Establishing Learning Goals for Formative Assessment

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Comprehensive assessment systems

- Inherent limitations of large-scale assessment systems
- Focus on learning and teaching
Foundations

• Instructionally sensitive assessment – purposes and uses
• Validity – reliability trade-offs
• What else is known to inform action in addition to immediate assessment
A look at learning/teaching

• Learning goal-oriented, action context
• Essential elements
  – View of the domain
  – View of student’s understanding
  – Plan for helping student learn in relation to domain goals
A look at assessment

Observation  Interpretation

Cognition

The assessment triangle
-- Knowing What Students Know, p. 44
View of the domain

• Constructed through many views
  – Domain experts
  – Developmental psychologists
  – Curriculum (what to teach)
  – Instruction (how to teach)
Intended Sequence and Scope

• Not your traditional “scope and sequence”
  – Not about task decomposition to smallest tasks
  – Not about pacing, practice, or reinforcement
• What is intended to develop
• Why these things (i.e., key for learning progression)
What is intended to develop

• Content
• Other dimension
  –Skills; Complexity – Proficiency
Content standards not enough

- Good examples of state grade-level content standards showing some development of knowledge, skills, or complexity over time
  - NECAP: Math
  - NRC Science:
Complexity continua

- Rote recall to strategic thinking (Webb)
- (Porter & Smithson)
- Concrete to abstract (Dienes)
- Global to analytic to deductive (van Hiele)
- Pre-operational to operational (Piaget & Beth)
- Concepts to rules to problem-solving (Gagne)
- Enactive to symbolic (Bruner)
- External to internal (Vygotsky)
- Situated to decontextualized (Cole & Griffen; Greeno)
- Facts/skills to applications to analysis/synthesis/evaluation (Bloom)
- Naïve interpretations (based on superficial characteristics) to scientific models (focused on key attributes and underlying regularities) (Steen)
- Application, learning potential, metacognition, beliefs and values, whole (Ginsburg et al.)
Proficiency

• Content, complexity, independence together
• Usually not specified completely
• Centered mostly on the complexity dimension!
Why this scope and sequence

- Domain
- Psychology of learning
- Teacher preference
- Student preference
Learning goals

• More than state content standards
• Learning progressions articulate what is to be learned
  – Makes clear the cognitive complexity
  – Provides a sequence and ideally a rationale
  – Identifies choice points that branch to other learning progressions
  – May also catalogue key states of how may be learned in terms of student knowledge representations (not instructional methods)
View of the student

• Cognitive representations
• How content representations develop
  – Example 1: Multiplication
  – Example 2: Forces and Motion
  – Example 3: Biological change
  – Example 5: Historical reasoning
Example: Multiplication

• Acquisition – movement from addition to multiplication
  – Multiplication: problem of finding the total quantity of objects contained in a given number of groups with the same number of elements
  – Cognitive challenges:
    • Learner has to know and operate with two different grouping systems (number of groups and number of items in a group) – not like addition or subtraction
    • Operational number systems different than place value system (e.g., 12 is one ten and two ones)
    • Generalization of learned representations (e.g., quantity per set model; area model; number line model)
Assessment

• Example (Ginsburg)
Example: Forces and motion
Assessment

• Example (Wilson)
Example: Biological change
Assessment

• Example (Gong et al.)
Example: Historical reasoning
Assessment

• Example (Baker)
Prior knowledge

• Incorporation into “more expert” analyses
• Planning future instruction
Other examples

• What are key attributes and distinguishing characteristics?
  – Forrester – reading literature
  – Computer-managed instruction
  – Intelligent tutoring systems
  – Curriculum frameworks
  – Textbooks, instructional programs
View of the Plan

- A hierarchy of values and goals
- Creating and executing a plan for formative assessment to achieve goals
- Formative self-assessment vs. formative instruction
Formative assessment

• Planning and selection
• Observing
• Eliciting
• Student self-evaluation
• Class/groups of students self-evaluation
What to do next? – big goals

• Purpose and values
  – Academic discipline
  – Student self-actualization
  – (from Vallance & Eisner)

• Deciding between individuals and groups of students

• What can I do?
What to do next? – learning goals

• Mastery
• Next in “core sequence”
• Extension
• More independent, less structured
• Transfer, application
• Motivation and other values
For more information:

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