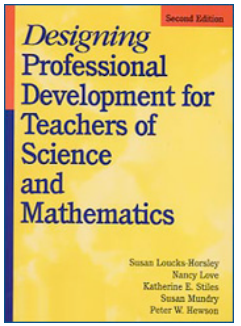


Designing Professional Development for Teachers of Science and Mathematics, 2nd Edition, 2003

Susan Loucks-Horsley, Nancy Love, Katherine E. Stiles, Susan Mundry, Peter W. Hewson

“Designing Professional Development” framework here

Professional Development Strategies

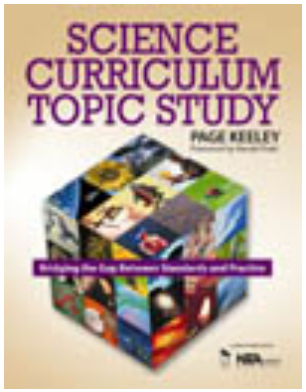


- After the cards are dealt, arrange your hand by those strategies you know most about to those you know least.
- Each "plays" the strategy you know most about – place the card in the center of your group, briefly share your knowledge/experience.
- Do a second round of "next best known".

Introduction to Curriculum Topic Study: Bridging the Gap

National Standards

Research on Learning

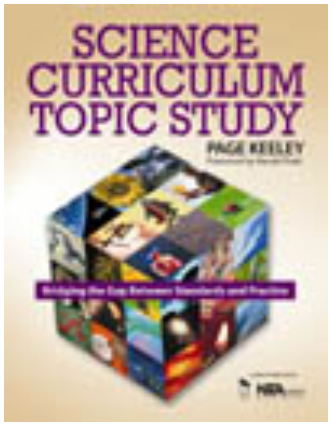


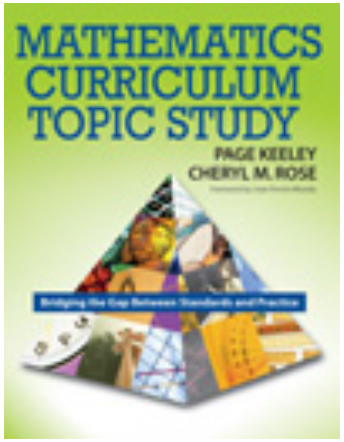
Classroom Practice

State Standards

The CTS Project

- NSF-funded Project awarded to the MMSA in partnership with West Ed
- 2 resources guides: Science and Mathematics Curriculum Topic Study
- Facilitator's Guide to Using Curriculum Topic Study

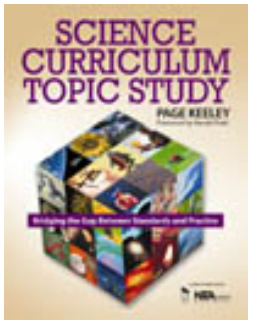


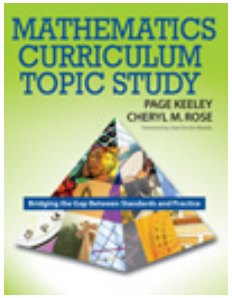


www.curriculumtopicstudy.org

Maine MATHEMATICS and SCIENCE Alliance

What is CTS?





A systematic process

A set of tools and collective resources

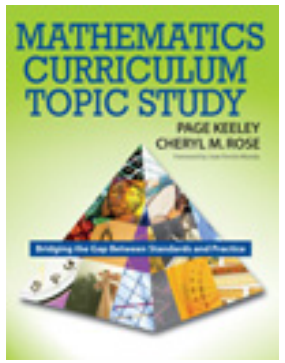
A professional development experience

Having State and National Standards Is Not Enough…

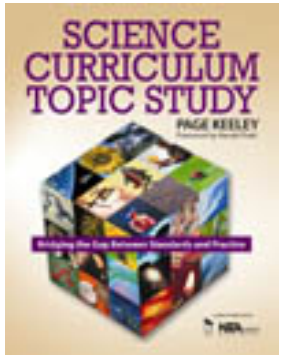
What has been missing is a *systematic, scholarly, deliberate process* to help educators intellectually engage with standards and research on student learning so they can make effective use of them

Keeley, 2005

CTS: The Missing Link



- Teachers deepen understanding of content
- Translate adult content to K-12
- Identify core knowledge and skills
- Apply content specific pedagogical strategies



Work smarter, not harder!

Establishing the Need

Jay Leno's "Jaywalking"

Warm Up Talk- Models

With a partner, have a 3 minute conversation about **models**. What role do **models** play in K-12 teaching and learning?

Scenarios - Step 1

- Examine your scenario and "Before Reading" question.
- Jot down a few ideas you have in response to the question in the "Before Reading" notes section (p.13).

Scenarios- Step 2

- Locate the reading that addresses your scenario.
- Read the section from the resource that pertains to your scenario question and jot down ideas that add to or change what you wrote in your "Before" notes. What have you learned based upon your reading?

Scenarios- Step 3

- Locate the poster that addresses your scenario.

- Discuss with your “scenario partners”: What have you learned based upon your reading?

Scenarios- Step 4

Table Discussion:

- Discuss the “Before and After” findings with your group (Practice “Evidence-based Talk”!). How did the resource add to or modify your prior knowledge of models?

- Choose one major new insight to share with the large group.

Connecting Back to Your Context

- How did your “study” help you better understand the unifying topic *Models*?
- How can our findings improve students’ opportunities to learn about and use models?

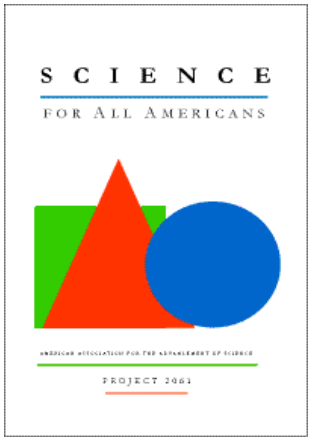
Features of "Effective PD" addressed by CTS

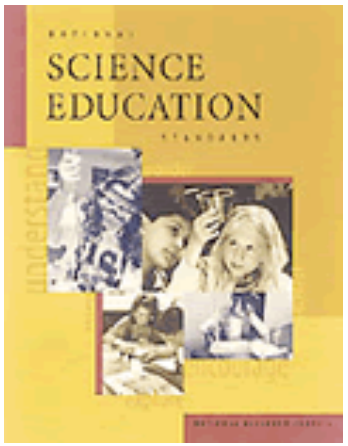
- PD is designed to address **clear and challenging goals tied to student learning.**
- **PD is rooted in content and pedagogy**

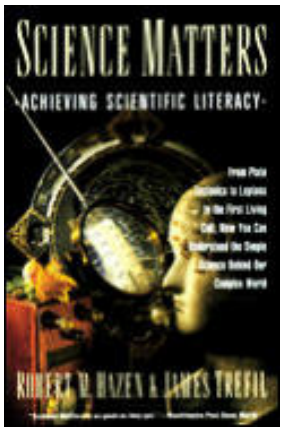
Features of "Effective PD" addressed by CTS

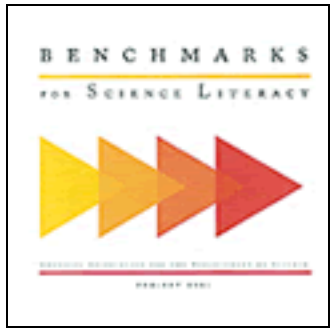
- PD supports development of programs that are **coherent** (aligned with local goals, curriculum, policies, other efforts underway).

CTS Collective Resources- Experts at Your Fingertips 24/7

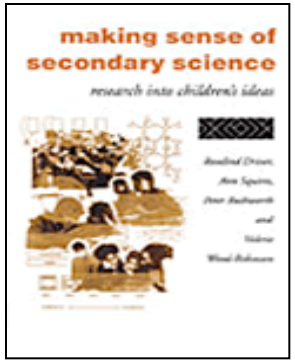
★ 

★ 



★ 

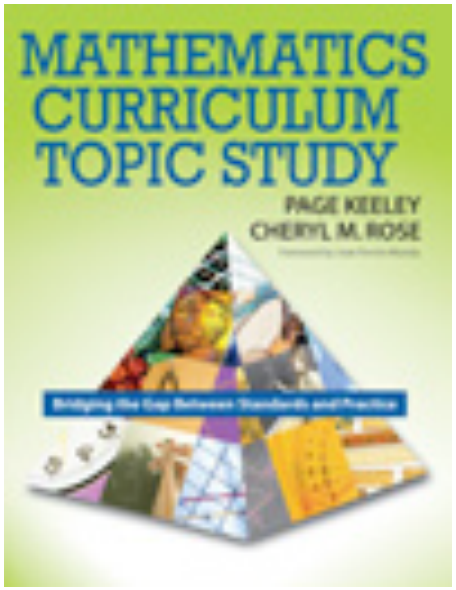
★ 



★ Indicates the resource or parts of it are online

Graphs and Graphing

A Mathematics Curriculum Topic Study



Goals

- Clarify K-12 learning goals related to graphs and graphing.
- Examine research on learning to anticipate and understand difficulties students have related to graphs and graphing.

Engagement

Why are the skills of graphing and understanding of graphic representation important?

Elicitation

- Examine the examples of graph tasks.
- What do students need to know and be able to do to perform the task?
- How do the mathematics tasks differ from the science tasks?

Exploration- CTS Study Groups

- Establish Elementary, Middle, and High School groups.
- Half of your table group will take notes on the grade span learning goals related to graphic representation.
- Half of your table group will take notes on the research on student learning related to graphic representation.

A Few Pointers

- Keep your “blinders” on! Focus on graphic representation as it relates to **graphs and graphing**.
- Take notes and include the name of the book and page numbers.
- Record the EXACT LANGUAGE.

Topic Clarification Jigsaw

Take turns sharing key points from your readings.

Each person should take a few notes on the key points – you will use this in the next step.

Monitor your time so that everyone shares.

Key Points

Based on your readings and presentation, identify and discuss the 3-4 most important points that emerged from your study to share with your colleagues.

Synthesis Discussion

- Form Elementary, Middle School, and High School triads.
- Share your Key points with each other.
- Discuss how sharing the findings strengthens the integration of graphic representation.

Looking at Student Work

Distance from Home

Examining Student Work

1. Complete the task. Discuss your explanation with a partner.
2. Which learning goals seem most aligned with the “probe”?
3. Anticipate student responses: what ideas might you see in student work?

Examining Student Work

How do student responses reflect the research findings?

Implications

How would you use the results of what you learned through your study to plan instruction, address students' ideas?

Linking to Your Work

- How might you incorporate the skills and knowledge of graphs and graphing into your work?

Next Steps – using the CTS process, GPS, and "National Standards" documents to:

- Clarify the "big ideas", concepts
- Improve K-12 articulation and coherency
- Use the research base to identify potential learning difficulties
- Apply effective instructional strategies for teaching and assessing concepts
- Promote collegiality among groups
- Provide a content focus to "PD"

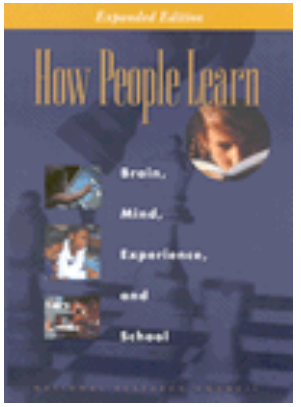
What is the first word or phrase that comes to mind when you hear the word:

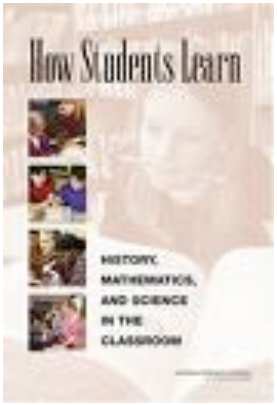
Assessment?

“The roles for assessment must be expanded beyond the traditional concept of testing. The use of frequent formative assessment helps make students’ thinking visible to themselves, their peers, and their teachers”.

How People Learn

- NRC Committee on Developments in the Science of Learning – John Bransford, Chair (2000)





Key Finding from *How People Learn*

"Students come to the classroom with preconceptions about how the world works. If their initial understanding is not engaged, they may fail to grasp the new concepts and information that are taught, or they may learn them for purposes of a test but revert to their preconceptions outside the classroom"

How People Learn, Bransford, Brown & Cockling. pp 14-15

Three Types and Purposes of Assessment

- Diagnostic
- Formative
- Summative

Formative Assessment

- Links instruction and assessment
- Used before and throughout instruction
- Informs current and future instruction
- Changes the culture of the classroom from an emphasis on **right answers** to one of **ideas**.