Building Upon SAMR

Ruben R. Puente'dura, Ph.D.
Augmenting Human Intellect & Learning Capacity

21st Century Learning

One-to-One Technologies
**Substitution**
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**Augmentation**
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**Modification**
*Tech allows for significant task redesign*

**Redefinition**
*Tech allows for the creation of new tasks, previously inconceivable*

Podcasts on iTunes U: http://tinyurl.com/aswemayteach
<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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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.
History
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?

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English
Marzano:
Six Steps to Effective Vocabulary Instruction

• Step 1: The Teacher Provides a Description, Explanation, or Example of the New Term

• Step 2: Students Restate the Explanation of the New Term in Their Own Words

• Step 3: Students Create a Nonlinguistic Representation of the Term

• Step 4: Students Periodically Do Activities That Help Them Add to Their Knowledge of Vocabulary Terms

• Step 5: Periodically Students Are Asked to Discuss the Terms with One Another

• Step 6: Periodically Students Are Involved in Games That Allow Them to Play with the Terms

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Biology
Understanding Science: How Science Works

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

GATHERING DATA
- Hypotheses
- Expected results/observations
- Actual results/observations

TESTING IDEAS
- Supportive, contradictory, surprising or inconclusive data may...
  - ...support a hypothesis.
  - ...oppose a hypothesis.
  - ...inspire revised assumptions.

INTERPRETING DATA
- Feedback and peer review
- Replication
- Coming up with new questions/ideas
- Discussion with colleagues
- Publication
- Theory building

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

COMMUNITY ANALYSIS AND FEEDBACK
- Personal motivation
- Serendipity
- Surprising observation
- New technology
- Practical problem
- Curiosity
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Literature
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

ConcepTest (~1-2 minutes)

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Geography
Gersmehl: Teaching Geography – Four Cornerstones

• Location
  • Position in space

• Condition
  • Mix of natural & artificial features that give meaning to a location

• Links
  • Connections between places

• Region
  • Formal region: group of places with similar conditions
  • Functional region: group of places linked together by a flow
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Mathematics I
Mathematical Proficiency: Five Strands

• Conceptual Understanding
  • Comprehension of concepts, operations, relations

• Procedural Fluency
  • Carrying out procedures accurately, efficiently, flexibly, appropriately

• Strategic Competence
  • Formulate, represent, solve problems in autonomous/real world situations

• Adaptive Reasoning
  • Logical thought, reflection, explanation, justification

• Productive Disposition
  • Habitual inclination to see mathematics as sensible, useful, worthwhile
  • Self-confidence in ability to master material

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Mathematics II
Fig. 2. Estimates by 160 gynecologists of the probability that a woman has breast cancer given a positive mammogram, before and after receiving training in how to translate conditional probabilities into natural frequencies.

Fig. 4. Lead-time bias. Even if the time of death is not changed by screening—and thus no life is saved or prolonged—advancing the time of diagnosis in this way can result in increased 5-year survival rates, causing such statistics to be misleading.
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Additional Resources
Resources

Background:

SAMR and TPCK:
• AACTE (Eds.) The Handbook of Technological Pedagogical Content Knowledge for Educators. New York:Routledge, 2008.
Resources – Part II

Defining Mobile Devices/The Lively Sketchbook

The Curiosity Amplifier

Technology In Education: The First 200,000 Years
Blog: http://hippasus.com/rrpweblog/
Email: rubenrp@hippasus.com
Twitter: @rubenrp

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