A Farewell to the Digital Mesolithic: Resources and Spaces for Student-Centered Learning

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The Backdrop
Augmenting Human Intellect & Learning Capacity

21st Century Learning

One-to-One Technologies
Redefinition
Tech allows for the creation of new tasks, previously inconceivable

Modification
Tech allows for significant task redesign

Augmentation
Tech acts as a direct tool substitute, with functional improvement

Substitution
Tech acts as a direct tool substitute, with no functional change

Enhancement

Podcasts on iTunes U: http://tinyurl.com/aswemayteach
The SAMR Ladder: Questions and Transitions

• **Substitution:**
  • What will I gain by replacing the older technology with the new technology?

• **Substitution to Augmentation:**
  • Have I added a feature to the task process that could not be done with the older technology at a fundamental level?
  • How does this feature contribute to my design?

• **Augmentation to Modification:**
  • How is the original task being modified?
  • Does this modification depend upon the new technology?
  • How does this modification contribute to my design?

• **Modification to Redefinition:**
  • What is the new task?
  • Will it replace or supplement older tasks?
  • How is it uniquely made possible by the new technology?
  • How does it contribute to my design?
<table>
<thead>
<tr>
<th>Social</th>
<th>Mobility</th>
<th>Visualization</th>
<th>Storytelling</th>
<th>Gaming</th>
</tr>
</thead>
<tbody>
<tr>
<td>200,000 years</td>
<td>70,000 years</td>
<td>40,000 years</td>
<td>17,000 years</td>
<td>8,000 years</td>
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</table>

![Images representing different time periods and cultural artifacts.]
It is imperative that the CCSS be considered the “floor”—not the “ceiling”—when it comes to expectations for student performance in the 21st century.
Understanding Science: How Science Works

EXPLORATION AND DISCOVERY
- Making observations
- Asking questions
- Sharing data and ideas
- Exploring the literature
- Finding inspiration

TESTING IDEAS
- Hypotheses
- Expected results/observations
- Actual results/observations
- Supportive, contradictory, surprising or inconclusive data may...
- ...support a hypothesis.
- ...oppose a hypothesis.
- ...inspire new hypothesis.
- ...inspire revised/new hypothesis.
- ...inspire revised assumptions.

BENEFITS AND OUTCOMES
- Develop technology
- Address societal issues
- Build knowledge
- Inform policy
- Satisfy curiosity
- Solve everyday problems

COMMUNITY ANALYSIS AND FEEDBACK
- Feedback and peer review
- Replication
- Discussion with colleagues
- Publication
- Coming up with new questions/ideas
- Theory building

Gathering data
- How science works
www.understandingscience.org
© 2008 The University of California Museum of Paleontology, Berkeley, and the Regents of the University of California
Lesh: Teaching History – Concepts and Criteria

• Core Concepts:
  • Causality
  • Chronology
  • Multiple Perspectives
  • Contingency
  • Empathy
  • Change and Continuity Over Time
  • Influence/Significance/Impact
  • Contrasting Interpretations
  • Intent/Motivation

• Guiding Criteria:
  • Does the question represent an important issue to historical and contemporary times?
  • Is the question debatable?
  • Does the question represent a reasonable amount of content?
  • Will the question hold the interest of middle or high school students?
  • Is the question appropriate given the materials available?
  • Is the question challenging for the students you are teaching?
  • What organizing historical concepts will be emphasized?
Collecting Resources
Unsworth: Scholarly Primitives

• Discovering
  • searching, browsing, accessing, collecting
• Annotating
  • categorizing, providing commentary, analyzing
• Comparing
  • find differences, similarities and create meaning from them
• Referring
  • linking, referencing
• Sampling
  • selecting according to a criterion, showing relationships of items selected to the original set
• Illustrating
  • showing an example, highlighting features within an example
• Representing
  • changing depiction mode, publishing
Muller et al: Community Types

• Communities of Practice
  • A group of people with a common interest or practice who share information and/or network.

• Teams
  • Communities working on a shared goal for a particular project or function.

• Technical Support Groups
  • Provide technical support for a particular software or hardware tool.

• IdeaLabs
  • Communities in which members brainstorm around a set of questions or issues for a limited period of time, usually one to three days long.

• Recreation
  • Communities devoted to recreational activities unrelated to work.
# Muller et al: Communities and Toolkits

<table>
<thead>
<tr>
<th></th>
<th>CoP</th>
<th>Teams</th>
<th>Tech</th>
<th>IdeaLabs</th>
<th>Rec</th>
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<td>Forums</td>
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<td>Activities</td>
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<td>Blogs</td>
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<td>Files</td>
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<td>Wikis</td>
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The Toolkit

- Bookmarks: Delicious
- RSS Feeds: Google Reader
- Forums: Google Groups
- Activities: Google Forms; Google Calendar
- Blogs: Twitter; Blogger
- Files: Google Docs; Picasa; YouTube; Google Drive
- Wikis: Etherpad; Google Sites
Rheingold: Key Information Literacies

- Attention
- Junk Detection
- Participation
- Collaboration
- Network Awareness

Knowledge and Assessment
## Bloom’s Taxonomy (Revised)

<table>
<thead>
<tr>
<th></th>
<th>Remember</th>
<th>Understand</th>
<th>Apply</th>
<th>Analyze</th>
<th>Evaluate</th>
<th>Create</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factual Knowledge</td>
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<td>Conceptual Knowledge</td>
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<td>Procedural Knowledge</td>
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<tr>
<td>Meta-Cognitive</td>
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## Critical Thinking: Cognitive Skills and Subskills

<table>
<thead>
<tr>
<th>Skill</th>
<th>Subskills</th>
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</table>
| Interpretation | • Categorization  
|               | • Decoding Significance  
|               | • Clarifying Meaning |
| Analysis     | • Examining Ideas  
|               | • Identifying Arguments  
|               | • Analyzing Arguments |
| Evaluation   | • Assessing Claims  
|               | • Assessing Arguments |
| Inference    | • Querying Evidence  
|               | • Conjecturing Alternatives  
|               | • Drawing Conclusions |
| Explanation  | • Stating Results  
|               | • Justifying Procedures  
|               | • Presenting Arguments |
| Self-Regulation | • Self-examination  
|               | • Self-correction |

“Practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited.”

Stiggins: Seven Principles of Assessment

• Where Am I Going?
  • Provide a clear and understandable vision of the learning target
  • Use examples and models of strong and weak work

• Where Am I Now?
  • Offer regular descriptive feedback
  • Teach students to self-assess and set goals

• How can I close the gap?
  • Design lessons to focus on one aspect of quality at a time
  • Teach students focused revision
  • Engage students in self-reflection, let them keep track of and share their learning

## Wiliam: A Framework for Formative Assessment

<table>
<thead>
<tr>
<th></th>
<th>Where the learner is going</th>
<th>Where the learner is right now</th>
<th>How to get there</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher</strong></td>
<td>Clarifying learning intentions and criteria for success</td>
<td>Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding</td>
<td>Providing feedback that moves learners forward</td>
</tr>
<tr>
<td><strong>Peer</strong></td>
<td>Understanding and sharing learning intentions and criteria for success</td>
<td>Activating students as instructional resources for one another</td>
<td></td>
</tr>
<tr>
<td><strong>Learner</strong></td>
<td>Understanding learning intentions and criteria for success</td>
<td>Activating students as the owners of their own learning</td>
<td></td>
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</tbody>
</table>

Dylan Wiliam, *Embedded Formative Assessment*. Solution Tree (2011)
Learning Environments
Flipping the Classroom: ConcepTests

- Brief Lecture or Group Discussion (~10 minutes)
  - ConcepTest (~1-2 minutes)
    - Fewer than 30% of students answer correctly: The instructor revisits and explains the concept
    - Between 30-75% of students answer correctly: Peer Discussion: students try to convince each other (~2-3 minutes)
    - More than 75% of students answer correctly: The instructor explains remaining misconceptions

Which of these scenarios does not describe an acceleration?

A. A car going round a circular racetrack at constant speed.

B. A car traveling on a straight racetrack at constant speed.

C. A stone falling from the top of a building.

D. A simple pendulum.
Which of these would best be described as the “Crossing of the First Threshold” in *The Matrix*?

A. Neo goes to the club.

B. Neo takes the red pill.

C. Neo meets the Oracle.

D. Neo returns to the Matrix to save Morpheus.
Additional Resources – Part I

**Augmenting Human Intellect & Learning Capacity:**


**SAMR and TPCK:**

Additional Resources – Part II

Technology In Education: The First 200,000 Years:

21st Century Learning: