I-SMART Goal 2 Scenario-based Tasks

Chapter 1: Introduction

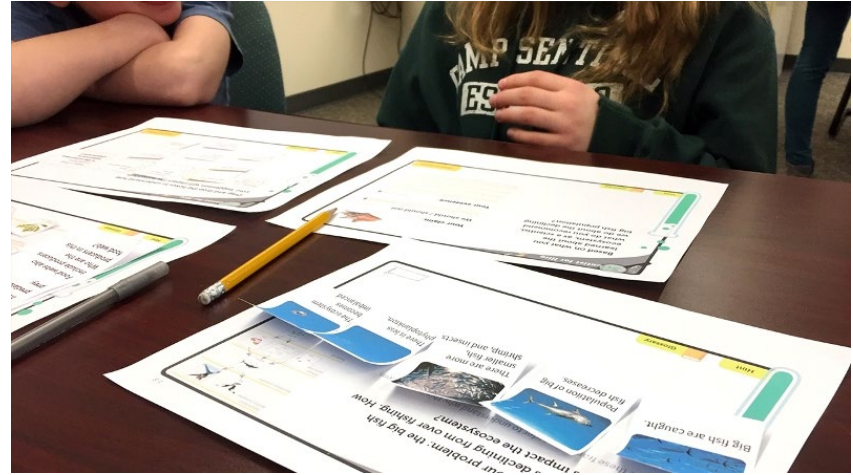I-SMART

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Overview of Chapters

1. Introduction
2. Testlet co-design
3. Testlet prototype walkthrough
4. Think-aloud study
5. What we learned

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I-SMART

- Multi-state project funded through U.S. Dept. of Education's *Enhanced Assessment Grant* program
- Focused on developing innovative approaches to science assessments using principles of evidence-centered design and UDL
- Builds upon existing dynamic learning map (DLM) efforts in ELA, math, & science

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I-SMART team
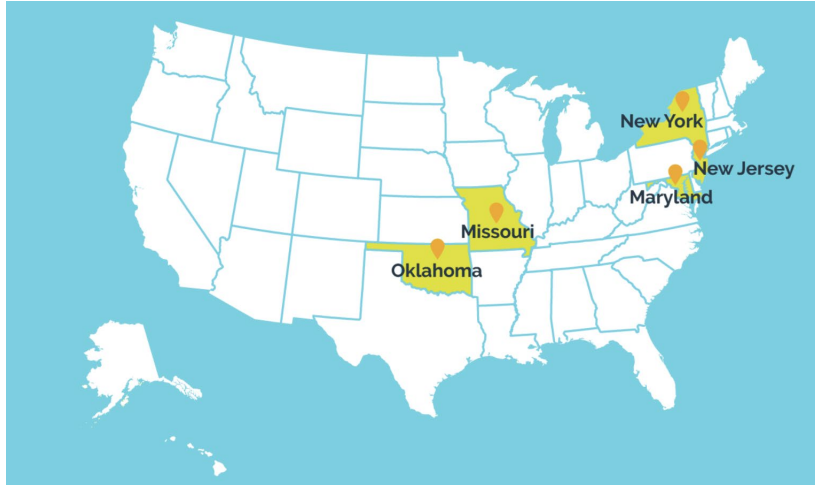
I-SMART Goal 2

Design, develop, and evaluate learning map model-based assessments that incorporate science disciplinary content and science and engineering practices in highly engaging, universally designed, technology-delivered formats.

Focus of This Study

- Co-design and evaluate testlets for "secondary population" students
- Scenario-based tasks to evaluate range of depth of knowledge (DOK)
- Deeper application of UDL principles
- Greater emphasis on formative use of instructionally embedded testlets

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Secondary Population

- *Without* significant cognitive disabilities
- Elementary, middle, and high school
- Struggling to meet grade-level expectations in science
- With or without identified disabilities

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Research Questions

1. Do students understand how to interact with new item types?
2. Did students make effective explicit and implicit choices?
3. Does task assess a range of DOKs?

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Deeper Application of UDL

- Provide students multiple means to demonstrate their construct-relevant knowledge, skills, and understandings (KSUs)
- Provide students multiple means to engage and interact with tasks and information
- Iterative co-design process with "expert learners"

udlguidelines.cast.org

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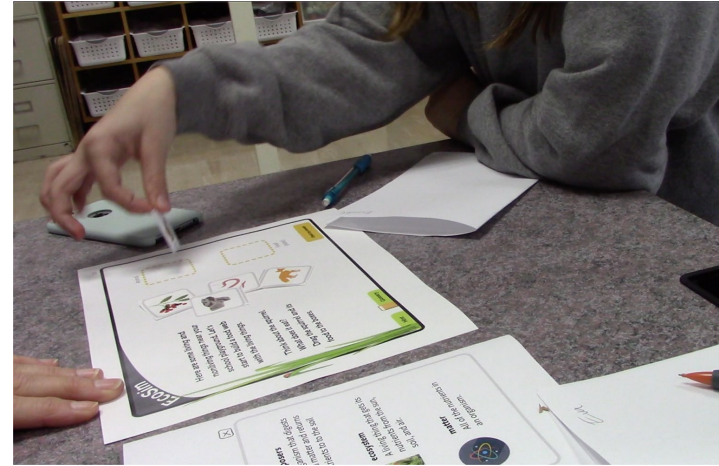
Formative Use of Testlets

- Provide opportunities to demonstrate *independently* both
  - **Basic DOK KSUs** (e.g., basic application) tied directly to EE nodes
  - **Higher-order DOK KSUs** (e.g., strategic and extended thinking) beyond EE nodes
- Provide students immediate feedback to support self-reflection

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Research Process

- Co-design testlets with students

- Prototype development

- Think-aloud study

- Analysis

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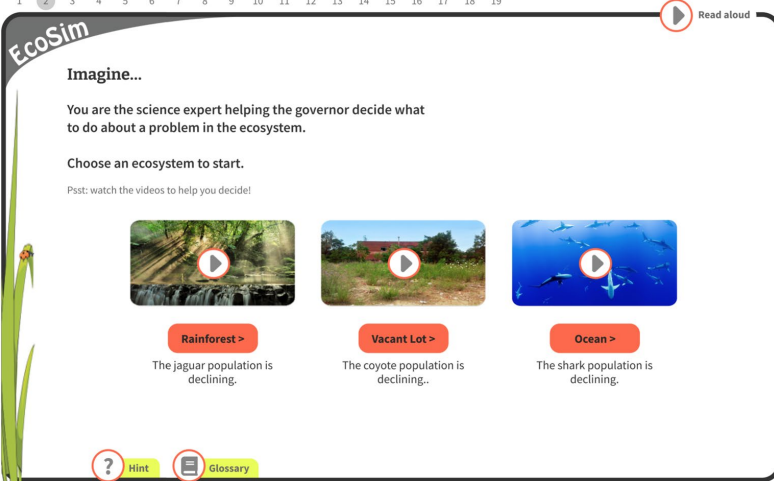Assessment & Report Technologies

Co-design with Students

- Student agency—giving students a say in how to demonstrate what they know and can do
- Invite feedback and out-of-the-box thinking
- Make thinking and learning visible for everyone: designers, researchers, students

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Prototype

- To support evaluation of testlet designs with students through "think-alouds"

Prototype Testlets

| **Elementary**	**Middle School**	**High School**
https://ismart-es.cast.org	https://ismart-ms.cast.org	https://ismart-hs.cast.org
Create and use food-chain models to trace matter from the environment to plants, through living things, from animals' food to plants, and from the soil to plants to animals and back to the soil. (NGSS)	Use food chains and webs to identify roles of organisms (e.g., producer, consumer) and relationships between organisms. (NGSS)	Explain changes in population or carrying capacity with multiple causes and effects and using graphical representations. (NGSS)

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Think-Aloud Study

- Single, one-on-one sessions with six middle school students struggling in science
- Components
  - Think-aloud as they complete the testlet
  - Semi-structured interview
- Conducted remotely through Zoom and recorded for post-hoc analysis

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Analysis

- Informal coding of utterances and interactions during think-aloud portion of session and responses during structured post-interview
- Visual analysis of interaction patterns
- Comparison of basic and high-order DOK scores

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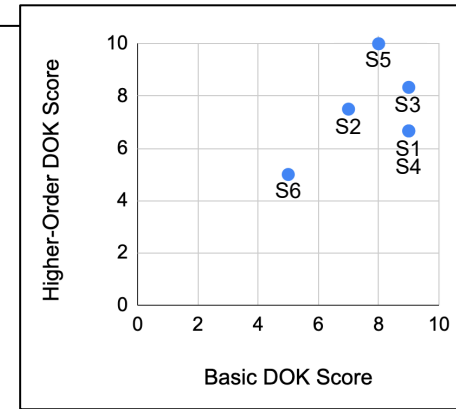
Findings

RQ1: Do students understand how to interact with new item types?

Yes, readily

RQ2: Did students make effective explicit and implicit choices?

Explicit choice: yes, in terms of engagement and accessing prior knowledge

Implicit choice: no, use of embedded supports will require training

RQ3: Does task assess a range of DOKs?

Some evidence to support ability to independently evaluate basic and higher-order DOK

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Next Up …

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