Principled Assessment of Computational Thinking

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How can we improve CS teaching, learning, and adoption through evidence-centered assessment?
PACT Project Goals I

- Develop valid and reliable assessments of computational thinking practices
- Aid in the adoption of high school computer science courses through assessments that stakeholders recognize as useful boundary objects
PACT Project Goals II

- Create **design patterns** for computational thinking practices that can be used to develop new assessments as curriculum evolves

- Create and field test assessments for *Exploring Computer Science* (ECS)
Evidence-Centered Assessment Design (ECD)

- What complex of knowledge, skills, or other attributes should be assessed?
- What behaviors or performances should reveal those constructs?
- What tasks or situations should elicit those behaviors?
Assessment Delivery

Students interact with tasks, performances evaluated, feedback created. *Four-process delivery architecture.*

Assessment Implementation


Conceptual Assessment Framework

Design structures: Student, evidence, and task models. *Generativity.*

Domain Modeling

How do we represent key aspects of the domain in terms of assessment argument. *Conceptualization.*

Domain Analysis

What is important about this domain? What work and situations are central in this domain? What KRs are central to this domain?

From Mislevy & Riconscente, 2006
Computational Thinking Practices

Inquiry Skills

CS Concepts

Non-Cognitive Skills

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## Computational Thinking Practices

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<th>Example Inquiry Skills</th>
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Integration
PACT Project Accomplishments I

- Aligned *Exploring Computer Science* lesson objectives to CSTA, NETS, Common Core, and state science and CTE standards

- Defined computational thinking practices (CTP) and focal knowledge, skills, and abilities (FKSAs) that constitute them
PACT Project Accomplishments II

- Developed and applied CTP design patterns to guide the development of assessments for ECS
- Field testing assessments for ECS Units 1-4, and a summative assessment
- Conducting think aloud interviews with ECS students
Thank You!

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