Education, Technology, and Change: SAMR and TPCK in Context

Ruben R. Puentedura, Ph.D.
Prologue: Metaphors
AS WE MAY THINK

A research center for augmenting human intellect

A Personal Computer for Children of All Ages

TO POLY :ANGLE :STEP
1. FORWARD :STEP
2. RIGHT :ANGLE
3. POLY :ANGLE :STEP
END

ON MAKING A THEOREM FOR A CHILD
The SAMR Model
Substitution
Tech acts as a direct tool substitute, with no functional change

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

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
Literacy and Vocabulary
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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Opening Up the Math Candy Store
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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The TPCK Model
Horizon Report: K12 Edition Wiki

Welcome to the workspace for the 2011 Horizon K12 Project. This space is a place for the members of the Horizon K12 Advisory Board to manage the process of researching, discussing, and ultimately, selecting the topics for the 2011 Horizon Report: K-12 Edition. The annual K12-focused report, which summarizes the qualitative research that will be conducted on this wiki, and the K12 Project as a whole is a project of the New Media Consortium.

The report, to be published in May 2011, will focus on emerging technologies and its applications to K-12 education. This is its third year of publication. (See the Horizon Report: 2010 K-12 Edition, shown in this link in its web-powered discussion format. The official electronic release appears in the right column.)

Horizon K12 is a project that applies the process developed for the New Media Consortium's Horizon Project to the identification of trends and challenges relevant to elementary and secondary learning institutions, and to clarifying key emerging technologies that are sure to impact the sector. Members of the
A Companion to Digital Humanities

Notes on Contributors
Foreword: Perspectives on the
The Digital Humanities and Hum

Part I: History
1. The History of Humanities
2. Computing for Archaeolog
3. Art History
4. Classics and the Computer
5. Computing and the Historic
6. Lexicography
7. Linguistics Meets Exact Scie
8. Literary Studies
9. Music
10. Multimedia
11. Performing Arts
12. Revolution? What Revolution

Part II: Principles
13. How the Computer Works
14. Classification and its Struct
15. Databases
16. Marking Texts of Man Di

A COMPANION TO

Digital Humanities

Beyond Search: Literary Studies and the Digital Library

Arcade

Mapping the Republic of Letters

Humanities at Stanford

WHAT are the humanities?
WHY are the humanities important?
WHO'S involved in the humanities?
WHERE can I learn about humanities research reshaping our future?
WHERE can I contribute? Now, in the Humanities’ Forum.

The Human Experience | inside the humanities at Stanford University

Digital humanities projects harness the power of technologies to conduct research and facilitate the sharing of information. Current projects include the digitization of print and sound archives, the creation of 3-D models of historical structures, and the development of virtual research forums so scholars from around the world can interact online.

Go to Beyond Search

Arcade

The new interactive website, entitled “Arcade,” is the first widely accessible platform for intellectual networking in the humanities. Arcade is a place for readers and writers interested in literature, the humanities, and the world. We aim to publish a broad range of the most exciting research in the humanities, from the accessible to the esoteric, across languages, historical periods, and generations.

Go to Arcade

Mapping the Republic of Letters

With the help of advanced visualization techniques, this project is literally “mapping” the Republic of Letters, by plotting the geographic data for the senders and receivers of correspondences. These maps will allow researchers to perceive the larger patterns of intellectual exchange in the early-modern world and raise new questions about the importance of places, nations, and cities, in the circulation of knowledge.

Go to Mapping the Republic of Letters
SAMR and Assessment
<table>
<thead>
<tr>
<th>Where the learner is going</th>
<th>Where the learner is right now</th>
<th>How to get there</th>
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<tbody>
<tr>
<td><strong>Teacher</strong></td>
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<td>1 Clarifying learning</td>
<td>2 Engineering effective</td>
<td>3 Providing</td>
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<td>classroom discussions and</td>
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## Substitution: Sociology Online Discussion Rubric (Evans, 2010)

<table>
<thead>
<tr>
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<th>4 Points</th>
<th>2 Point</th>
<th>0 Points</th>
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</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td>You show that you can apply or extend the idea you are discussing.</td>
<td>Some of your messages analyze, interpret, or apply the material well, but some do not. This might either be because the analysis was not done well, or because it was not attempted (that is, was simply opinion or hearsay).</td>
<td>Your messages generally show little evidence of analysis, consisting instead of opinion, feelings and impressions.</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>You accurately represent the concepts discussed.</td>
<td>You generally represent the concepts accurately, but you do not do so in all cases.</td>
<td>You have significant issues with regard to accurately representing the concepts.</td>
</tr>
<tr>
<td><strong>Use of material</strong></td>
<td>You use and cite sources, including the text and articles and/or bring in an outside source, all of which clearly add significantly to the discussion.</td>
<td>You clearly refer back to a definition, example or concept from the reading or lecture.</td>
<td>You do not bring in or refer to any material from the text, outside sources, or lectures.</td>
</tr>
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<td><strong>Sociological Analysis</strong></td>
<td>You focus on the sociological implications of the issue at hand (e.g., social meaning, the outcomes for society or groups, the social function served).</td>
<td>You touch on some sociological issues, but focus also on individual ones.</td>
<td>You focus primarily on individual issues.</td>
</tr>
<tr>
<td><strong>Responses</strong></td>
<td>You extend or politely question the post of another person in a way that advances the discussion.</td>
<td>You add new examples that continue the idea created by another person.</td>
<td>Your responses are primarily agreement.</td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td>You write at least three or more substantive comments (using the above criteria) based on the discussion assigned.</td>
<td></td>
<td>You write fewer than three substantive comments.</td>
</tr>
<tr>
<td><strong>Time of Posting</strong></td>
<td>Your posts are spread widely during the discussion.</td>
<td>You post at two significantly different times.</td>
<td>Your posts are clustered within a short period of time.</td>
</tr>
<tr>
<td><strong>Posts Read</strong></td>
<td>You have read at least 75% of the posts in the discussion.</td>
<td>You read at least 50% of the posts in the discussion.</td>
<td>You read less than 50% of the posts in the discussion.</td>
</tr>
<tr>
<td><strong>Clarity</strong></td>
<td>You use standard grammar and spelling and your meaning is clear.</td>
<td>Your posts have some grammar or spelling mistakes or your meaning is not entirely clear.</td>
<td>Your posts have significant grammar or spelling mistakes or your meaning is not clear.</td>
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Augmentation: A Branching Rubric for Writing (Hedrick, 2010)

Writing Assignment:
- Is there a clear topic?
  - Yes, the topic is clear.
  - Yes, there are some interesting sentences that could be developed into a paper with a clear topic.
  - Yes, there seems to be no topics or thoughts for development.
  - No, the topic is vague or unclear.
  - No focus is established.
  - No, go to 3.

Three Features Dichotomous Rubric
(Focus, Elaboration/Details, Organization)

- Level 4: everything in place
- Level 3: most things in place some lapses
- Level 2: a few things in place but not everything
- Level 1: very few things in place

Developed by Vickie Hedrick

Hedrick, V. Continuous Improvement in the Language Arts Classroom. Quality Press (2010)
Modification: *ConcepTests* 
(Mazur, 1997)

**Diagram Description:**
- 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
- Another ConcepTest (~1-2 minutes)

Redefinition: *Designing for Wiki Learning* (Beasley-Murray, 2008)

Wikipedia:WikiProject Murder Madness and Mayhem
Epilogue: Expectations
Seymour Papert: Four Expectations

- **Expectation 1**: the scholastically unsuccessful group among the students will advance by several grade levels on standard achievement tests in mathematics and language. We shall, of course, confirm the significance of any such observation by comparison with a control group matched on a series of variables set up before the outset of the experiment.

- **Expectation 2**: observers will agree that the student in the experiment not only learned more than in a traditional class, but learned it in a more articulate, richer, more integrated way.

- **Expectation 3**: students will develop, or adapt concepts and metaphors derived from computers and use them not only as intellectual tools in the construction of models of such things as "number" and "theory" but also in elaborating models of their own cognitive processes. This will in turn have an impact on their styles of learning and problem-solving.

- **Expectation 4**: the use of computer metaphors by children will have effects beyond what is normally classed as "cognitive skill". We expect it will influence their language, imagery, games, social interactions, relationships, etc…
Additional Resources
Resources

Metaphors:

SAMR and TPCK:
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