Representing Targets of Measurement within ECD

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The College Board

NCME 2009

San Diego

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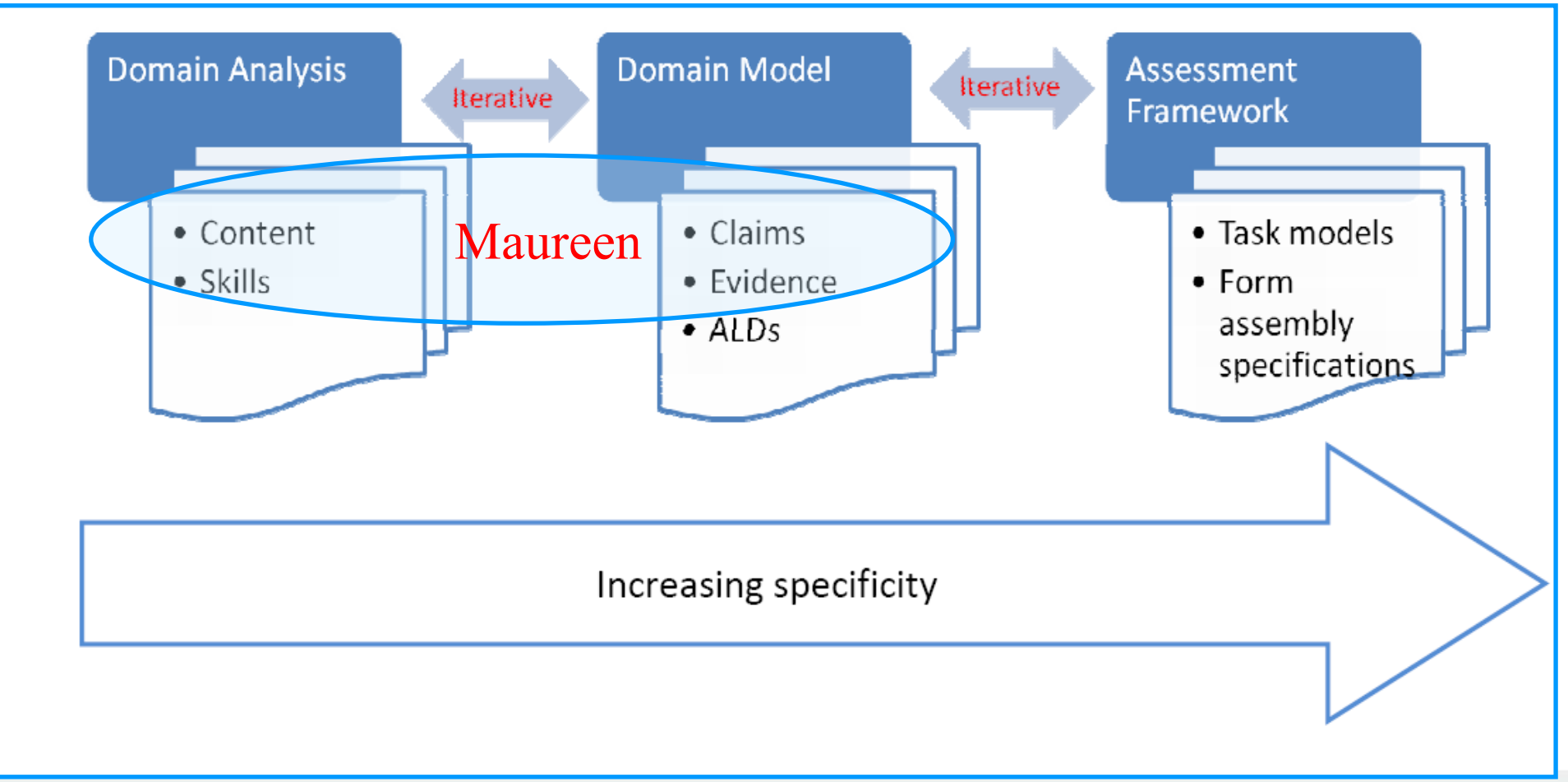
Purpose



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Domain Analysis

- First step was to convene panel of content experts
- Identify the content that represented best practices in teaching and learning
    - Deep conceptual understanding is promoted when learning is organized around “big picture” ideas
    - Content for domain organized and prioritized in increasing specificity starting with the big ideas of the discipline
- Identify the skills to be developed in the course
    - Key goal was to move away from a domain that emphasized content facts

Domain Analysis

Inputs to Domain analysis

- Current AP course descriptions
- National and state standards
- Latest research on student learning and assessment
- College Curriculum Study
  - Importance ratings for content and skill
  - Data on their teaching practices and course format
  - Uploaded documents (e.g., syllabus, assessments)
- Expert judgment of panelists to make final decisions

Domain Model

- Claims: statements about students' knowledge and skill proficiencies
  - Summative claims represent all of the content and skills that should be acquired after learning a particular domain
  - Formative claims represent a subset of the content and skills intended to guide teaching and assess progress
- Evidence: actual student work that is required to support the claims; must be observable.
- Articulation of claims and evidence useful because it goes beyond a simple listing content and skill

Writing claims: Guidelines

- Claims start with “The student can…”
  - To reinforce that fact that claims are made about what students should know or be able to do
- Each claim required a verb or verb phrase that represented the skill involved in the claim
  - For science, these verbs came directly from the list of skills that were considered important in the domain
- Each claim required a piece of content from the domain analysis

Writing claims: Content and Skill Pairing

- What content and skill pairings are most appropriate or ideal?
  - All possible pairings of content and skills were not appropriate or feasible given the learning goals and constraints of the summative exam
  - Determine and reach consensus on the most ideal content and skill pairings
  - Examples of Ideal pairings: promote conceptual understanding, required the student to go beyond simple rules, or promoted depth of understanding

Writing claims: Grain Size

- At what level of specificity or grain size should the claim and evidence pairs be written?
- General guideline was that grain size of the claim should be such that it can be supported by a manageable amount of observable evidence
  - Does claim provoke the question: “What does this mean?” Too general, difficult to articulate evidence
  - Is claim too specific? Only evidence that can be articulated is a restatement of the claim

Writing claims: Proficiency level

- What is the target proficiency level of the claim and evidence pair?
  - Claims should represent summative expectations about what students should know and be able to do at the end of AP course
  - Further defined as any claim one would want to make about an AP student at the end of the course who deserves college credit
- 84 to 119 claims written depending on subject

Defining Evidence

- Evidence started with the phrase “The work is characterized by…” to reinforce the fact that evidence includes characteristics of work that is produced by students
- Evidence should include only nouns and adjectives to emphasize that evidence must be concrete and observable
- Evidence cannot include reference to the student or the task

Defining evidence: Skill definitions

- Key component of the process was defining skills in terms of observable evidence
- Apply mathematical routines to quantities that describe natural phenomena
    - Correctness of equation and formulas
    - Correctness of application of mathematical routine
    - Reasonableness of solution given context
- Definitions are helpful because offers a way to represent the observable characteristics of important skills
- Ensures consistency between the evidence associated with claims that evoke the same skill but address different content

Claim and Evidence example

- Claim: The student can apply mathematics in which they evaluate the reasonableness of quantities found in stoichiometric calculations.
- Evidence:
  - Correctness of chemical equation
  - Correctness of chemical formulas
  - Correctness of application of mathematical routine
  - Correctness of coefficients interpreted as mole ratios
  - Reasonableness of solution as it related to mole ratio and differing molar masses

Challenges & Future Research

- Iterative nature of work
  (1) Skill definitions initially created were preliminary
  (2) Process of writing claims and evidence was itself iterative
  (3) Strained project timeline
- Steep learning curve – difficult to think in terms of observable evidence
- Defining appropriate grain size at which to write claims and evidence

Advantages of ECD

- Knowledge about how deep conceptual understanding and complex reasoning skills are acquired and evidenced in specific subject areas is still evolving
  - Articulating claims and evidence for these disciplines helped further understanding within the disciplines themselves
- Having evidence of the skill integrated with the content provides teachers with more guidance for designing instruction that develops content and skill in the context of each other.
- No guesswork on the part of the item writer about what is valued in the domain or what characteristics of student works are required for evidence.

Thank You!

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