Workshop Guide:
Exploring Student-Designed Assessment

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Presenters

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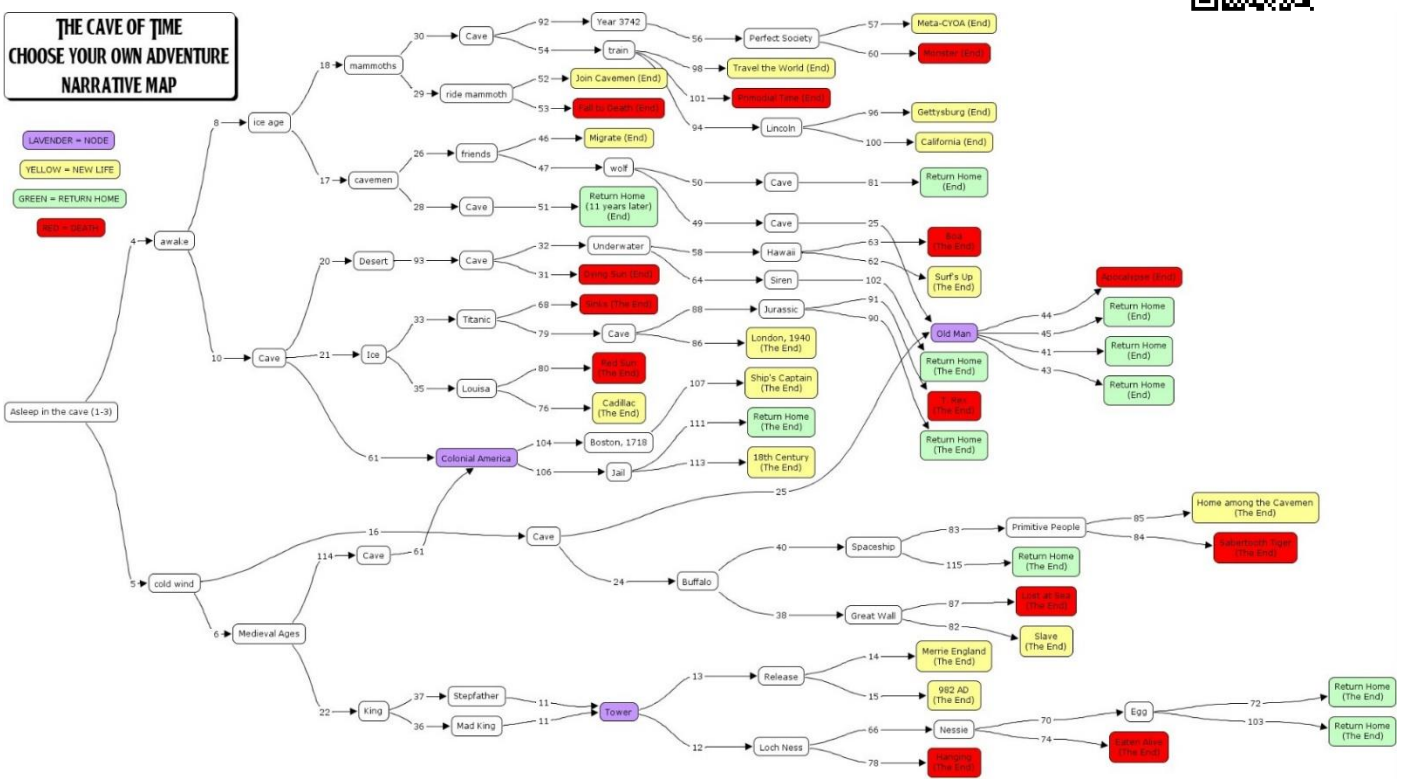
Agenda

1. Description of 2 techniques for enabling student-designed assessment
2. Student perspectives
3. Exercises for you to try:
   a. Skill sheet
   b. Format-Independent Rubric
4. Questions

Workshop URL

http://shiftingphases.com/2017/05/29/exploring-student-designed-assessment

http://bit.ly/20170601sda



Example 1: Skill Sheet

To implement the UDL philosophy of "tight goals, loose means", I switched my assessments from being focused on tasks (quiz 1, lab 2) to being focused on skills (similar to learning outcomes). For students to take control of when and how they demonstrate their mastery of those skills, it helps to have an organized way to track what is and isn't complete. I call this a "skill sheet," and issue one for every major topic we study (typically 3-5 for any given course). Here's how I create one.

	Ideas	*Questions*
Identify Outcomes *Students will be able to…*	• Summarize another's point in their own words • Improve clarity and precision of a given text by asking questions or making suggestions • Identify cause and effect • Identify contradictions	
Define Conjunctive Grading *Will you require mastery of mandatory skills before students receive credit for optional skills?*	In my system, some skills are required in order to pass and must be fully mastered; others are optional, and it's not necessary even to attempt them.	
Grade Levels *How might you translate this into a grade?*	Completing all required skills earns a 60%. Mastering additional skills earns an additional 20%. Taking initiative for self-directed learning earns an additional 20%.	
Sketch a Skill Sheet *On a separate piece of paper, use the skills and grade levels above to sketch a skill sheet for your course.*	See my example below	

Thinking Like a Technician

Goals:

- Summarize someone else's point of view
- Clarify an idea
- Distinguish between a tested idea and an inference
- Identify hazards
- Document best practices

3/5	Demonstrate **required concepts**

+1	In addition to #3, combine key concepts in **circuit applications**

+1	In addition to #3, combine skills to learn something new. Requirements: - Use at least one skill from this sheet - Use at least one other skill (from this sheet, other sheets, other courses, previous experience, etc.) - Learn something new and explain how it works - Document (written description, photos, video, screencast, or any other way)

Theory

Shop

3/5: Required Skills

		In Progress	Mastery
	Summarize ☐ Explain what the author thinks ☐ Must be in your own words ☐ Must not add information ☐ Highlight what is most important		
	Clarify ☐ Improve the clarity of a statement ☐ Improve the precision of a statement ☐ Help us add information or understand better		
	Identify Cause and effect ☐ State what physically forces something to happen ☐ Cause and effect must be different things – nothing causes itself		

		In Progress	Mastery
	Interpret ammeter measurements ☐ Use safely ☐ Use best practices		
	Interpret ohmmeter measurements ☐ Use safely ☐ Use best practices		
	Interpret voltmeter measurements ☐ Use safely ☐ Use best practices		

+1: Application

	Assess model presentation ☐ Unclear or imprecise? ☐ Cause has gaps or begs the question? ☐ Unresolved contradictions?		

	Document Circuits ☐ Label all tools and supplies ☐ Disassemble and reassemble a plastic base ☐ Disassemble and reassemble a ceramic base ☐ Build and draw a working circuit ☐ Build and draw a non-working circuit ☐ Build and draw a wacky circuit ☐ Fully document a test circuit ☐ Fully document 3 circuits		

+1: Investigation

☐ Find an interesting project on Makezine.com or Instructables.com and build it
☐ Your topic here!

Activity 1: Create a Skill Sheet

	Ideas	*Questions*
Identify Outcomes *Students will be able to…*		
Define Conjunctive Grading *Will you require mastery of mandatory skills before students receive credit for optional skills?*		
Grade Levels *How might you translate this into a grade?*		
Sketch a Skill Sheet *On a separate piece of paper, use the skills and grade levels above to sketch a skill sheet for your course.*		

Example 2: Make a Format-Independent Rubric

If I'm going to encourage students to choose their own format for demonstrating mastery, I have to be ready for anything. No one's written a folk song about electrons yet, but I'm looking forward to that day. In the meantime, I need a rubric that is format and content independent. This example is one I use for anything that students build – whether they submit a report about it, a video about it, or demonstrate it to me in person.

	Ideas	*Questions*
Requirements *All assignments must include…*	a) Predictions of voltage, current, resistance, power b) Measurements of all predicted values c) Comparisons of predictions and measurements d) Discussion of results, including o "story of the electrons" o Example measurements to back up any points made o Possible causes or questions about causes o Connections to the class model	
Create a Rubric *…that students, and you, can use to assess for mastery*	See my example below	
Find the Mistakes in an Example Assessment *Create an example assessment containing common errors or omissions, to help students practice using the rubric*	See my example below	

My Rubric for Circuits

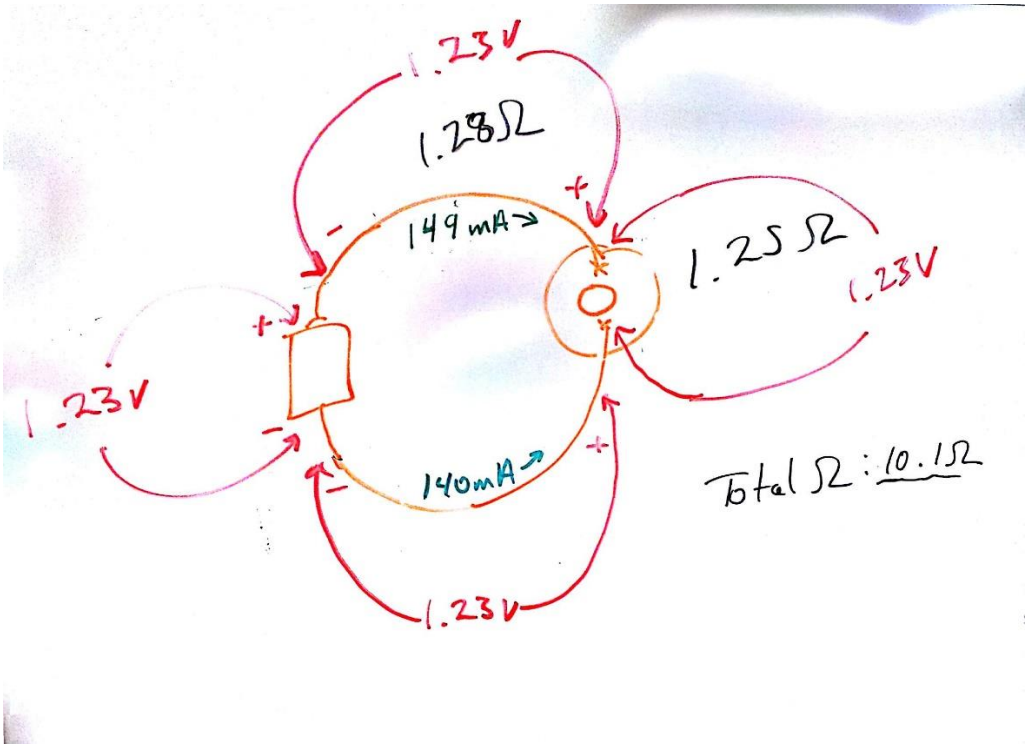


Figure 1: Impossible Circuit

Predictions

- ☐ Show enough reasoning that I could reproduce your work.
- ☐ Include a schematic.

Measurements Complete?

- ☐ **Ohms of all components** (if safe to measure)
- ☐ **Total ohms** (measured from the battery position, but with the battery removed)
- ☐ **Amps into and coming out of each component** (amount of flow per second)
- ☐ **Amps going through each wire** (amount of flow per second)
- ☐ All **current directions** marked
- ☐ **Volts of all components** (difference of energy)
- ☐ All voltages show **which side of the component has higher energy** (-), lower energy (+)

Compare

- ☐ Are the predictions fairly accurate to reality?
- ☐ How far off are the predictions from reality?
- ☐ If Possible: $\% \, difference = \frac{Measured - Predicted}{Measured} * 100\%$

Guidelines

- ☐ You can ignore any measurement that contributes less than 1% to the total effect

Discussion

Ohms

☐ Tell the story of the electrons ☐ Use example measurements to back up each point ☐ Possible causes or cause questions ☐ Connections to the model	The resistance (ohms) of the two wires is close to the same (1.28 Ω, 1.23 Ω). Maybe the reason they are roughly the same difficulty for electrons to travel through is because they're about the same length. The lightbulb also has about the same difficulty for electrons (1.25 Ω). That doesn't make sense to me. I thought wires were designed to be the easiest things for electrons to travel through; why would a lightbulb be just as easy as a wire? Then again, the filament inside the lightbulb is basically a wire, so maybe that's why. The total ohms (10.1Ω) doesn't seem to have any relationship to the ohms of the individual components. What is causing this?

Amps

☐ Tell the story of the electrons ☐ Use example measurements to back up each point ☐ Possible causes or cause questions ☐ Connections to the model	From the measurements, it looks like 140 mA of electrons flowed out of the negative side of the battery toward the lightbulb, and another 149 mA flowed out of the positive side. Does this mean that electrons are piling up inside the lightbulb? I think electrons repel each other, so it's also possible that the electrons coming in one direction get stopped by the repulsion of the electrons coming in the other direction. Where is the battery getting all these electrons? Also, it's one thing for electrons to come out of the side marked "minus". If it's full of electrons, then it makes sense that it's negatively charged. But how can electrons come out of the part of the battery that's positively charged? Do these words mean something different here?

Volts

☐ Tell the story of the electrons ☐ Use example measurements to back up each point ☐ Possible causes or cause questions ☐ Connections to the model	It looks like the electrons lose energy on their way from the battery's positive terminal to the light (1.23 V of difference). What is making them lose energy? The ones that leave from the negative side seem to lose exactly the same amount. Is that because the two wires have about the same difficulty rating (ohms)? Then it looks like the electrons on one side of the lightbulb have the same amount of energy as the electrons on the other side. Does this mean they're not gaining or losing any energy in the lightbulb? Also, what's going on with the energy levels of the battery? It looks like the electrons on the negative side start out with more energy than the ones on the positive side (by 1.23 V). Then, the two groups of electrons lose the same amount of energy (1.23 V each). But somehow at the lightbulb, the two groups have the same amount. If they started out with different amounts, and each lost 1.23V, shouldn't end up just as different as they were at the beginning?

Activity 2: Make a Format-Independent Rubric

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