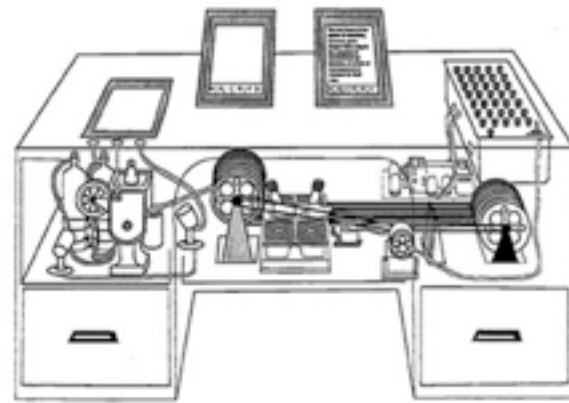


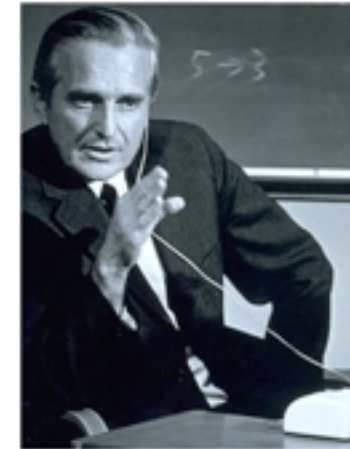
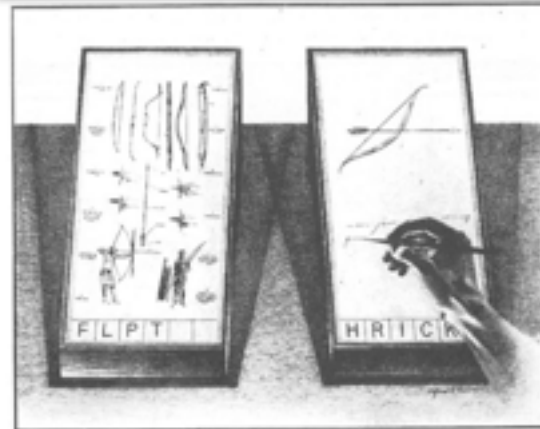
SAMR and Change

Ruben R. Puentedura, Ph.D.

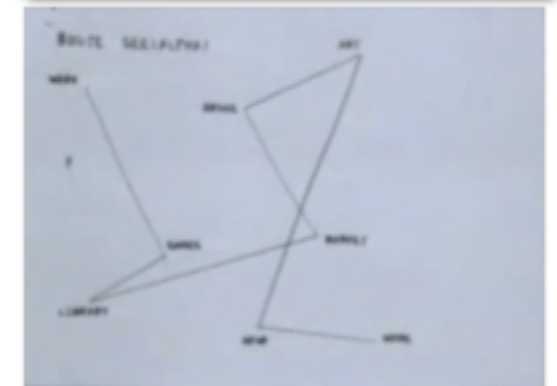
Prelude: Metaphors



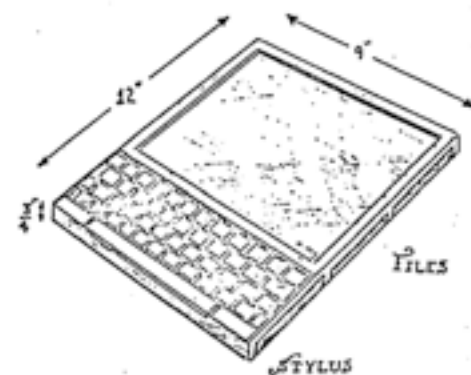
AS WE MAY THINK



a research center
for augmenting human
intellect

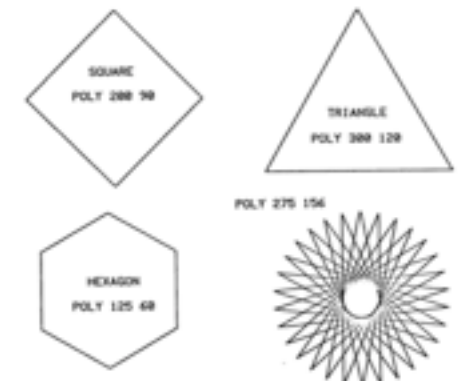


A Personal Computer for Children of All Ages

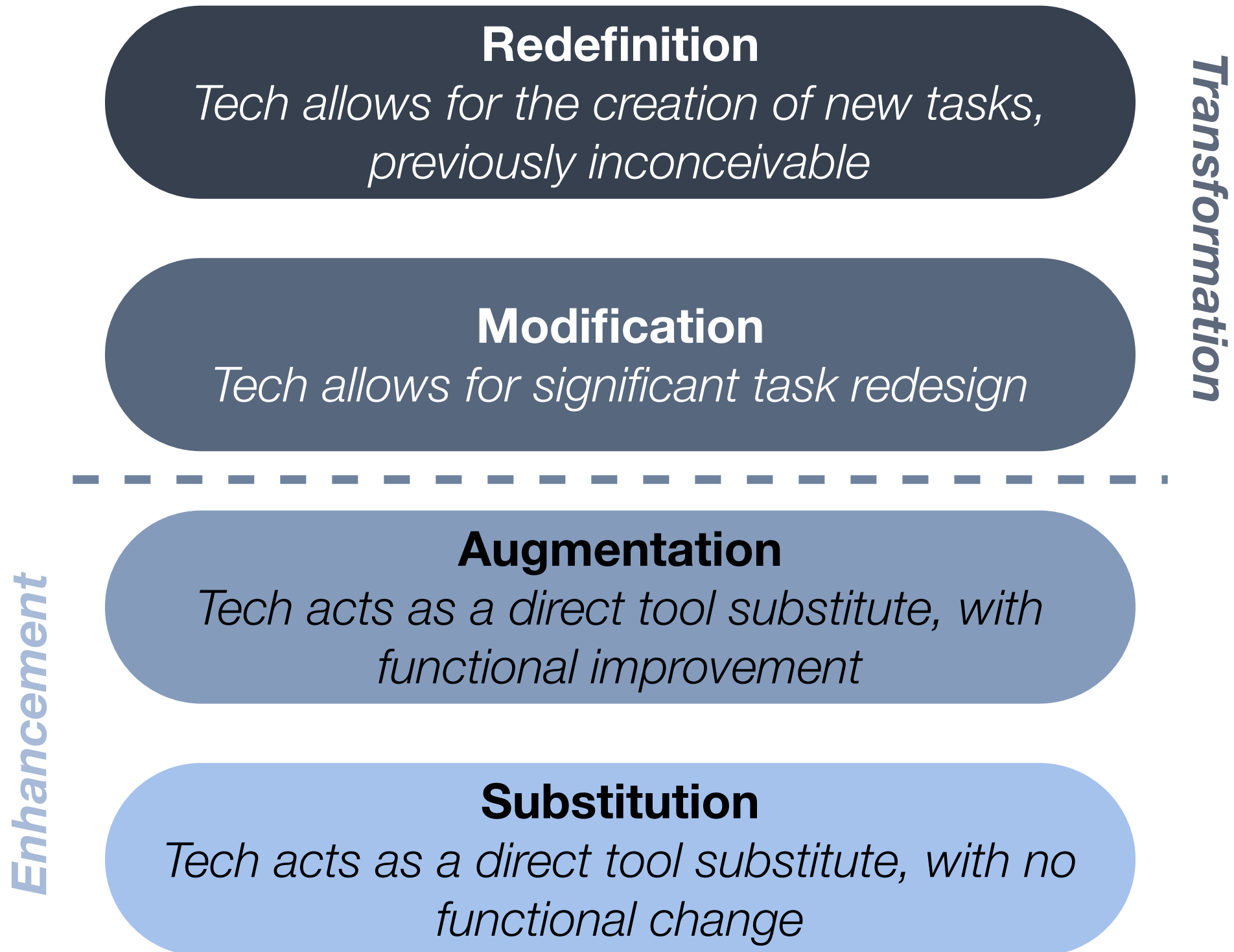


TO POLY :ANGLE :STEP
1. FORWARD :STEP
2. RIGHT :ANGLE
3. POLY :ANGLE :STEP
END

ON MAKING A THEOREM FOR A CHILD



The SAMR Model



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

Redefinition

Tech allows for the creation of new tasks, previously inconceivable

Modification

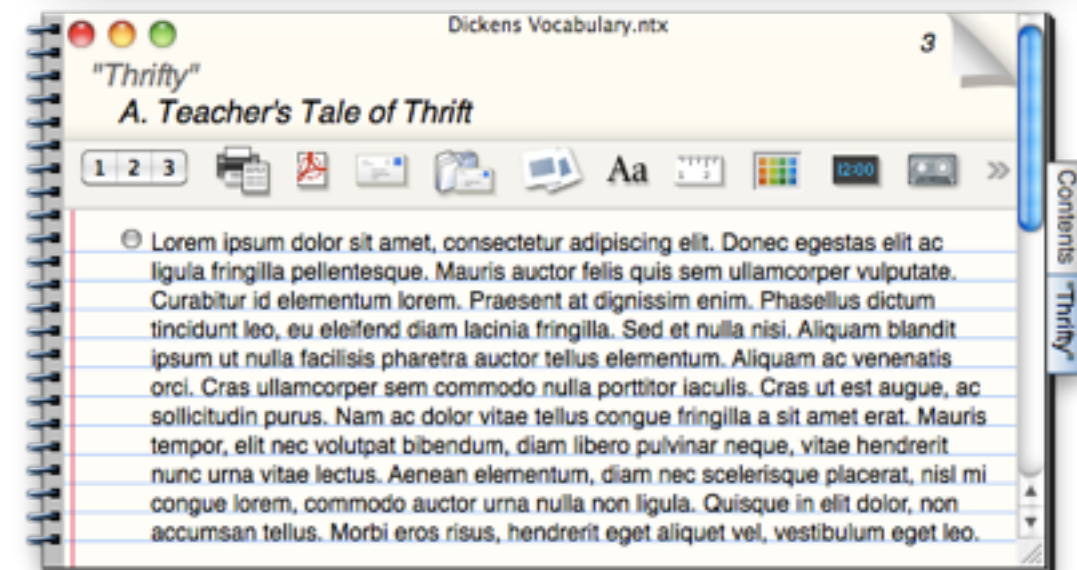
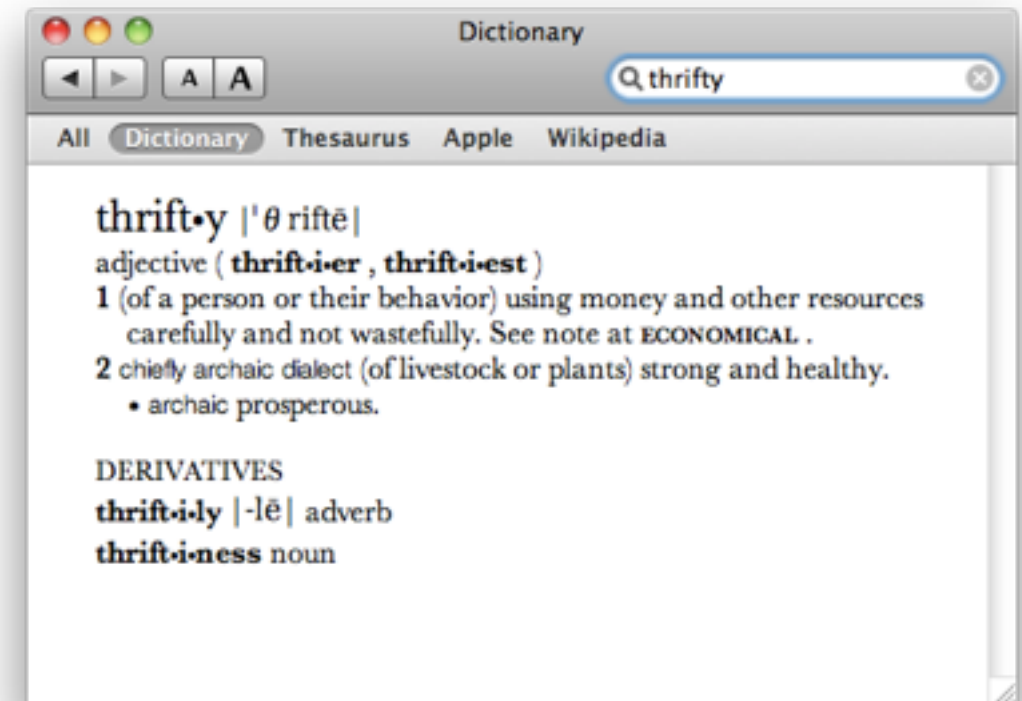
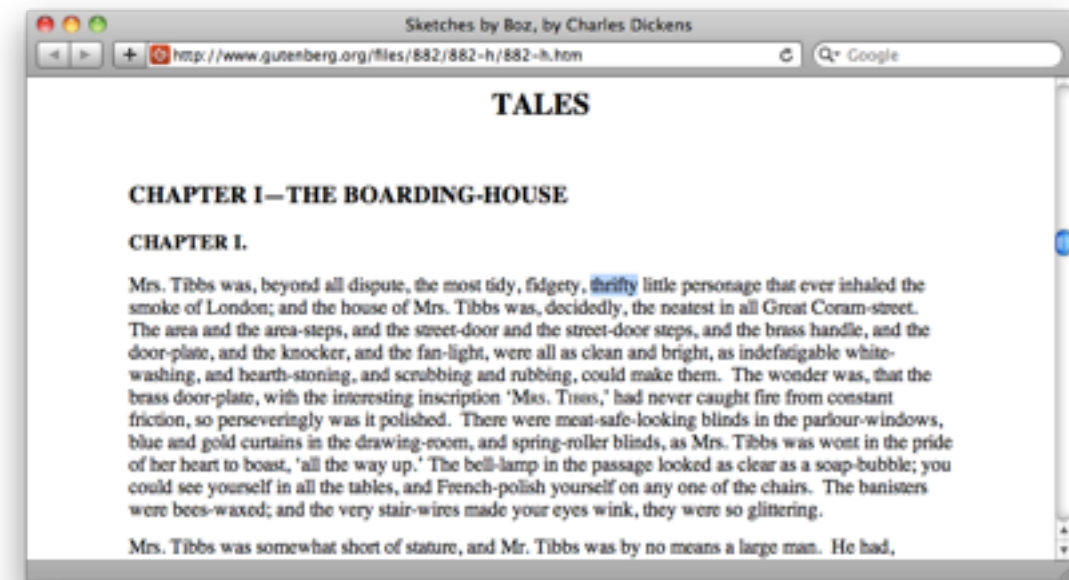
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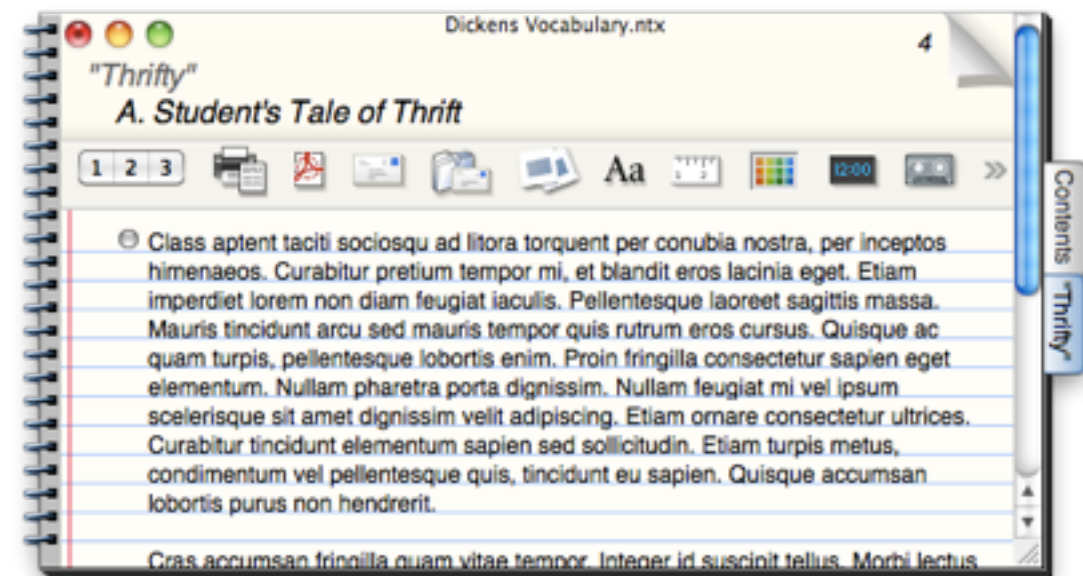
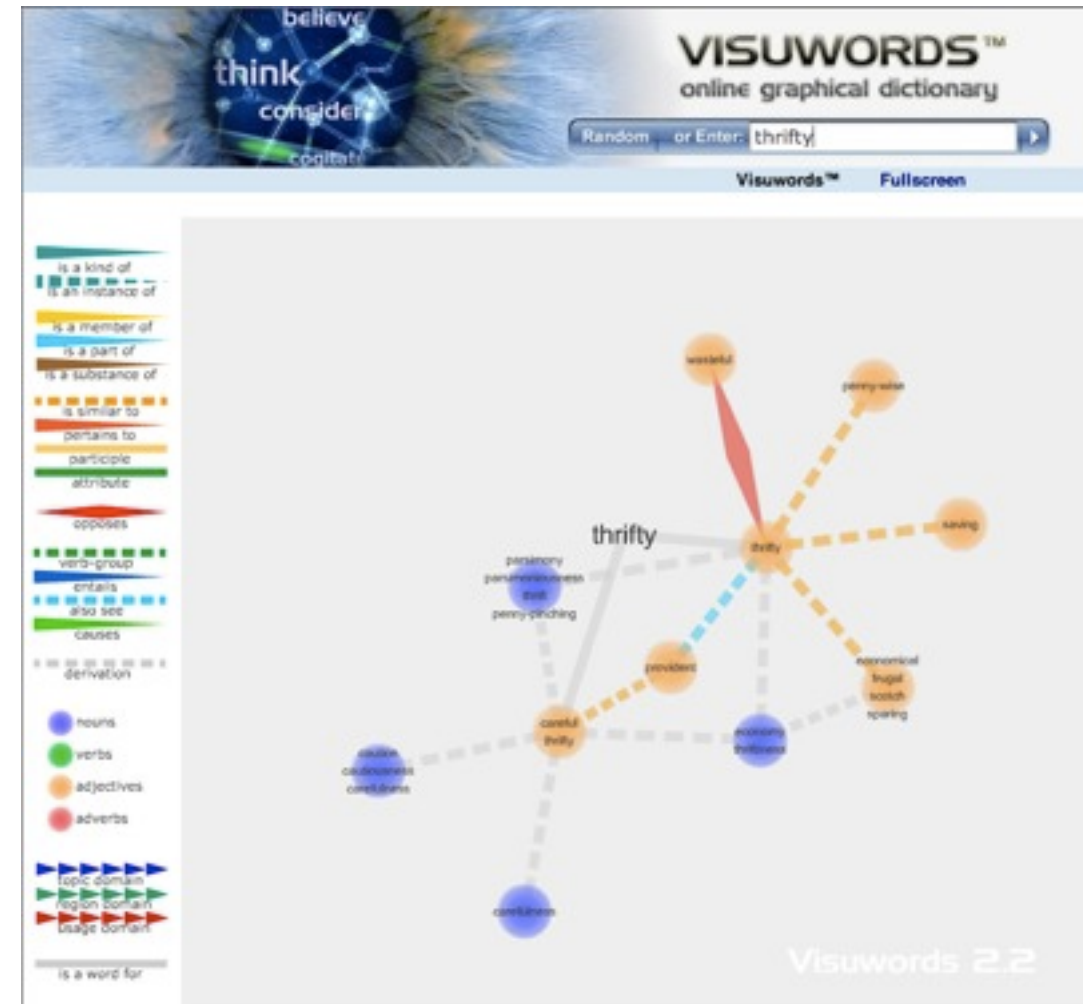
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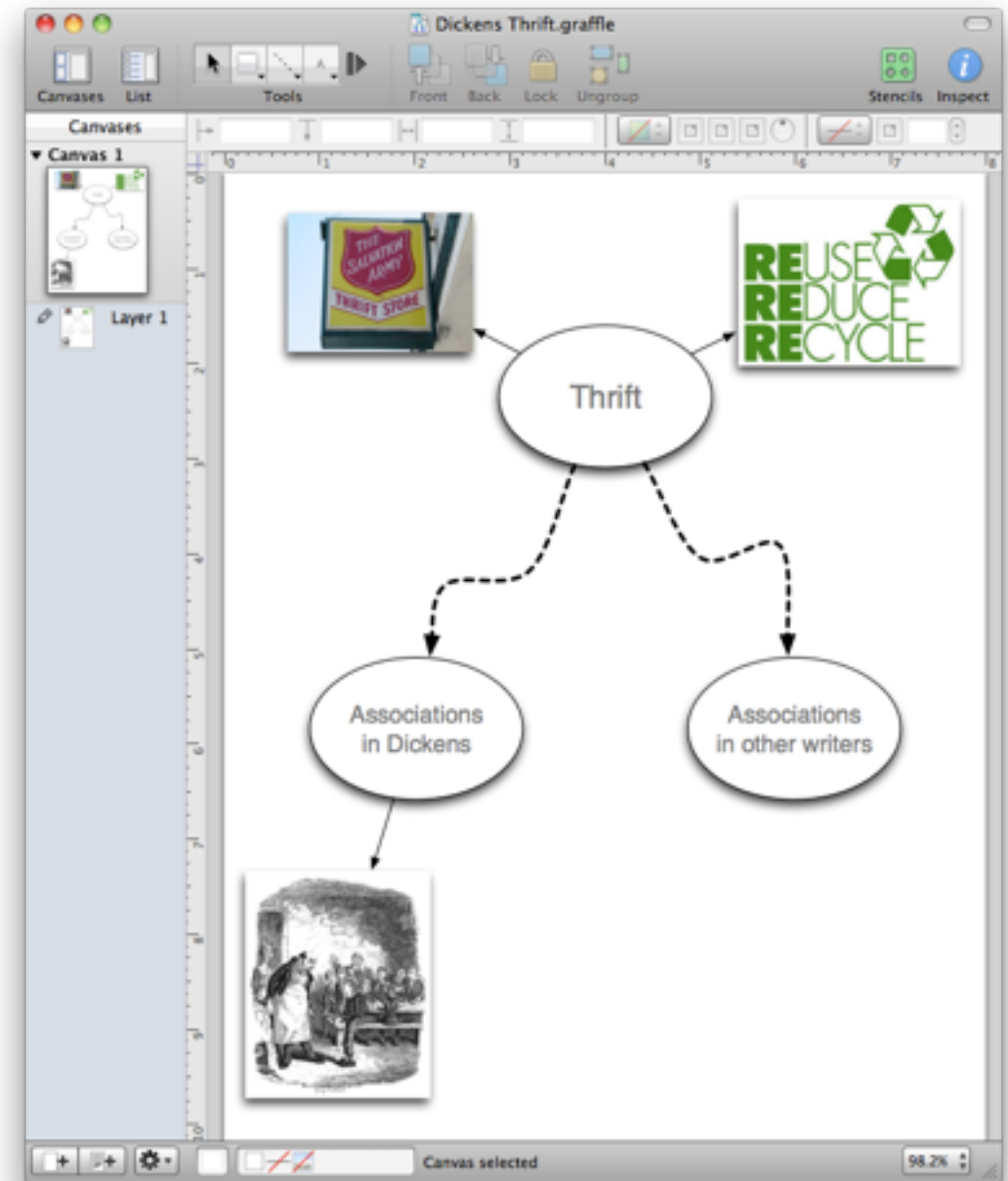
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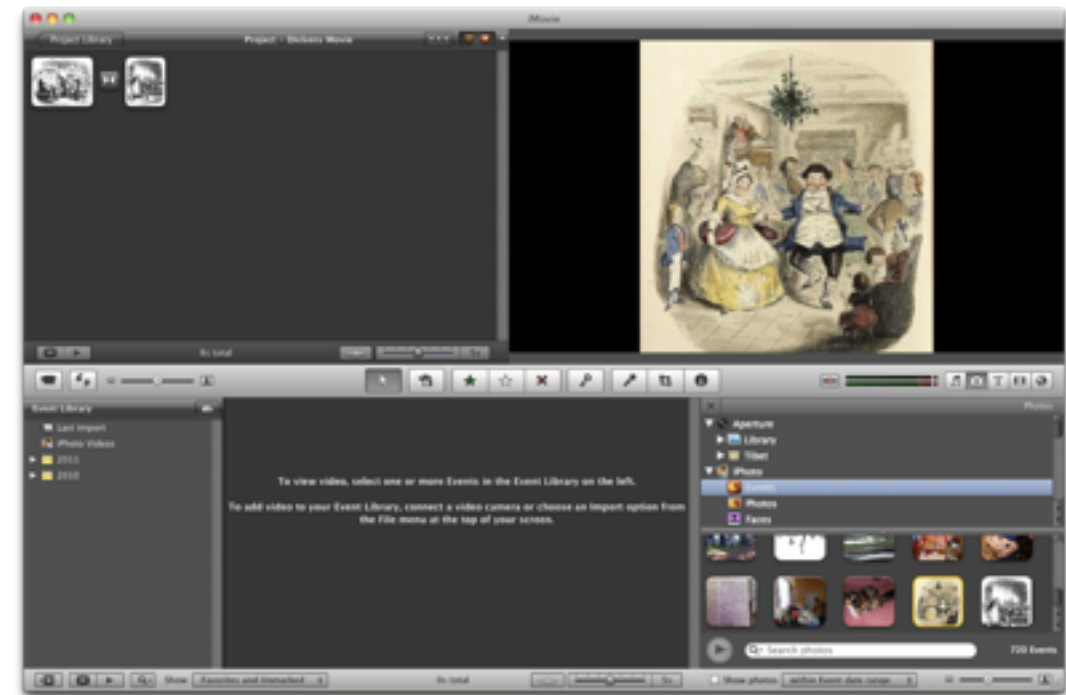
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The Student Historian

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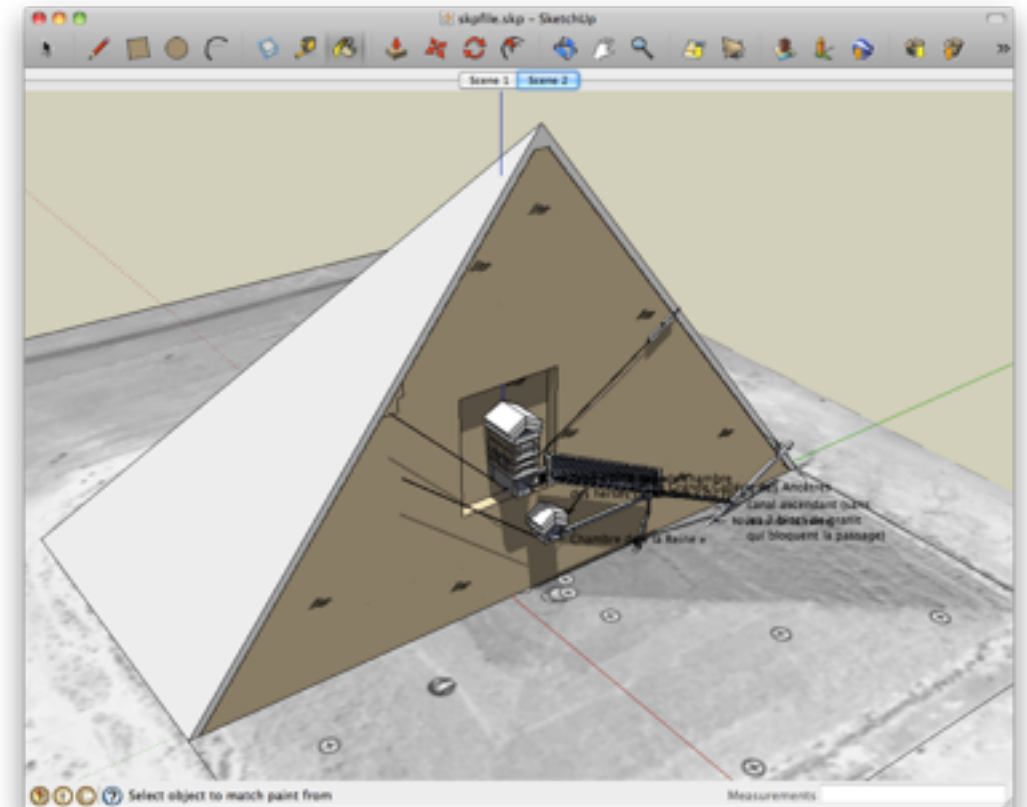
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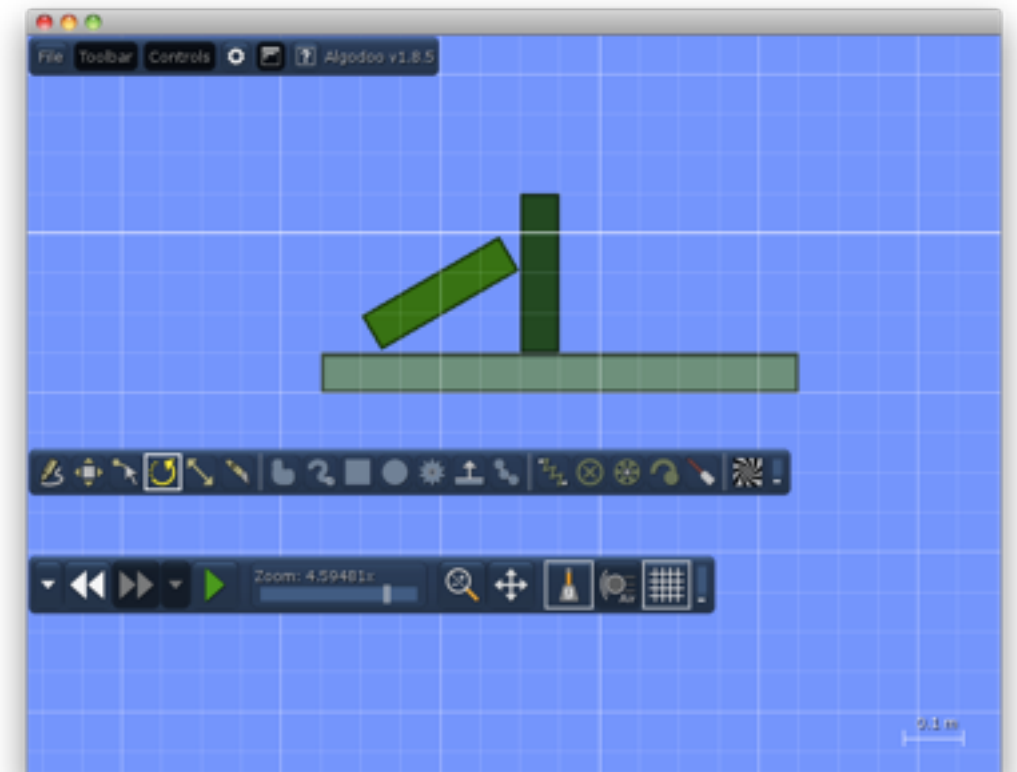
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Science as Concrete Abstraction

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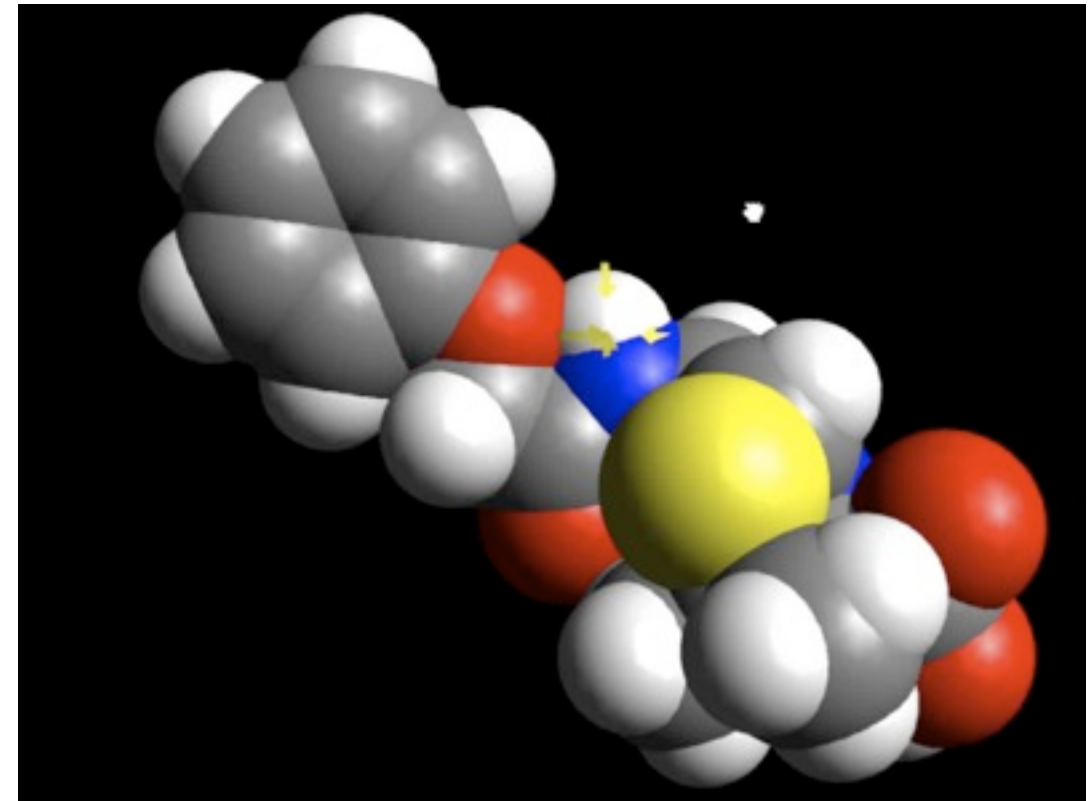
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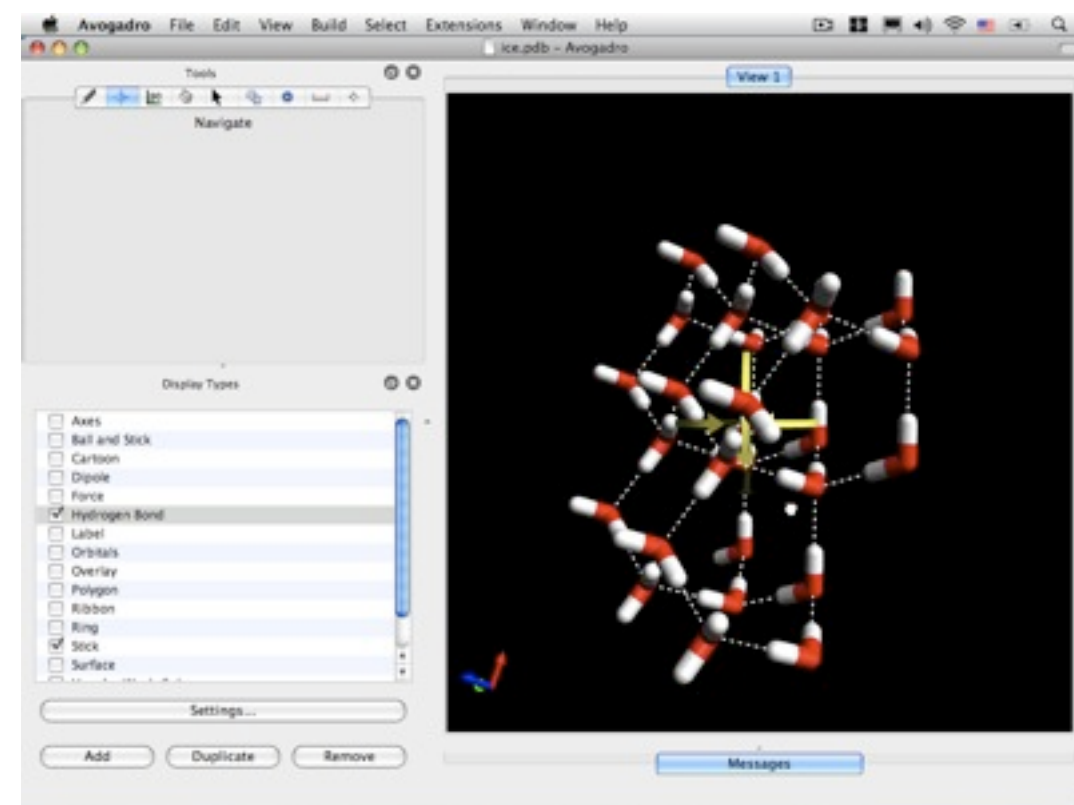
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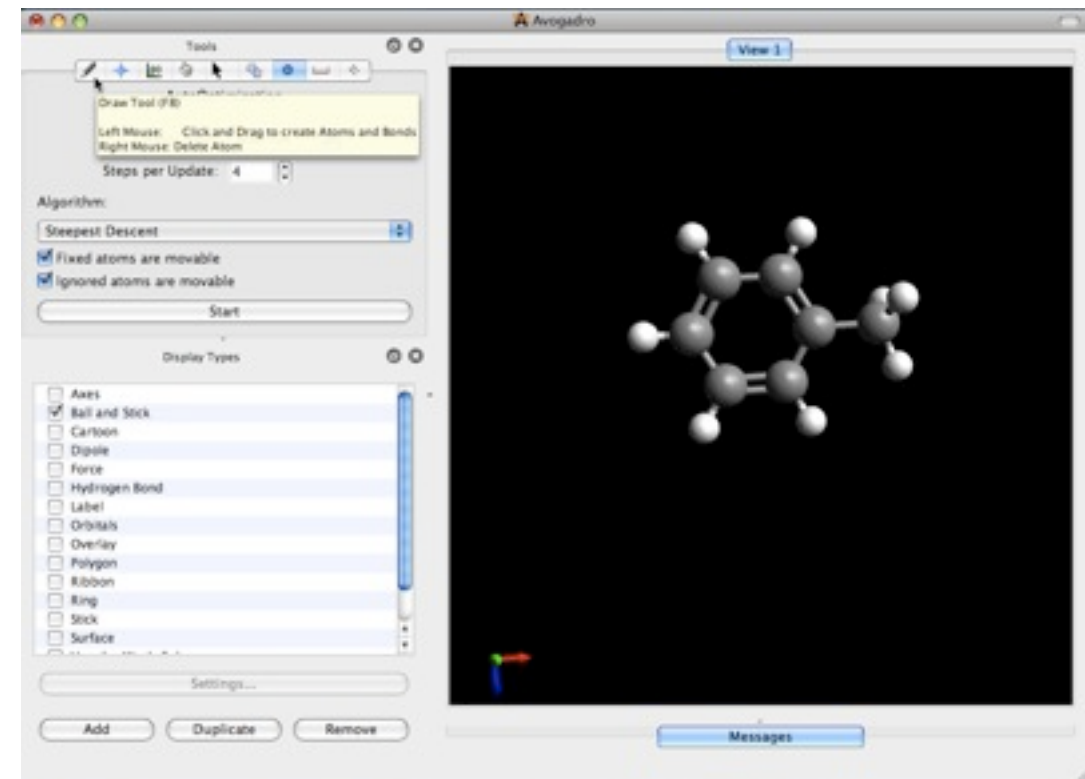
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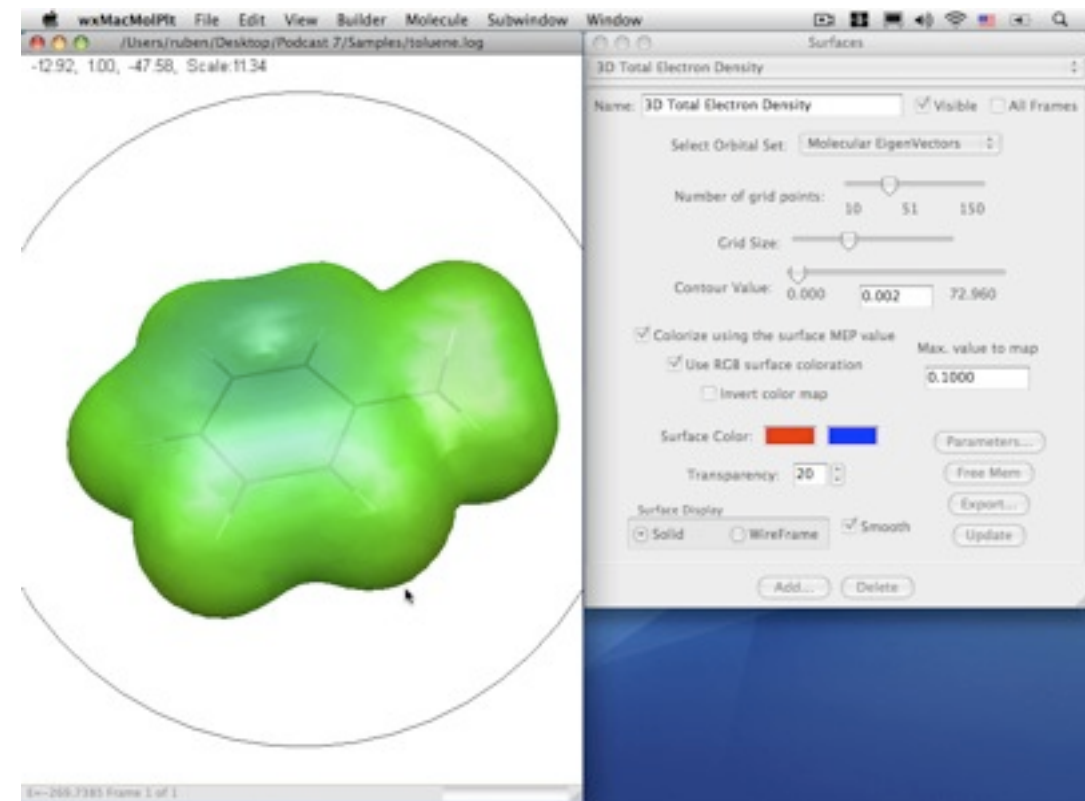
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Opening Up the Math Candy Store

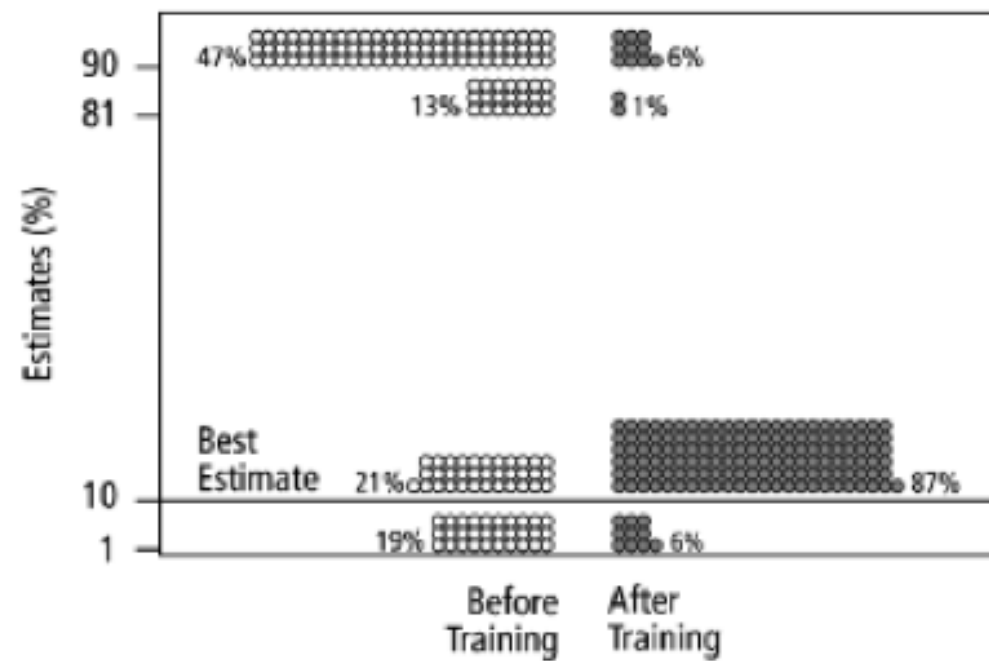


Fig. 2. Estimates by 160 gynecologists of the probability that a woman has breast cancer given a positive mammogram, before and after receiving training in how to translate conditional probabilities into natural frequencies.

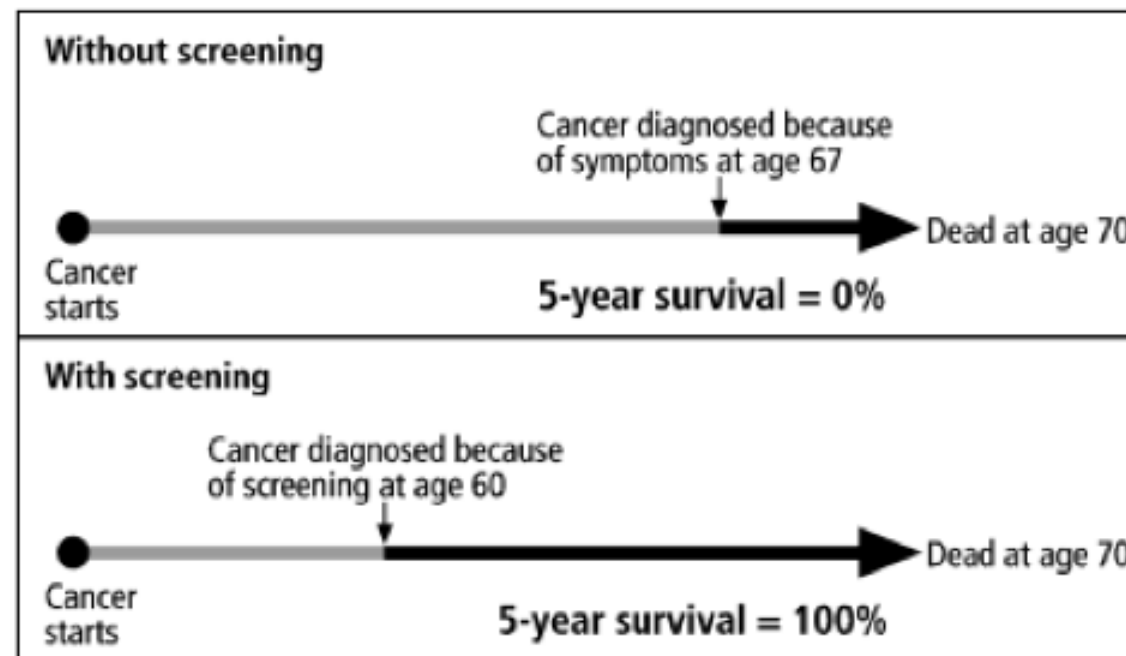


Fig. 4. Lead-time bias. Even if the time of death is not changed by screening—and thus no life is saved or prolonged—advancing the time of diagnosis in this way can result in increased 5-year survival rates, causing such statistics to be misleading.

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The screenshot shows a web page titled "AP Statistics Curriculum 2007 Bayesian Prelim". It features a navigation menu on the left with links like "Home Page", "Community portal", "Current events", "Recent changes", "Random page", "Help", "Donations", "Keyword Search", and "Create Account". The main content area includes a "Contents" table of contents, a "Probability and Statistics Ebook - Bayes Theorem" section, an "Introduction" to Bayes Theorem, a mathematical formula for $P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)}$, a paragraph explaining the theorem in words, a formula for conditional density $f(Y|X) = \frac{f(X,Y)}{f(X)}$, an "Example" section with a probability problem and its solution, and a "Bayesian Statistics" section.

page discussion view source history

AP Statistics Curriculum 2007 Bayesian Prelim

Contents (xxx)

- 1 Probability and Statistics Ebook - Bayes Theorem
 - 1.1 Introduction
 - 1.2 Example
 - 1.3 Bayesian Statistics
- 2 See also
- 3 References

Probability and Statistics Ebook - Bayes Theorem

Introduction

Bayes Theorem, or "Bayes Rule" can be stated succinctly by the equality

$$P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)}$$

In words, "the probability of event A occurring given that event B occurred is equal to the probability of event B occurring given that event A occurred times the probability of event A occurring divided by the probability that event B occurs."

Bayes Theorem can also be written in terms of densities or likelihood functions over continuous random variables. Let's call $f(\cdot)$ the density (or in some cases, the likelihood) defined by the random process x . If X and Y are random variables, we can say

$$f(Y|X) = \frac{f(X,Y)}{f(X)}$$

Example

Suppose a laboratory blood test is used as evidence for a disease. Assume $P(\text{positive Test}|\text{Disease}) = 0.95$, $P(\text{positive Test}|\text{no Disease}) = 0.01$ and $P(\text{Disease}) = 0.005$. Find $P(\text{Disease}|\text{positive Test})$?

Denote $D = \{\text{the test person has the disease}\}$, $D^c = \{\text{the test person does not have the disease}\}$ and $T = \{\text{the test result is positive}\}$. Then

$$P(D|T) = \frac{P(T|D)P(D)}{P(T)} = \frac{P(T|D)P(D)}{P(T|D)P(D) + P(T|D^c)P(D^c)} = \frac{0.95 \times 0.005}{0.95 \times 0.005 + 0.01 \times 0.995} = 0.3231293.$$

Bayesian Statistics

What is commonly called Bayesian Statistics is a very special application of Bayes Theorem.

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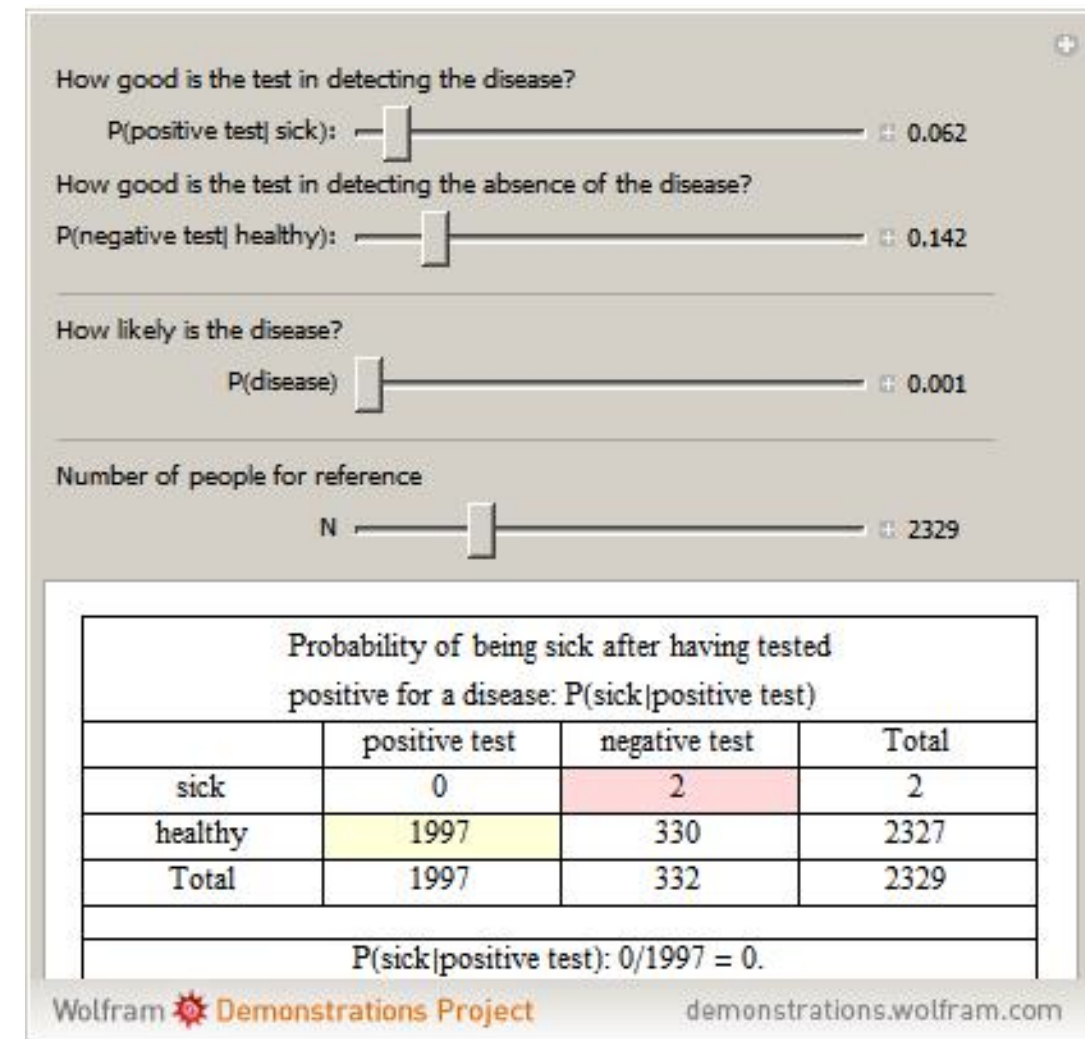
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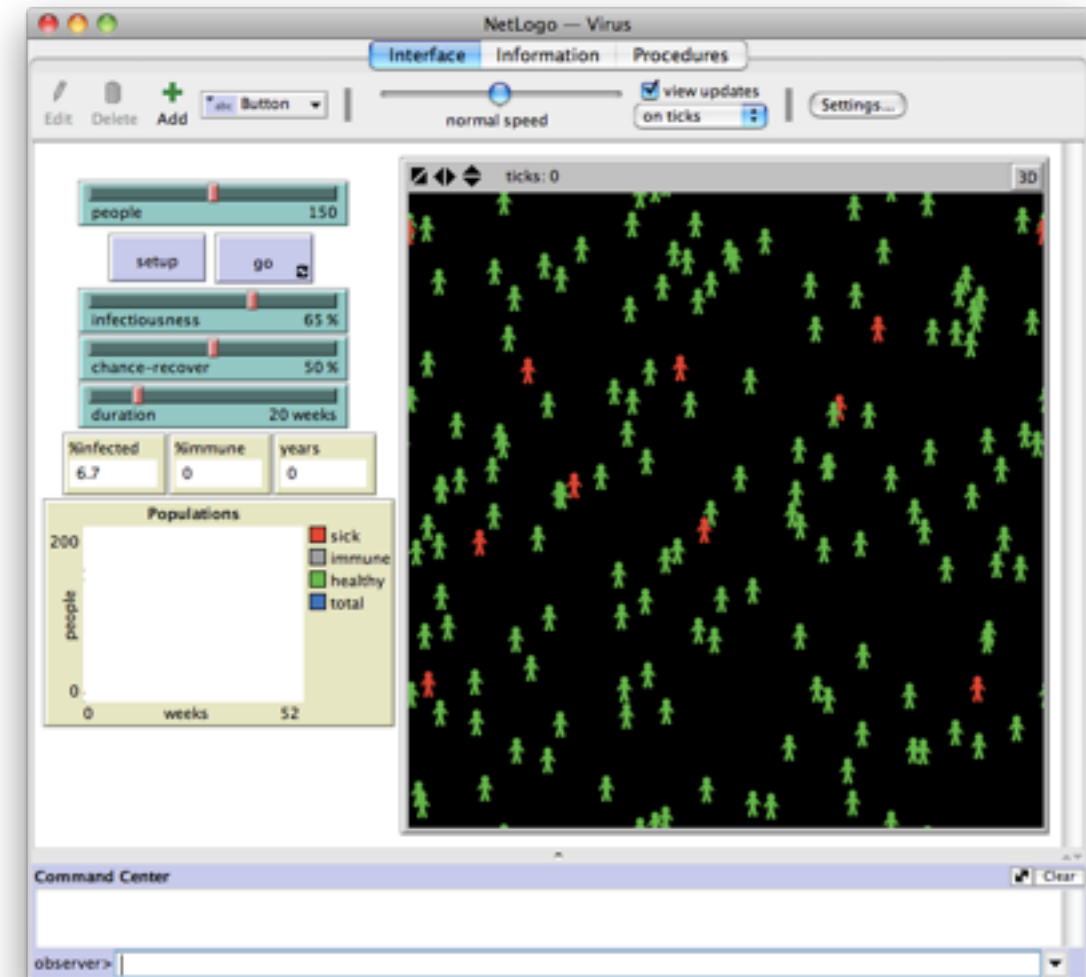
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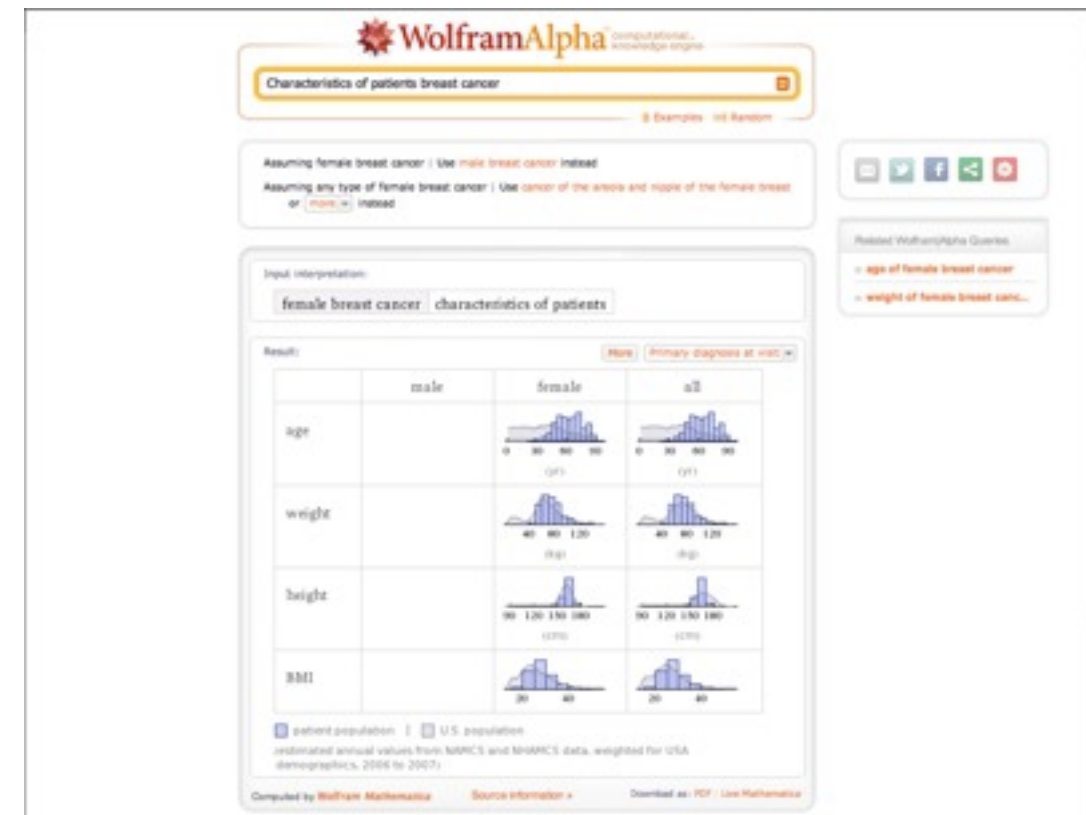
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The Personal Learning Network

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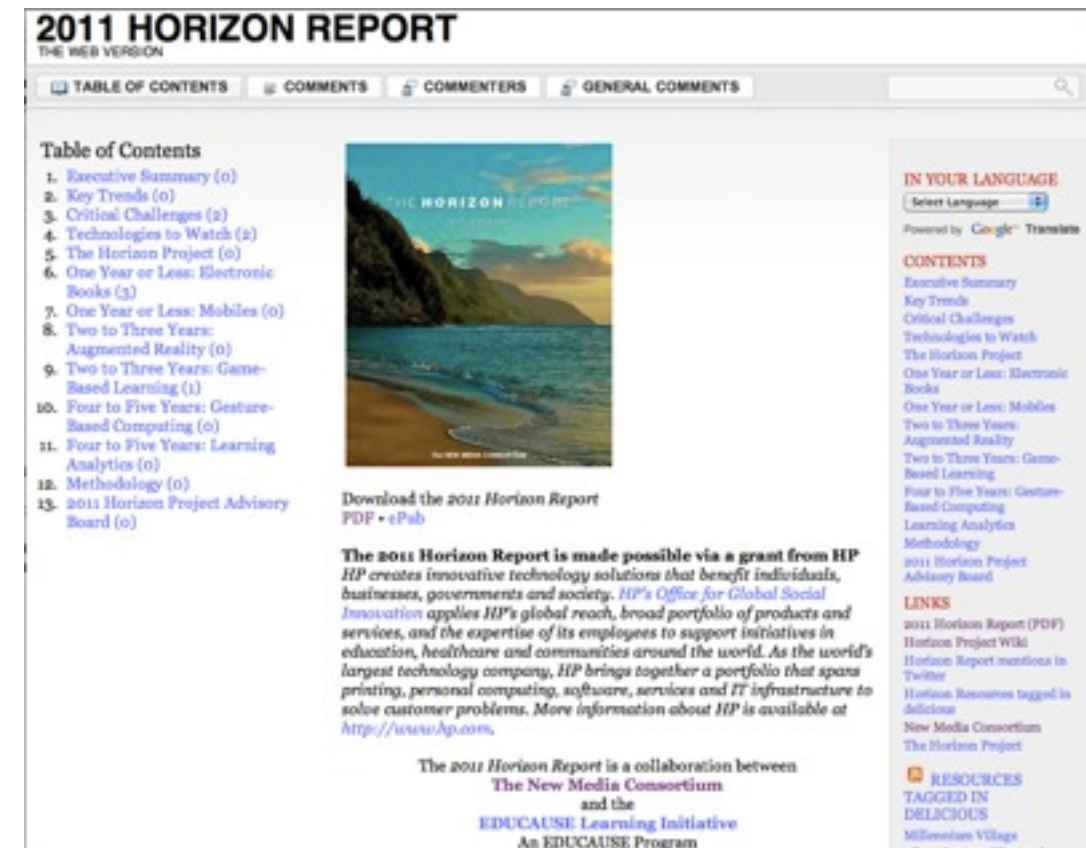
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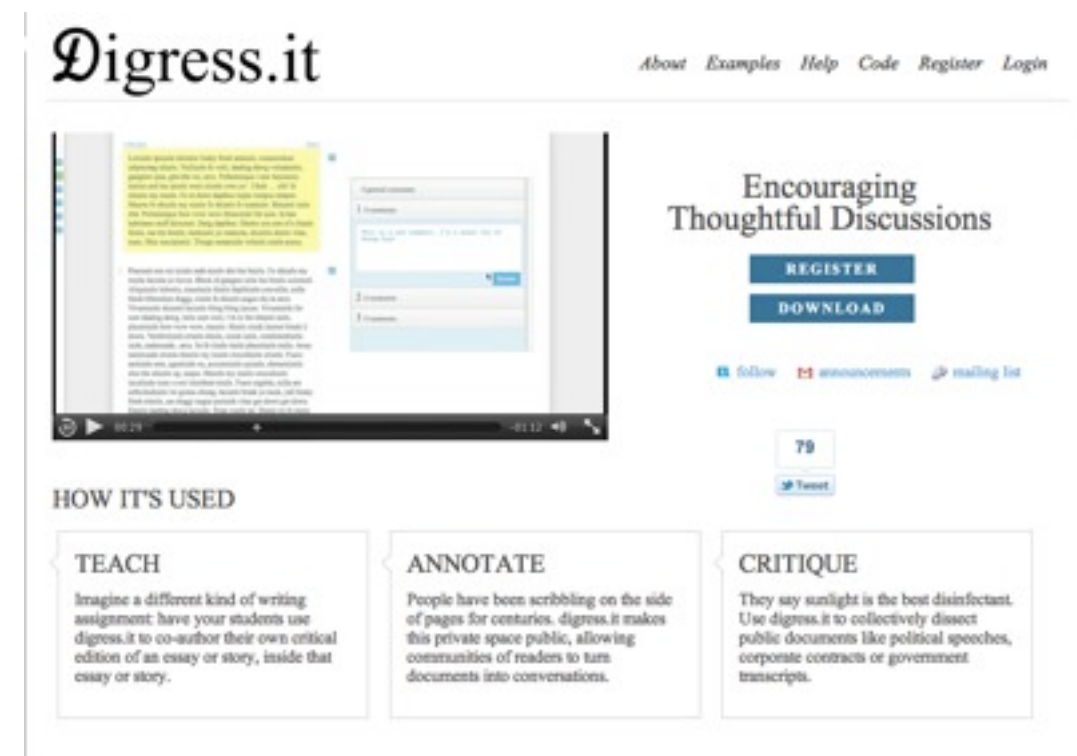
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SAMR and Assessment

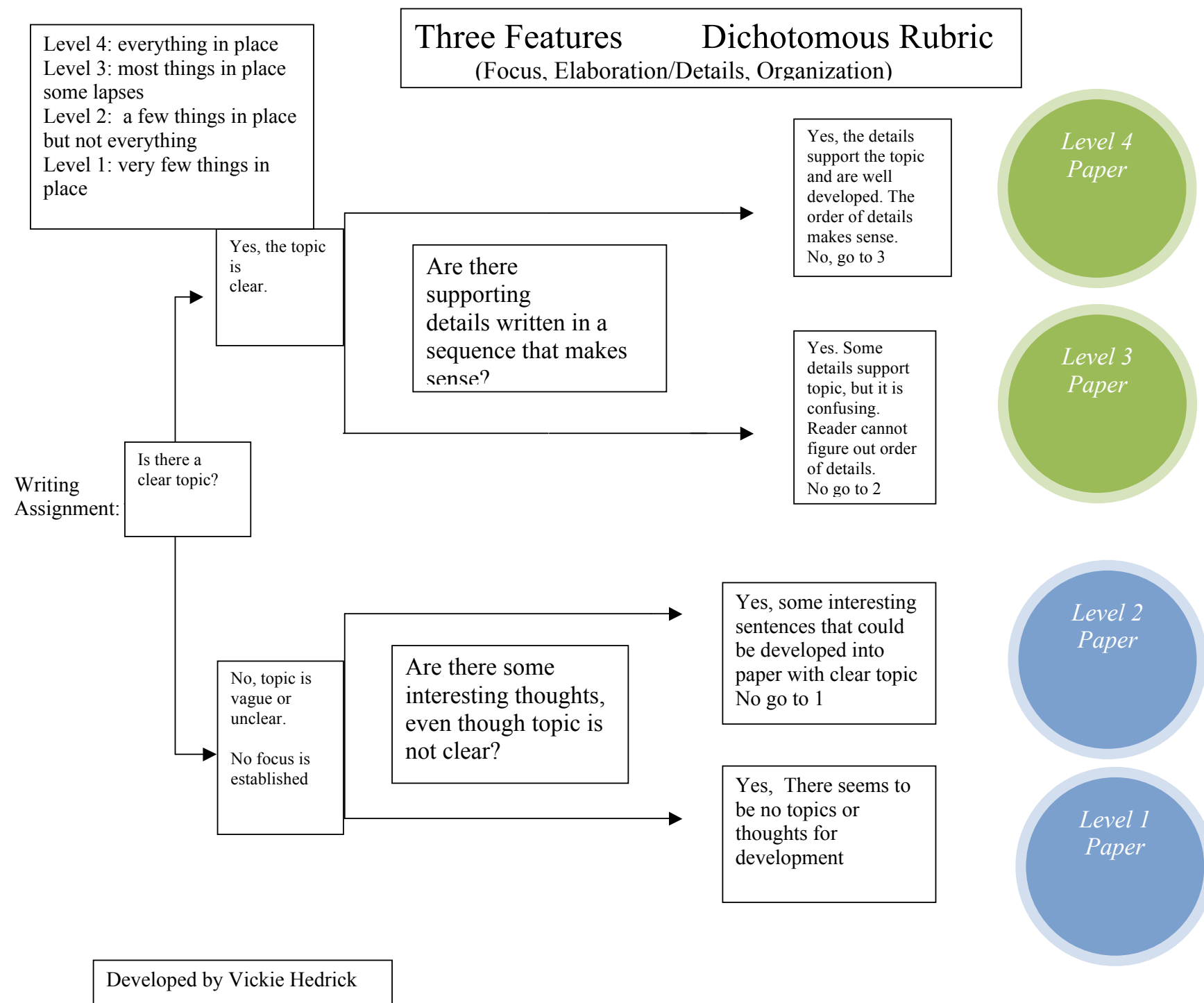
	Where the learner is going	Where the learner is right now	How to get there
Teacher	1 Clarifying learning intentions and criteria for success	2 Engineering effective class-room discussions and other learning tasks that elicit evidence of student understanding	3 Providing feedback that moves learners forward
Peer	Understanding and sharing learning intentions and criteria for success	4 Activating students as instructional resources for one another	
Learner	Understanding learning intentions and criteria for success	5 Activating students as the owners of their own learning	

Black, P. and William D. “Developing the theory of formative assessment.” *Educational Assessment, Evaluation and Accountability*. 21:5-31 (2009)

Substitution: *Sociology Online Discussion Rubric* (Evans, 2010)

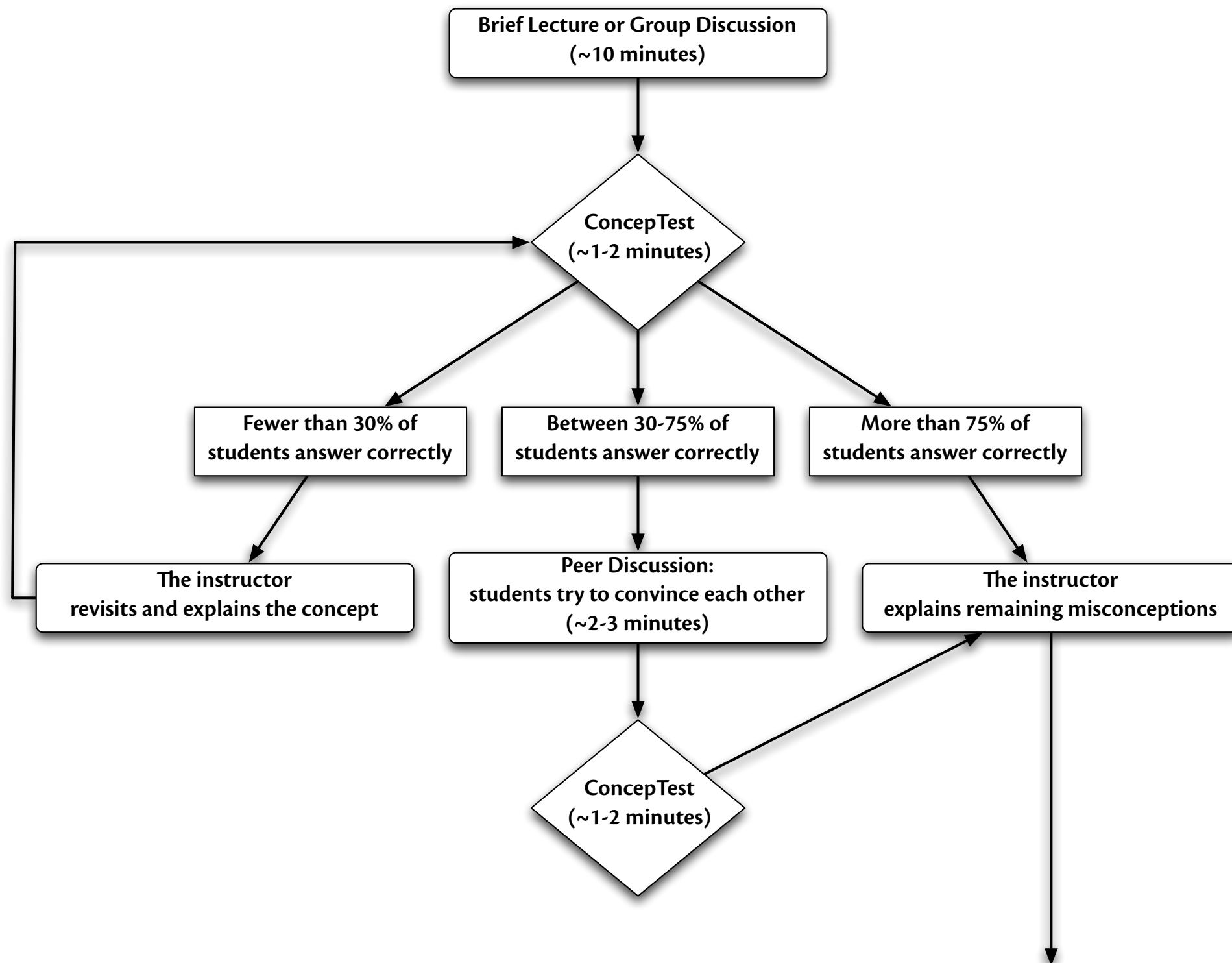
	4 Points	2 Point	0 Points
Content	You show that you can apply or extend the idea you are discussing.	Some of your messages analyze, interpret, or apply the material well, but some do not. This might either be because the analysis was not done well, or because it was not attempted (that is, was simply opinion or hearsay).	Your messages generally show little evidence of analysis, consisting instead of opinion, feelings and impressions.
Accuracy	You accurately represent the concepts discussed.	You generally represent the concepts accurately, but you do not do so in all cases.	You have significant issues with regard to accurately representing the concepts.
Use of material	You use and cite sources, including the text and articles and/or bring in an outside source, all of which clearly add <i>significantly</i> to the discussion.	You clearly refer back to a definition, example or concept from the reading or lecture.	You do not bring in or refer to any material from the text, outside sources, or lectures.
Sociological Analysis	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).	You touch on some sociological issues, but focus also on individual ones.	You focus primarily on individual issues.
	2 Points	1 Point	0 Points
Responses	You extend or politely question the post of another person in a way that advances the discussion.	You add new examples that continue the idea created by another person.	Your responses are primarily agreement.
Participation	You write at least three or more substantive comments (using the above criteria) based on the discussion assigned.		You write fewer than three substantive comments.
Time of Posting	Your posts are spread widely during the discussion.	You post at two significantly different times.	Your posts are clustered within a short period of time.
Posts Read	You have read at least 75% of the posts in the discussion.	You read at least 50% of the posts in the discussion.	You read less than 50% of the posts in the discussion.
Clarity	You use standard grammar and spelling and your meaning is clear.	Your posts have some grammar or spelling mistakes or your meaning is not entirely clear.	Your posts have significant grammar or spelling mistakes or your meaning is not clear.

Augmentation: *A Branching Rubric for Writing* (Hedrick, 2010)

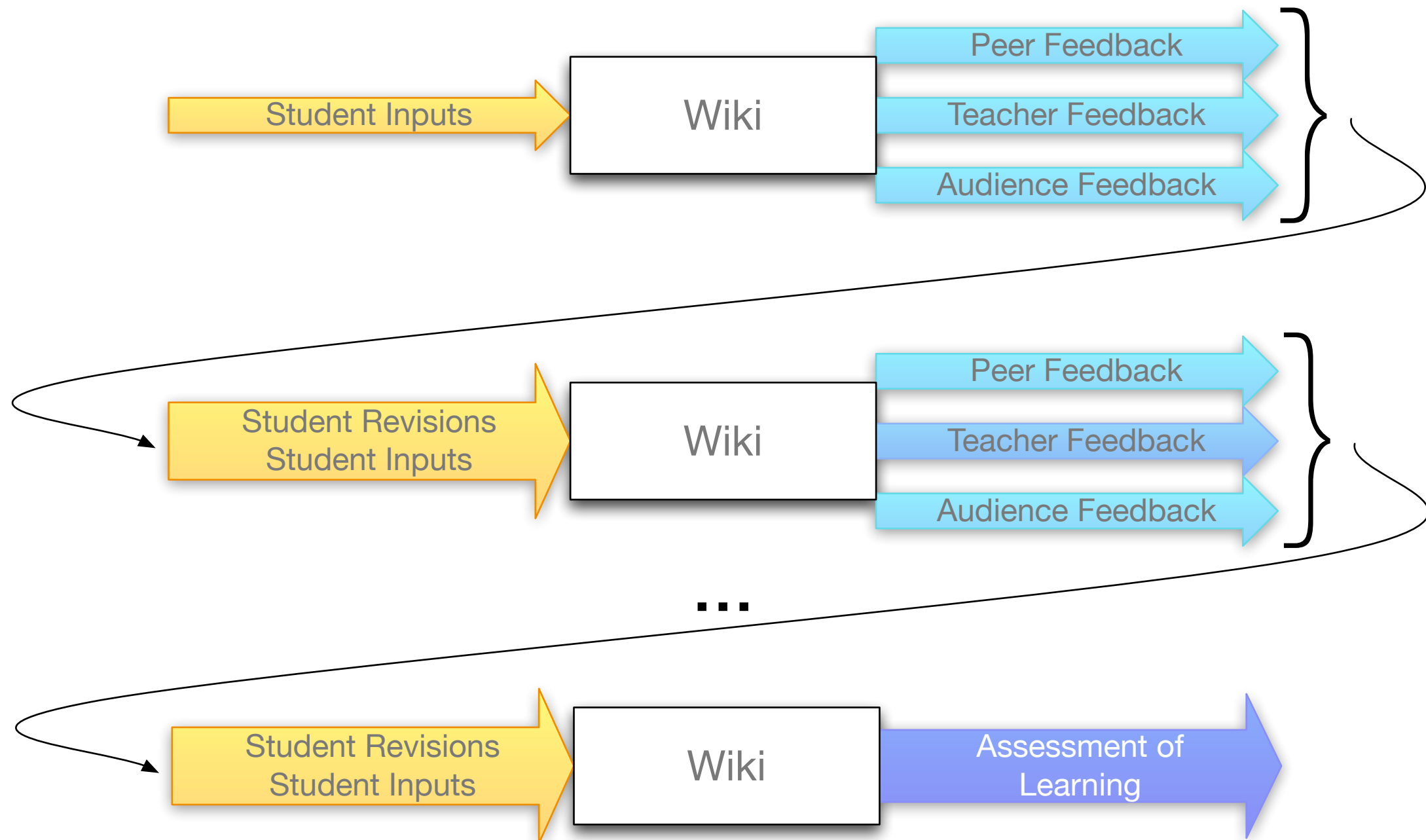


Modification: *ConcepTests*

(Mazur, 1997)



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



SAMR, the iPad, and AAC

Three Key Characteristics of Mobile Devices

- Ubiquity
- Intimacy
- Embeddedness





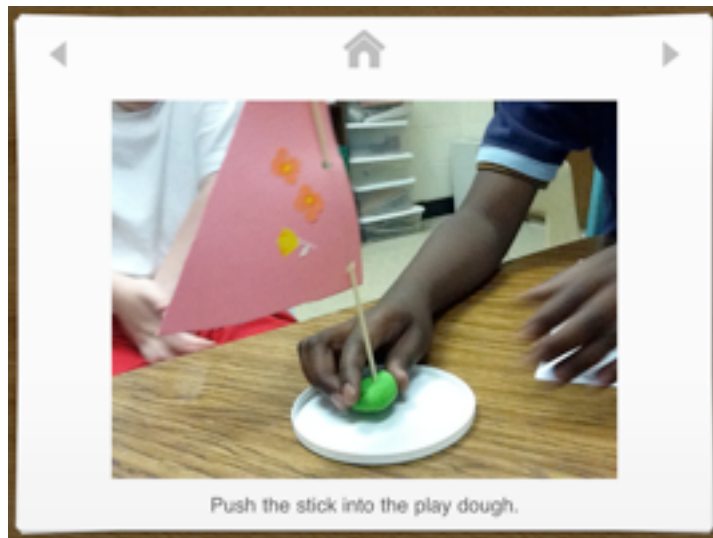


Two Key Metaphors

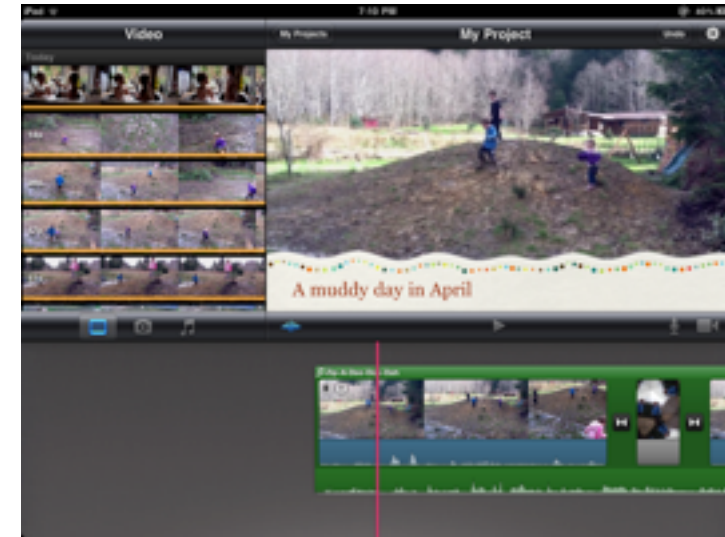
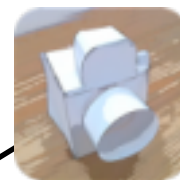
- The Lively Sketchbook
- The Curiosity Amplifier

A SAMR Ladder for AAC

Modification



Substitution

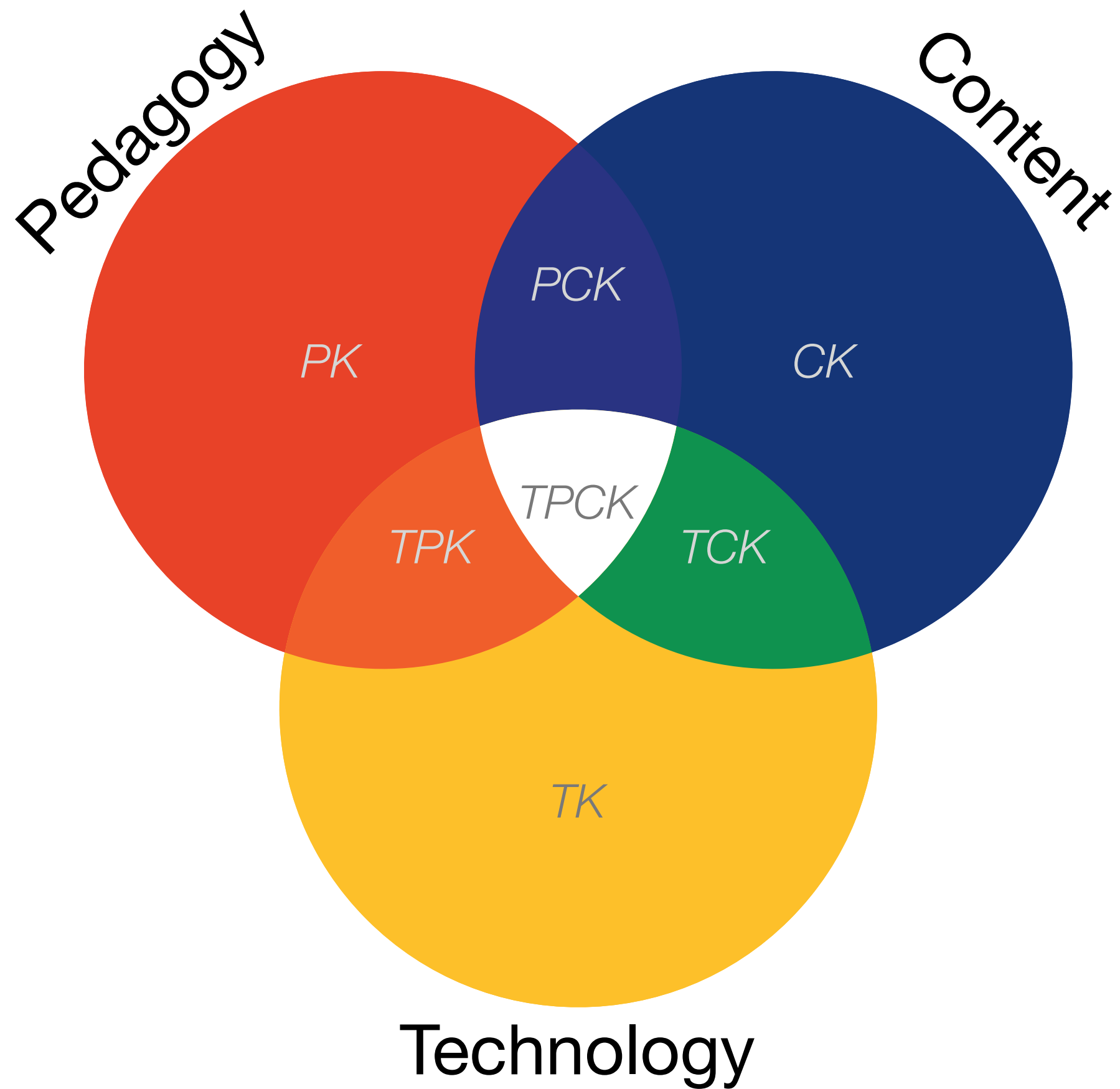


Redefinition



Augmentation

Epilogue: The TPCK Model



Additional Resources

Resources – Part 1

Metaphors:

- Vannevar Bush, “As We May Think”. *The Atlantic Monthly*. (July 1945) Online at: <http://www.theatlantic.com/magazine/archive/1969/12/as-we-may-think/3881/>
- Douglas C. Engelbart, *A Research Center for Augmenting Human Intellect*. (December 1968 live demo) Archived online at: <http://sloan.stanford.edu/mousesite/1968Demo.html>
- Alan Kay, “A Personal Computer for Children of All Ages”. *Proceedings of the ACM National Conference*. Boston (August 1972) Online at: <http://www.mprove.de/diplom/gui/Kay72a.pdf>
- Seymour Papert, “On Making a Theorem for a Child”. *Proceedings of the ACM National Conference*. Boston (August 1972) Online at: <http://portal.acm.org/citation.cfm?id=569942>

SAMR and TPCK:

- Ruben R. Puentedura, *Transformation, Technology, and Education*. (2006) Online at: <http://hippasus.com/resources/tte/>
- Ruben R. Puentedura, *As We May Teach: Educational Technology, From Theory Into Practice*. (2009) Online at: <http://tinyurl.com/aswemayteach>
- *TPCK - Technological Pedagogical Content Knowledge*. (2008-2010) Online at: http://www.tpck.org/tpck/index.php?title=Main_Page
- AACTE (Eds.) *The Handbook of Technological Pedagogical Content Knowledge for Educators*. New York:Routledge, 2008.

Resources – Part 2

Defining Mobile Devices/The Lively Sketchbook

- Ruben R. Puentedura, “Drawing On The Lively Sketchbook”. *Connect@NMC Talks*. (2010) Online at: <http://www.nmc.org/connect/2010/april/16>
- Ruben R. Puentedura, “The Lively Sketchbook”. (2010) Online at: http://www.hippasus.com/rrpweblog/archives/2010_01.html

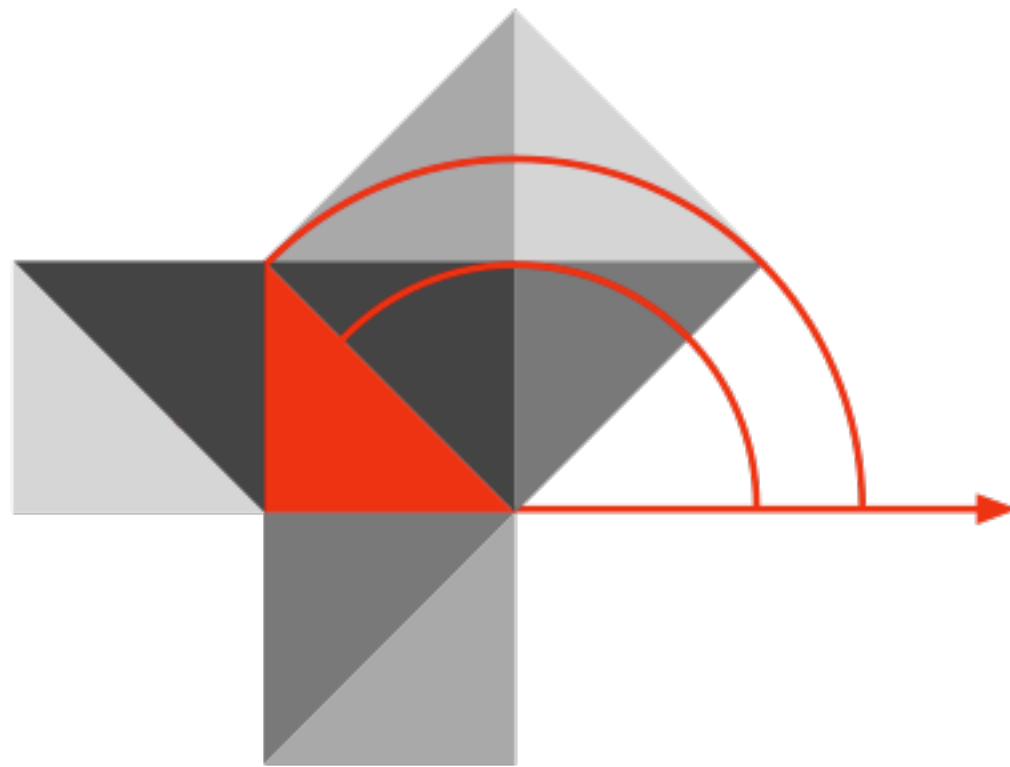
The Curiosity Amplifier

- John Seely Brown. “A New Culture of Learning”. NMC Summer Conference, Closing Keynote. (2010) Online at: <http://www.nmc.org/2010-summer-conference/jsb-keynote-video>

Photo Credits

- *iPad in Subway*: Takashi M
- *YouTube + iPad + Hanalei = Happiness*: Wayan Vota
- *Parcours-jeu multimedia : Les métiers du musée*: Jean-Pierre Dalbéra

Hippasus



Blog: <http://hippasus.com/rrpweblog/>

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