Toward a Validity Framework for Classroom Assessments

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Assessment in the Service of Learning

- Assessment is the art & science of knowing what students' know
- Assessments provide "evidence" of students' knowledge, skills & abilities
- Evidence supports teachers "inferences" of what students' know & can do
- Inferences guide and inform instruction

What is Formative Assessment?

- Encompasses all those activities undertaken by teachers, and/or students, which provide information to be used as feedback to modify the teaching and learning activities (Black & Wiliam, 1998).
- Assessment carried out during the instructional process for the purpose of improving teaching or learning (Shepard et al., 2005)

Why Focus on Classroom Assessment?

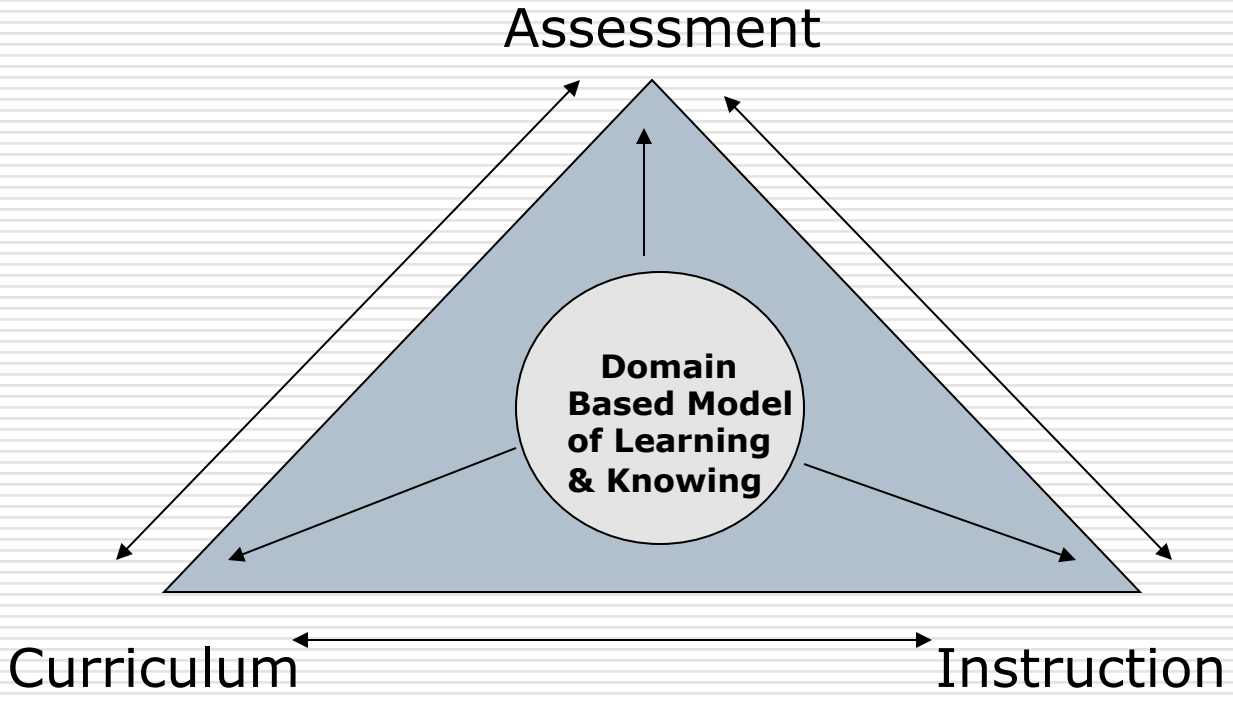
- As instruction is occurring, teachers need information to evaluate whether their teaching strategies are working.
- They also need information about the current understanding of individual students and groups of students so they can identify the most appropriate next steps for instruction.
- Students need feedback to monitor their own learning success and to know how to improve.

Make Students' Thinking Visible

- Students' approach new learning with complex, but often incomplete, views of the world
- If this initial understanding is not engaged, they often fail to grasp new concepts
- Teachers need to "make visible" students' pre-existing knowledge and incomplete understanding

The Curriculum-Instruction-Assessment Triad

Assessment Triad



Adapted from Pellegrino, Chudowsky, & Glaser, 2001.

Assessment Centered Elements

- There are frequent opportunities to make students' thinking visible through processes of formative assessment.

- Teachers try to grasp where students are in the development of their thinking and understanding of critical constructs, and well designed formative assessments can help.

Advances in the Sciences of Learning

This represents a multi-disciplinary study of human and computer-based learning (e.g., computer science, cognitive science, educational psychology, linguistics & neuroscience)

- Nature of expertise
- Learning with understanding
- Influence of prior knowledge
- Situated knowledge & understanding
- Multiple paths to knowledge acquisition
- Metacognitive knowledge

Translating Learning Sciences Instructional Design Principles

- Instructional design driven by cognitive & behavioral outcomes—what we want students to know & be able to do
- From a learner-centered perspective we want to want to make **inferences about student learning in the context of classroom instruction** .
- Instructional design is recursive & iterative process and ought to offer clues about the kinds of assessment tasks that will produce evidence of student learning.

Key Elements of a Learner-Centered Model

- The outcomes of instruction
  - What we want students to know
  - What we want students to do
  - Often referred to as ***Learning Objectives***

- The need for a ***Taxonomy of Learning Objectives*** based on our current understanding of both the disciplinary domain and human cognition—how students learn.

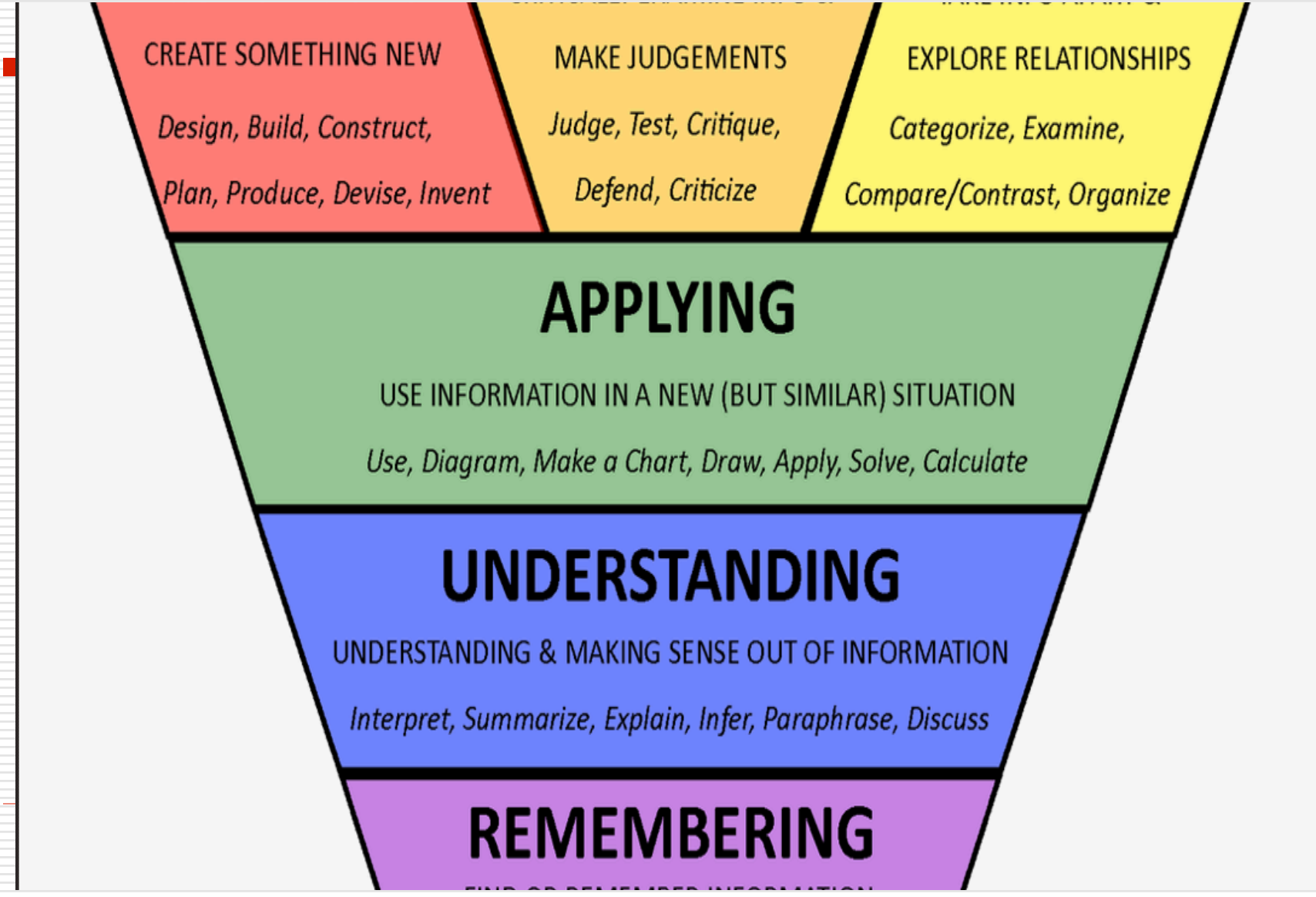
Overview of Cognitive Processes

- Remembering
  - Short-term memory
  - Long-term memory
- Organization of Knowledge
  - Declarative & Procedural Knowledge
  - Knowledge Structures: Schema
- Problem Solving: Use of Rule Making—establishing laws, principles, etc.
- Reasoning & Thinking
  - Inductive, deductive, abductive

The Role of Learning Objectives

- Learning objectives make clear what students ought to know and be able to do throughout the course of instruction
- Typically organized around "big ideas"
- Focus on types of knowledge, skills and abilities developed during the course
- Provide the basis for the learning objectives that are used to guide the instructional sequence.

Taxonomy of Learning Objectives



Why Cognitive Models of Content Knowledge are Critical

- Tell us what are the important aspects of knowledge that we should be teaching & assessing.
- Give deeper meaning and specificity to learning objectives
- Give us strong clues as to how knowledge can be deepened to promote *enduring understanding*
- Suggest what can and should be assessed at points proximal or distal to instruction
- Can guide instructional design and the development of systems of assessments

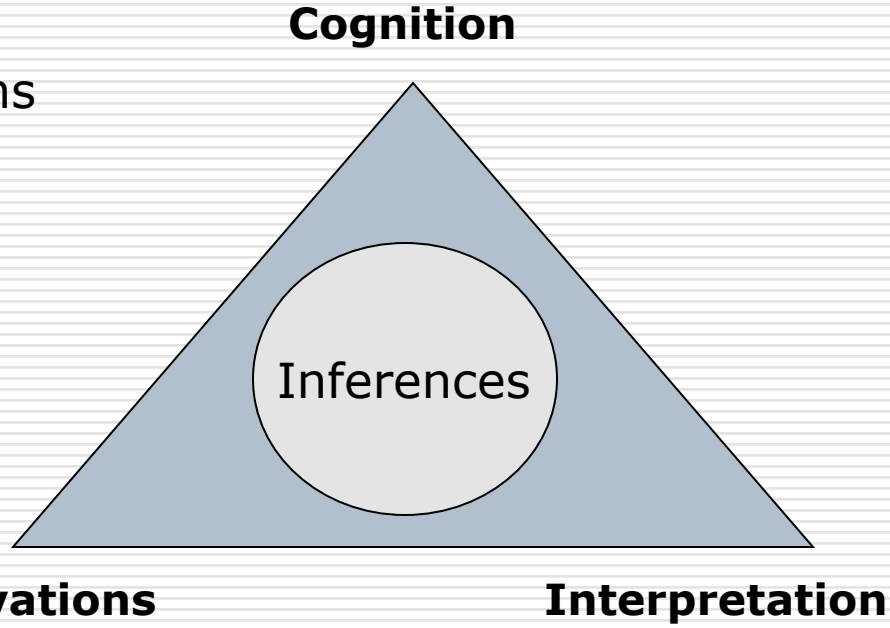
Assessment: A Process of Reasoning from Evidence

Cognition-model of how students represent knowledge

Observations-tasks or situations that allow us to observe students' performance

Interpretation-method of making sense of the data

Inference-judging what students' know & can do



4 Core Design Principles

- Developing depth of knowledge, & connecting to prior knowledge
- Defining the roles of the Teacher & the Learner
- Making students' thinking visible
- Assessing student learning, informing teaching

Developing Depth of Knowledge

- Students need a deep foundation of factual knowledge
- They need to connect facts & ideas in the context of a conceptual framework
- They need to connect concepts to prior knowledge to facilitate recall and application for problem solving

Role of the Learner

- Learning is a "constructive" process, active not passive
- Students arrive with prior knowledge, often with incomplete understanding of the subject
- Knowing what you know, and what you don't know is key
- Views of one's "intelligence" are central

Teacher as Instructional Designer

- Teachers have depth of subject-matter knowledge
- Connecting to students existing knowledge—becoming "learner centered"
- Teaching for understanding, rather than retrieval of facts & bits of information
- Assumptions about intelligence and transfer of learning

Instructional Design Principles

- Design instruction to promote depth of knowledge & understanding
- Build on students' prior knowledge
- Organize content around "big ideas" to develop a "schema of expertise"
- Promote enduring understanding
- Identify learning standards & instructional objectives
- Factual knowledge, conceptual knowledge, reasoning with content, problem solving (application)

Instructional Strategies

- Active learning. A process in which students are actually engaged in learning (other than take notes and follow instructions). It may include inquiry learning, cooperative learning, or student centered learning.
- Inquiry learning. The process of engaging students in the process of exploration and asking and answering questions to acquire new knowledge and skills.
- Assessment. A tool for understanding what students are learning. Assessments provide feedback to the instructor that informs instruction and to the students to inform learning behaviors.

Assessment Design Desiderata

- Assess the full range of the teaching objective and/or learning standards including standards that may be difficult to measure.
- Be able to measure the full range of student performance, including the performance of high and low performing students.
- Provide data to inform instruction, sharpen interventions and teaching strategies Provide data for measures of growth.
- Incorporate innovative approaches to assessing students' competencies.

What is an Assessment Framework?

- An overarching document that provides a starting point for a constructive conversation between the teacher and the learners about the nature of the learning objectives
- Describe how formative assessments provide a window into students' thinking, and identify KSA's that need to be strengthened.
- The frameworks represent a vision driven by the learning objectives and the expected student performances.

Guiding Principles

- Classroom teachers as instructional designers are responsible for developing the assessment frameworks, i.e., they define the scope & depth of the domain, and describe the knowledge, skills, and abilities to be assessed—including the form and format of their formative assessments and the preliminary achievement levels
- The assessment framework then builds from the course syllabus and other available descriptions of the content to be learned, and the level of mastery expected.

Guiding Principles

Continued...

- A framework ought to provide preliminary achievement level descriptions—and may do so using rubrics and other scoring criteria
- A formative assessment framework provides a sufficient level of specification of the KSAs to guide the design of the items and tasks presented to students.
- The framework ought to be flexible enough to warrant periodic revisiting over the course.

Goals for Assessment Frameworks

Take aways…

- They build a tangible link among the curriculum, instruction and assessment designs—serving as a unifying tool.
- Promote student learning by making students' cognition and achievements visible
- And, serve as a tool to improve classroom teaching.

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