# I-SMARTI Learn About UDL Applied in Assessments

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# Innovations in Science Map, Assessment & Reporting Technologies (I-SMART)

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### Polleverywhere

#### PollEv.com/joseblackorb262

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Innovations in Science Map, Assessment & Report Technologies

# 1. What types of assessments do you use in your practice?

#### 2. How do you use assessment information?



# 3. What do you think of when you think of UDL and assessment?

















# **Common history**

Grade	Goal
3	Identify coins
7	Identify coins
10	Identify and count coins

**New HS expectation:** Solve real-world problems involving multiplication of decimals and whole numbers, using models when needed.



#### A Different Way to Model the Domain









REPORT DATE: 06-06-2018 SUBJECT: English language arts GRADE: 10

#### Individual Student Year-End Report Learning Profile 2017-18



DISTRICT ID: DLM District STATE: DLM State

#### NAME: Student DLM DISTRICT: DLM District ID SCHOOL: DLM School

		Level Mastery					
Area	Essential Element	1	2	3	(Target)	5	
ELA.C1.3	ELA.RI.9- 10.3	Identify actions in familiar routines	Determine which event comes first	Identify relationships between concrete details	Determine the logical relationship between details	Identify how details change across the text	
ELA.C1.3	ELA.RL.9- 10.3	Understand subgroups within categories	Identify character feelings in a familiar story	Describe internal and external character traits	Determine how a character changes or develops	Identify changes in characters, settings, and events	
ELA.C1.3	ELA.RL.9- 10.5	Identify event sequence	Identify the beginning and end of a story	Identify story elements that change	Identify deviations from chronological order in a text	Understand how structure influences meaning	
ELA.C2.1	ELA.L.9- 10.2.c	Identify the first letter in own name	Use letters to create words	Represent initial sound in a word with a letter	Spell single-syllable words conventionally and phonetically	Spell irregular words correctly	
ELA.C2.1	ELA.W.9- 10.2.c	Produce a two word message	Connect two or more words together when writing	Write a complete thought	Write grammatically correct simple sentences	Write grammatically correct compound sentences	
ELA.C2.1	ELA.W.9- 10.2.d	Understand subgroups are within broad categories	Recognize domain-specific words	Use domain-specific vocabulary in writing	Use domain-specific vocabulary to strengthen claims	Use academic words in informative writing	
ELA.C2.1	ELA.W.9- 10.2.f	Identify the end of a familiar routine	Produce a universal ending	Write a concluding sentence	Write a conclusion for a text	Produce a relevant conclusion when writing	



No evidence of mastery on this Essential Element

Essential Element not tested

Page 3 of 4



# **A Few Guiding Principles**

Instructionally relevant

Connected to the timing of instruction

Organize maps - show teachers important nodes

Diagnostic information to guide decisions







# Test Design and Development for I-SMART



# **I-SMART Purpose**

Improve achievement of multidimensional science standards for students with and without disabilities through accessible, learning map model-based assessments and reporting tools.



# **Building on the work from DLM**

- Deep integration of the UDL guidelines into the test design and development process
- Students with significant cognitive disabilities
- Students with and without disabilities who are struggling to meet grade-level expectations in science



# Integrating UDL Guidelines into Cognitive models of learning

- Learning maps are a type of cognitive model that intentionally represent multiple pathways of learning
- We used the UDL guidelines when developing the design principles and stakeholder review criteria for I-SMART maps



# **Science Neighborhood Maps**





# Stakeholder Evaluation of I-SMART Maps

- Evaluating maps for content accuracy
- Evaluating map structures to reduce barriers
- Evaluating maps to be useful for all students



# Integrating UDL Guidelines into Test Design

• Assessments are an opportunity to

#### demonstrate learning

- Results that provide evidence of learning
- Planning for next steps
- UDL principles apply to good test design



# **UDL in an Evidence-Centered Design Framework**

- Essential Element Concept Map is a document that specifies the connection between the content, a testlet's design elements, and student observations.
- Provides guidance to item-writers in developing testlets and incorporating UDL options.



# **I-SMART Testlets**

- Phenomena-based engagement
- Student Choice
- Wonder Questions
- Science Narratives
- Embedded Items





# **Examples of UDL Features**

- Engaging science phenomena
- Wonder Questions
- Student choice of context for assessment
- Self-evaluation questions
- Innovative Item Types



# **Choice of Context**

Provides an option for recruiting interest
Found at the beginning of the testlet
Unscored





# **Wonder Question**

Provides option for selfregulation
Found near the beginning of the testlet
Unscored
Students return to wonder question at end of testlet

#### det Preview

#### I wonder...

Tim knows that animals get matter from food to grow. Tim knows some animals eat plants. Tim knows other animals eat animals. Tim wonders what would happen to animals if all the plants died. What do you think? What would happen to animals if all the plants died?

Animals that eat other animals would survive.

No animals would survive.







#### **Lessons Learned**

Application of UDL guidelines is best approached holistically across the assessment design process.

• It's not a checklist



# **The I-SMART Dashboard**



## What's the takeaway?

	College	Degrees	No Colleg	e Degrees
Income	Under 50	Over 50	Under 50	Over 50
Up to \$50k	643	793	590	724
Over \$50k	735	928	863	662

From 'Show Me the Numbers' by Stephen Few



# What's the takeaway?



From 'Show Me the Numbers' by Stephen Few



# 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 more empowering 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 and for instructional decision-making



# **The process: Design cadre**

- Recruited 11 teachers from 4 states
- Held 4 co-design / rapid prototyping cycles
  - Identified needs & requirements
  - Developed & evaluated features to add / change
  - Tested usability



## **Iterative co-design cycles**









## **Iterative co-design cycles**



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			Add another note	Add notes		
>	Trait Inheritance	$\checkmark$	✓ Use a model to recognize that sound	X Investigate changes in vibrations and	Use a model to show how light waves or	





## **Iterative co-design cycles**

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# Test results: class overview

DYNAMIC LEARNING MAPS: Tracker					S	earch:	Enter sea	arch ter	m(s)		Search	
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Johnny Doe	$\rightarrow$	*	×		~	*	×			$\rightarrow$		
Karen Oh	$\rightarrow$	*	*	×	~	*	*	×		$\rightarrow$		
Hubert Pho	$\rightarrow$	×			~	×				$\rightarrow$		
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Jane Snow	$\rightarrow$	*	*		~	*	×			$\rightarrow$		
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→ Instruction In Progress X Mastery Not Yet Demonstrated

Instruction Complete

# Test results: student overview



# Test results: detail view by class





### Feedback

In **your** experience, when reviewing student assessment data, what functions / features help to inform instructional planning, design, and decision-making?



# **UDL Guidelines for Assessment**



# **Universal Design for Computerbased Testing (UD-CBT)**

**CAST-Pearson collaboration** 

- Framework
- <u>Guidelines</u>



# **Student-Task Interaction**

Phase of interaction	Student Task
Task presentation	Recognize and understand the information presented in the task directions and stimulus/stimuli
Strategic interaction	Manipulate, reorganize, modify, and/or combine the information in the prompt and strategically apply prior knowledge and skills
Response action	Plan, organize, and produce a response based upon an understanding of what the response entails



# **Processing Categories**

- Perceptual
- Linguistic
- Cognitive
- Motoric
- Executive
- Affective



# **Task Components**

- Text
- Images
- Audio
- Tables and Graphs
- Mathematical Numbers and Symbols
- Video and Animation
- Response Options
- Active Objects / Links
- Multi-stage / Multi-part Tasks
- Constructed Response: Text
- Constructed Response: Math



#### **Example: Video/Animation Component**

Task Component: Video/Animation						
Category of Processing	If this task <i>does not</i> intend to measure:	Then consider the following design options to minimize measurement of unintended constructs (construct irrelevant variance):				
	Visual Ability	Rich description				
Perceptual	Visual Acuity	Flexible image size, zoom				
	Visual Discrimination	Black and White/Greyscale options, flexible contrast				
	Visual Processing Skills	Highlight critical features				
	Knowledge of Graphic Conventions	Alternative descriptions or depictions				
	Knowledge of Iconic Conventions	Alternatives for icons				
Cognitivo	Visual Syntax Fluency	Highlight critical relationships				
Cognitive	Background Knowledge	Links to background knowledge				
	Cognitive Strategies	Prompts and supports for viewing and interpretation strategies				
	Planning and Organizing Skills	Graphic organizer, planning templates				
	Attention and Concentration	Summary of action, prompts, navigation control (pause, forward, reverse, replay and search features), highlighting in graphic organizer synchronized to stages of action				
Motoric	Navigation of Animation or Video	Keyboard alternatives for all on screen navigation commands; assistive device compatibility, do not disable OS functions				
	Goal Setting Ability	Explicit Instructions, goal-setting supports				
Evenutive	Goal Maintenance and Adjustment	Reminders, prompts				
Executive	Monitoring Progress	Extrinsic Scaffolds for monitoring				
	Working Memory	Note-taking, mnemonic aids, text complement, locate prompts near relevant stimuli				
Affective	Self-regulation	Scaffolds for self-regulation				
	Intrinsic Task-specific Motivation	Alternative content for interest				
	Extrinsic Incentives	Individualized rewards, repercussions				
	Test Conditions	Alternative settings and conditions (time, sessions, location); review for racial, cultural, ethnic, & gender bias; differential item functioning; age appropriate content				

# Questions

- Short-term: Can the guidelines support the next round of I-SMART item design?
- Long-term: How can we improve usability of the guidelines for key stakeholders?
  - Test developers
  - Item writers
  - UX designers
  - Software developers
  - Test administrators



### **Current Efforts**

- Jibe with UDL 2.0 guidelines
- Refresh of approaches and technologies
- Consider interfaces that would support more effective use



# **Discussion**



# Questions

- What do you think of the learning map?
- Could you see it useful in your practice?
- Would you be interested in a using a dashboard like the one we've described?
- What would you like to see on such a dashboard?

