Design Features Supporting Teachers’ Use of a Dashboard for Diagnostic Assessment Results

Emma L. Starr, Robert P. Dolan, Cara Wojcik, Kim Ducharme, and Jose Blackorby

CAST, Inc.

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Agenda

• Background of Project
• Brief Introduction to Universal Design for Learning
• Dashboard Development Methodology
  • Participants
  • Process
• Design Findings
• Next Steps
Project Background
I-SMART Purpose

Help students with and without disabilities achieve proficiency on multidimensional science standards through an assessment system that is:

• learning map model-based
• instructionally embedded
• formative and summative
Builds on the work from DLM

- Deeply integrates the **UDL guidelines** into the test design and development process
- Supports not just students with significant cognitive disabilities, but also **students with and without disabilities** who are struggling to meet grade-level expectations in science
- Provides a new, actionable **dashboard** to support teacher interpretation of test results to inform instructional decision making, designed through a UDL lens
A Few Guiding Principles for Development

Instructionally relevant

Connected to the timing of instruction

Utilized maps - show teachers important nodes

Diagnostic information to guide decisions
Brief Introduction to Universal Design for Learning
Universal Design for Learning (UDL)

A framework that suggests embedding options and supports into curricula and learning experiences to expand learning opportunities for all learners.
What is Universal Design?
Universal Design

“The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.”

Necessary for **some**, good for **all**
What is Universal Design for Learning?
The Universal Design for Learning Guidelines

Access
- Provide options for Recruiting Interest
  - Optimize individual choice and autonomy
  - Optimize relevance, value, and authenticity
  - Minimize threats and distractions
- Provide options for Sustaining Effort & Persistence
  - Heighten salience of goals and objectives
  - Foster collaboration and community
  - Increase mastery-oriented feedback
- Provide options for Comprehension
  - Activate or supply background knowledge
  - Highlight patterns, critical features, big ideas, and relationships
  - Guide information processing and visualization
  - Maximize transfer and generalization

Build
- Provide options for Perceetion
  - Offer ways of customizing the display of information
  - Offer alternatives for auditory information
  - Offer alternatives for visual information
- Provide options for Language & Symbols
  - Clarify vocabulary and symbols
  - Clarify syntax and structure
- Provide options for Executive Functions
  - Guide appropriate goal-setting
  - Support planning and strategy development
  - Facilitate managing information and resources
  - Enhance capacity for monitoring progress

Internalize
- Provide options for Action & Expression
  - Vary the methods for response and navigation
  - Optimize access to tools and assistive technologies
- Provide options for Expression & Communication
  - Use multiple media for communication
  - Use multiple tools for construction and composition
  - Build fluencies with graduated levels of support for practice and performance

Goal
- Purposeful & Motivated
- Resourceful & Knowledgeable
- Strategic & Goal-Directed


Innovations in Science Map, Assessment & Report Technologies
The Goal of UDL: Expert Learners (and Teachers)
Dashboard Development
The problem

Teachers are swimming (drowning) in data generated by standardized tests; but it is often not presented in a usable, actionable way.

How can we make data displays and the way they are used more empowering and effective for teachers?
How can UDL principles inform data visualization design for teachers?
The starting point
The goal

Design an interface that supports teachers to use the Dynamic Learning Maps and test results as a planning tool for instructional decision-making
Cadre Design Process

Main Cadre:
- 11 Educators from DLM partner states
- 4 Meetings
- Meetings of 1-5 cadre members, 2-4 I-SMART team members
- 90 Minutes
- Video Conferencing

Gen Ed Focus Group:
- 1 Meeting during Cadre Process
- Same Format as Above
- 2 Gen Ed Science Teachers (6th and 8th) from a MA school
Cadre Participants

Cadre Members Current Primary Role

- Program Specialist: 9.1%, 1 participant
- District Staff: 18.2%, 2 participants
- Curriculum / Program Coordinator: 9.1%, 1 participant
- Classroom Teacher: 63.6%, 7 participants
Cadre Participants

Previous DLM Experience

- Implemented DLM Assessments in Math and ELA: 8
- Implemented DLM Assessments in Science: 5
- Participated in DLM Item Writing or Map Review: 7
Iterative Discovery / Design Process:

Cadre Meetings 1-3
- Recap of the previous design’s principal elements and features
- Walk-through of newly introduced screens and functions spotlighting design solutions resulting from teacher-generated feedback
- Facilitated discussion of prototype focusing on areas of clarity/confusion, features to change/add, most/least useful functions, and “Five Ws”

Cadre Meeting 4
- “Scavenger Hunt” usability testing session - teachers completed usability tasks to uncover any areas needing further refinement
- Cadre process reflection
Iterative co-design cycles
Iterative co-design cycles
Iterative co-design cycles
## Test results: class overview

### Class Overview

**B1: Science, Grade 7**

<table>
<thead>
<tr>
<th>Name</th>
<th>Chemical Changes</th>
<th>Food Webs</th>
<th>Trait Inheritance</th>
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<td>Chloe Beaux</td>
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<tr>
<td>Siobhan Clough</td>
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<tr>
<td>Johnny Doe</td>
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<tr>
<td>Karen Oh</td>
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<td>Hubert Pho</td>
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<tr>
<td>Asawan Rowe</td>
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<td>Jane Snow</td>
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</table>

**Key:**
- ✔️ Instruction Not Begun
- ✔️ Instruction In Progress
- ✔️ Instruction Complete
- ✫ Mastery Demonstrated
- ✫ Mastery Not Yet Demonstrated
Test results: student overview
Test results: detail view by class
Summary of Design Findings

• Teachers found the learning maps valuable for understanding student progress and supporting instructional decisions

• However, scaffolding teacher’s use of the map is necessary; there is a learning curve that can be supported through multiple representations of the same data

• Necessary to include aggregate view of class data to meet teachers’ instructional needs
Final Cadre Findings

- In final usability/interpretability testing, cadre members were able to complete tasks effectively
- Feedback from cadre about final design was positive
- In final reflection, cadre members reported that they felt positive about the process, including that their ideas were used and that they developed professionally through participating
Next Steps
Upcoming Research Study

- Pilot study of science assessment system in 2020
  - Including evaluation of teacher dashboard through …
    - Interpretability and usability studies
    - Teacher interviews and focus groups