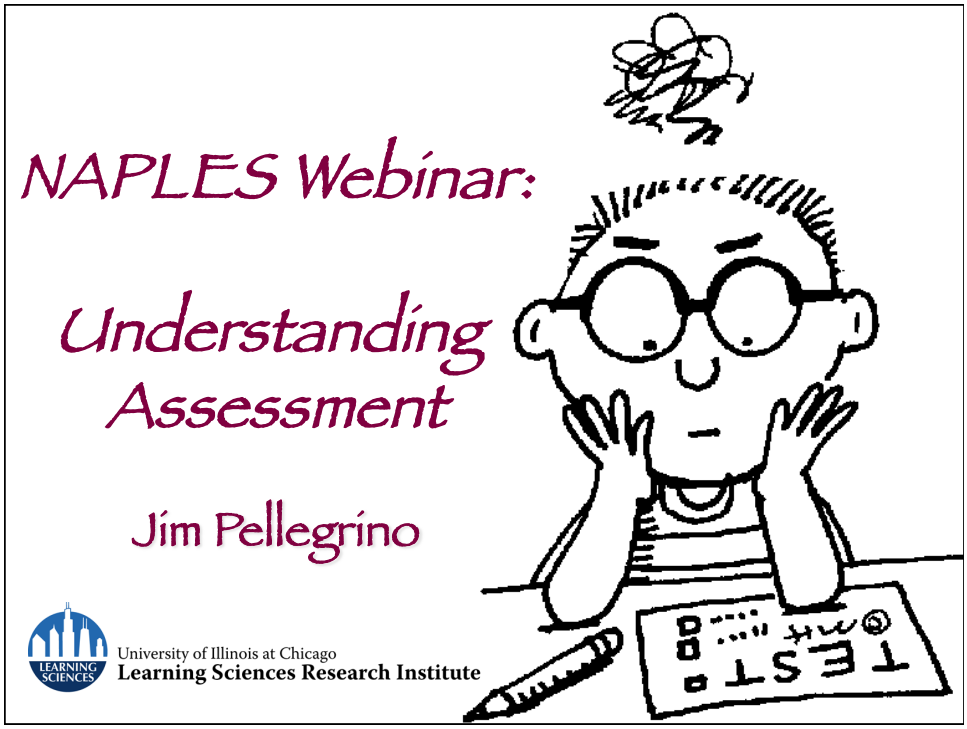
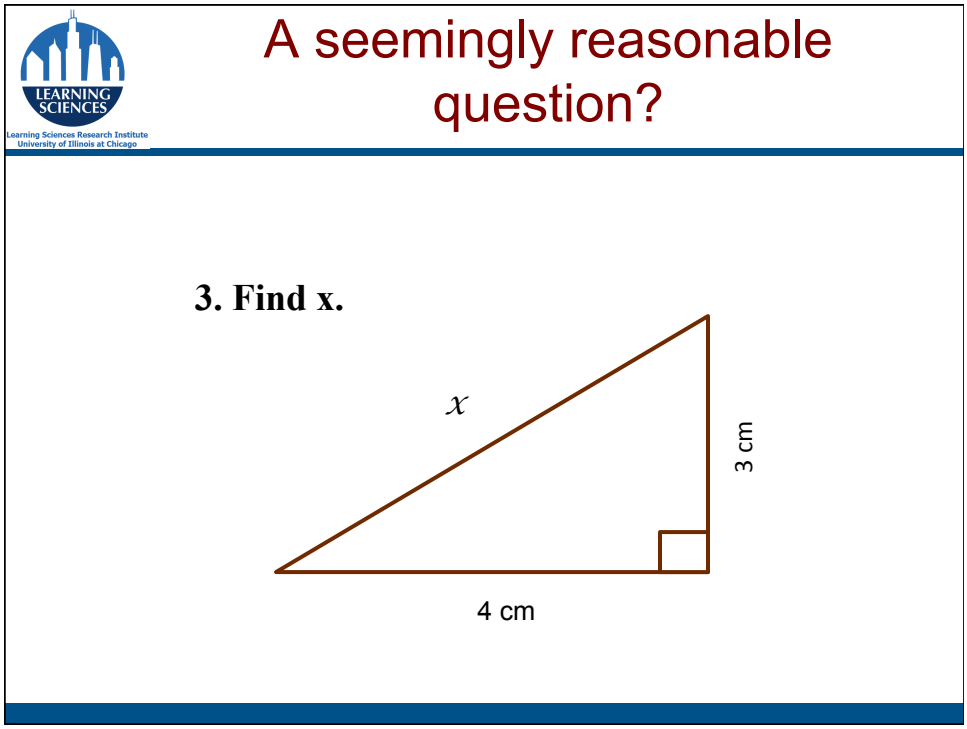
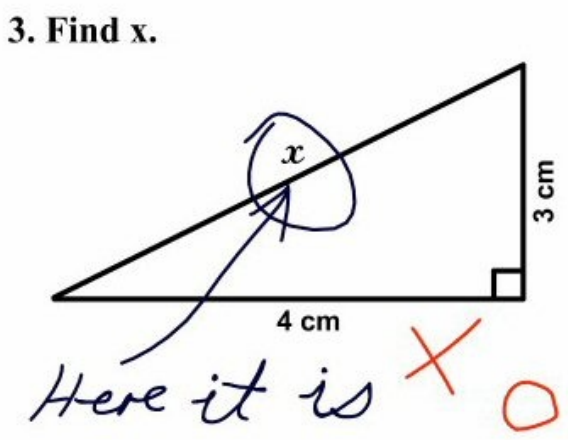

NAPLES Webinar:
Understanding Assessment
Jim Pellegrino
University of Illinois at Chicago
Learning Sciences Research Institute
TEST


A seemingly reasonable question?
3. Find x.
x
3 cm
4 cm

Be careful about your assumptions and how you pose your question!!!



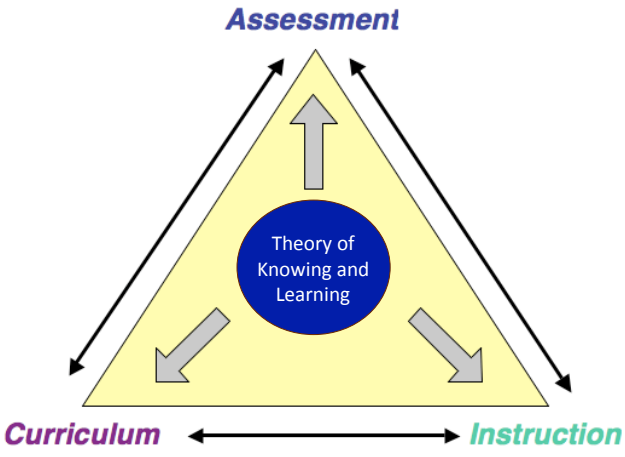
Two Important Preliminary Ideas Regarding Educational Assessment

University of Illinois at Chicago
Learning Sciences Research Institute

What & Why of Assessment

- Assessment is a process of gathering information for the purpose of making judgments about a current state of affairs.
- In educational assessment, the information collected is designed to help instructors, administrators, accrediting agencies, policy makers, and the public infer what students know and how well they know it, presumably for the purpose of enhancing future outcomes.
- Some of these outcomes are more immediate such as the use of assessment in the classroom to improve learning and others are more delayed such as the use of assessment for program evaluation.

Assessment: Part of a Larger Coordinated System



Four Topics for Discussion

1. assessment contexts, purposes and uses,
2. the nature of assessment and the importance of research on learning,
3. assessment design processes and affordances of technology,
4. systems of assessment and quality criteria

Contexts and Purposes

- Educational assessment typically occurs in multiple contexts:
  - Small scale: individual classrooms
  - Intermediate-scale: districts
  - Large-scale: states, nations
- Within and across contexts it can be used to accomplish differing purposes:
  - Assist learning (formative)
  - Measure individual achievement (summative)
  - Evaluate programs (accountability)

Multiplicity of Actors & Needs

The reason we have and need so many different forms and types of assessment is that "***One size does not fit all***"

- Educators at different levels of the system need different information at different time scales and at different "grain sizes"
- They have differing priorities, they operate under different constraints, & there are tradeoffs in terms of time, money, and type of information needed

Discussion Question

- What contexts, purposes, and uses of assessment seem most pertinent to the research and development interests and needs of learning scientists?

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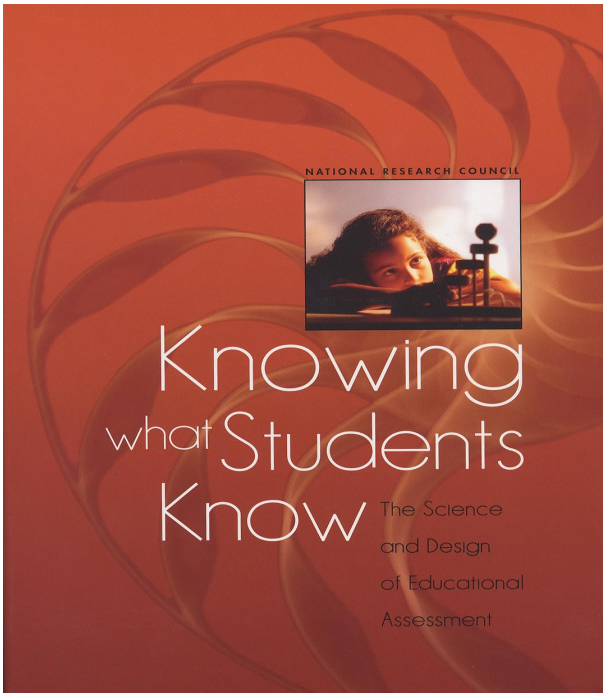
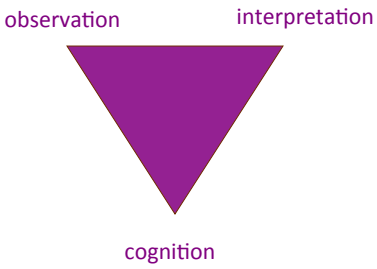


Assessment as a Process of Reasoning from Evidence

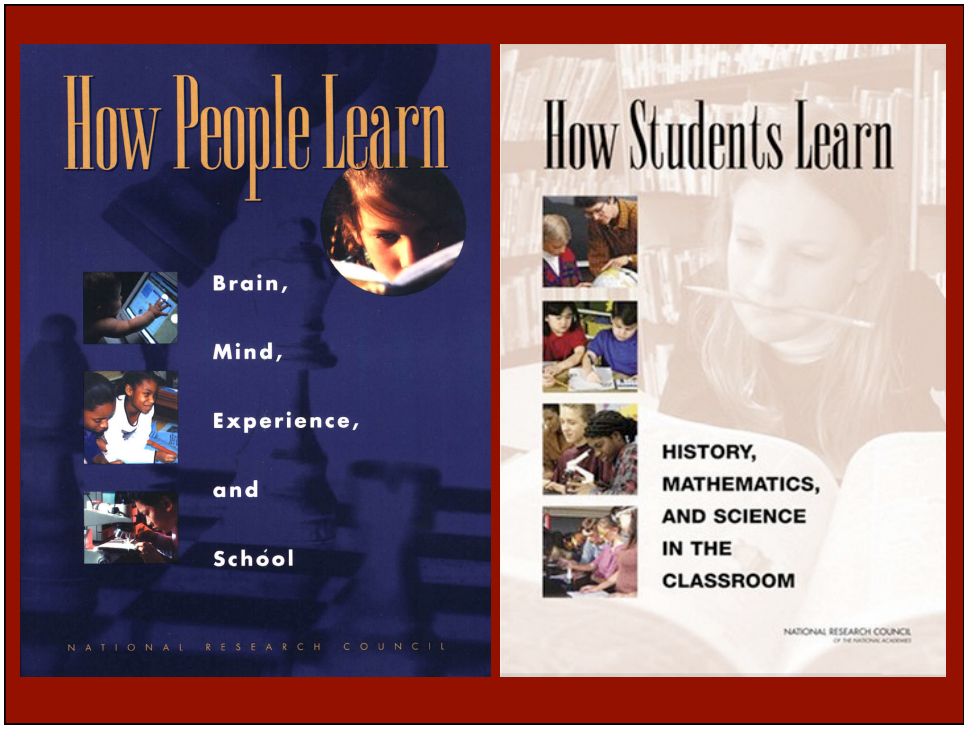
- cognition
  - theory or model of how students represent knowledge & develop competence in the domain
- observations
  - tasks or situations that allow one to observe students' performance
- interpretation
  - method for making sense of the data



Must be coordinated!

Scientific Foundations of Educational Assessment

- Advances in the Sciences of Thinking and Learning -- the cognition vertex
  - informs us about what observations are important and sensible to make
- Contributions of Measurement and Statistical Modeling -- the interpretation vertex
  - Informs us about how to make sense of the observations we have made


How People Learn
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CPRE
Consortium for Policy Research in Education
May 2009
Learning Progressions in Science
An Evidence-based Approach to Reform
Prepared by
Tom Corcoran
Frederic A. Mosher
Aaron Rogat
Center on Continuous Instructional Improvement
Teachers College–Columbia University
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Frederic A. Mosher
Tom Corcoran
WITH
Jeffrey Barrett
Michael Battista
Douglas Clements
Jere Confrey
Vinci Daro
Alan Maloney
Wakasa Nagakura
Marge Petit
Julie Sarama

Why Models of Development of Domain Knowledge are Critical

- Tell us what are the important aspects of knowledge that we should be assessing.
- Give us strong clues as to how such knowledge can be assessed
- Can lead to assessments that yield more instructionally useful information
  - diagnostic & prescriptive
- Can guide the development of systems of assessments intended to cohere
  - across grades & contexts of use

Discussion Question

- How might varying theoretical and/or disciplinary perspectives about the nature of learning and knowing affect this process of reasoning from evidence?

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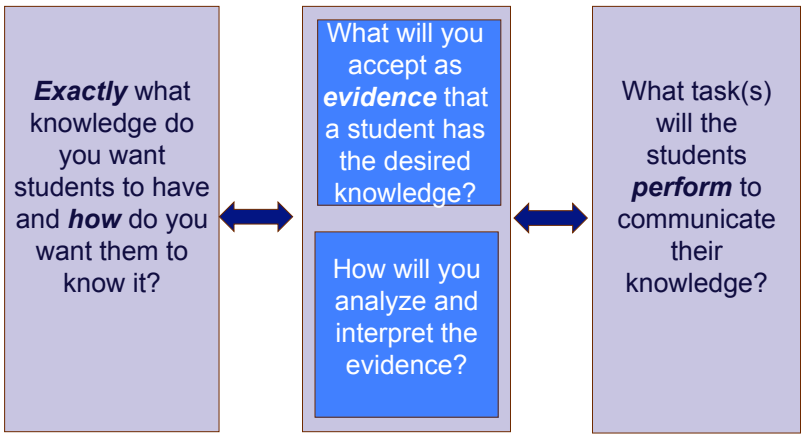
Beyond Issues of Theory to Issues of Design & Use

- Assessment design spaces vary tremendously & involve multiple dimensions
  - Type of knowledge and skill and levels of sophistication
  - Time period over which knowledge is acquired
  - Intended use and users of the information
  - Availability of detailed theories & data
  - Distance from instruction and assessment purpose
- Need a principled process that can help structure going from theory, data and/or speculation to an operational assessment
  - Evidence-Centered Design

Evidence-Centered Design



This is challenging to execute but a fundamental part of constructing the validity argument for any given assessment relative to its scope and intended use

Capitalize on the Multiple Affordances of Technology

- Makes it possible to tap a broader repertoire of cognitive skills and knowledge
  - Can go beyond conventional practices for item presentation and conventional stimuli
  - Can implement a range of task designs and item formats
  - Can record and score complex aspects of behavior
  - Functioning models of technology use exist in LS research projects and for multiple programs like NAEP and PISA -- basis from which to extrapolate
- Can adapt assessments to the needs of different learners and student populations
  - May better enable use of Universal Design principles
  - Can implement adaptive assessment methods

Discussion Question

- What are the most important things that learning scientists might be able to bring to the process of assessment design and interpretation that could yield more valid and potentially more educationally useful assessments?

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Overall Argument About the Need for Systems and Quality Criteria

"No single assessment can evaluate all of the kinds of learning we value for students or meet all of the goals held by parents, practitioners, and policymakers. In a coordinated system of assessments, different tools should be used for different purposes: formative and summative, diagnostic, and large-scale reporting. However, all assessments should faithfully represent the Standards and model good teaching and learning practice. We urge that systems be evaluated by five explicit criteria."

from Darling-Hammond, Herman, Pellegrino, et al., 2013

Elements of a Comprehensive System

- Desired end product is a multilevel system
  - Each level fulfills a clear set of functions and has a clear set of intended users of the assessment information
  - The assessment tools are designed to serve the intended purpose
    - Formative, summative or accountability
    - Design is optimized for function served
- The levels are articulated and conceptually coherent
  - They share the same underlying concept of what the targets of learning are at a given grade level and what the evidence of attainment should be.
  - They provide information at a "grain size" and on the "time scale" appropriate for translation into action.

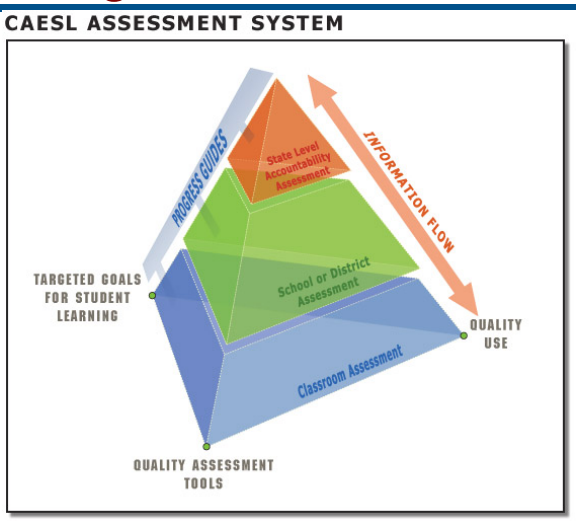
What Such a System Might Look Like

An Integrated System

Coordinated across levels

Unified by common learning goals

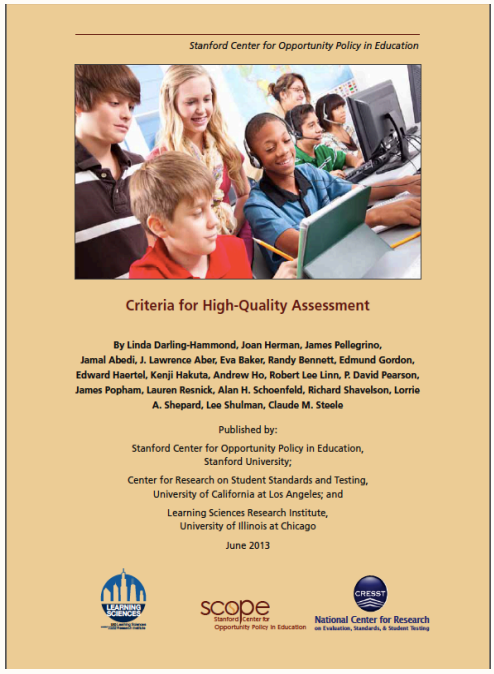
Synchronized by unifying progress variables



Multilevel Assessment System

The Key Design Elements of Such a System

- The system is designed to track progress over time
  - At the individual student level
  - At the aggregate group level
- The system uses tasks, tools, and technologies appropriate to the desired inferences about student achievement
  - Doesn't force everything into a fixed testing/task model
  - Uses a range of tasks: performances, portfolios, projects, fixed- and open-response tasks as needed



1. Assessment of Higher-Order Cognitive Skills
2. High-Fidelity Assessment of Critical Abilities
3. Internationally Benchmarked Standards
4. Items that are Instructionally Sensitive and Educationally Valuable
5. Assessments that are Valid, Reliable & Fair

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Discussion Question

- Given issues such as the need for multilevel systems and application of quality criteria at all levels of the system, where might the time, effort, and knowledge of learning scientists be best spent to insure that educational assessment is maximally helpful and least harmful?