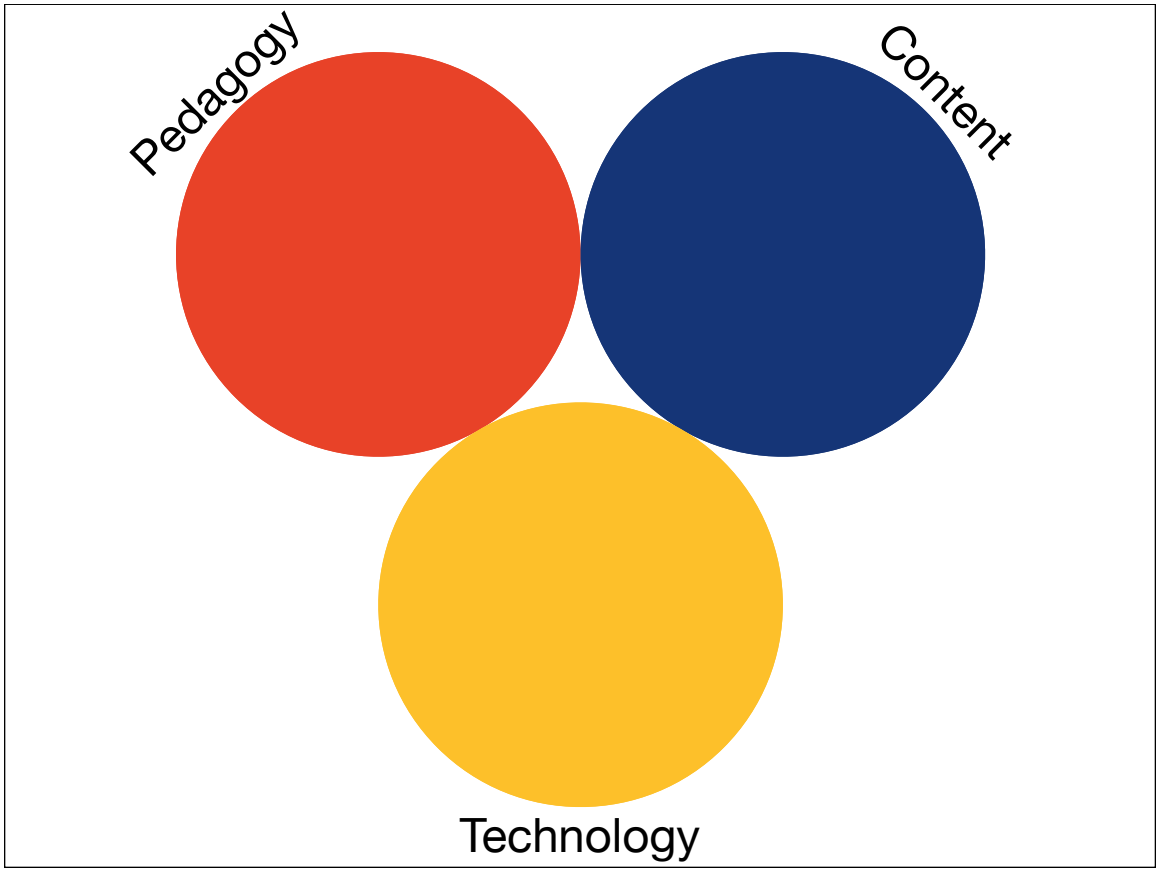
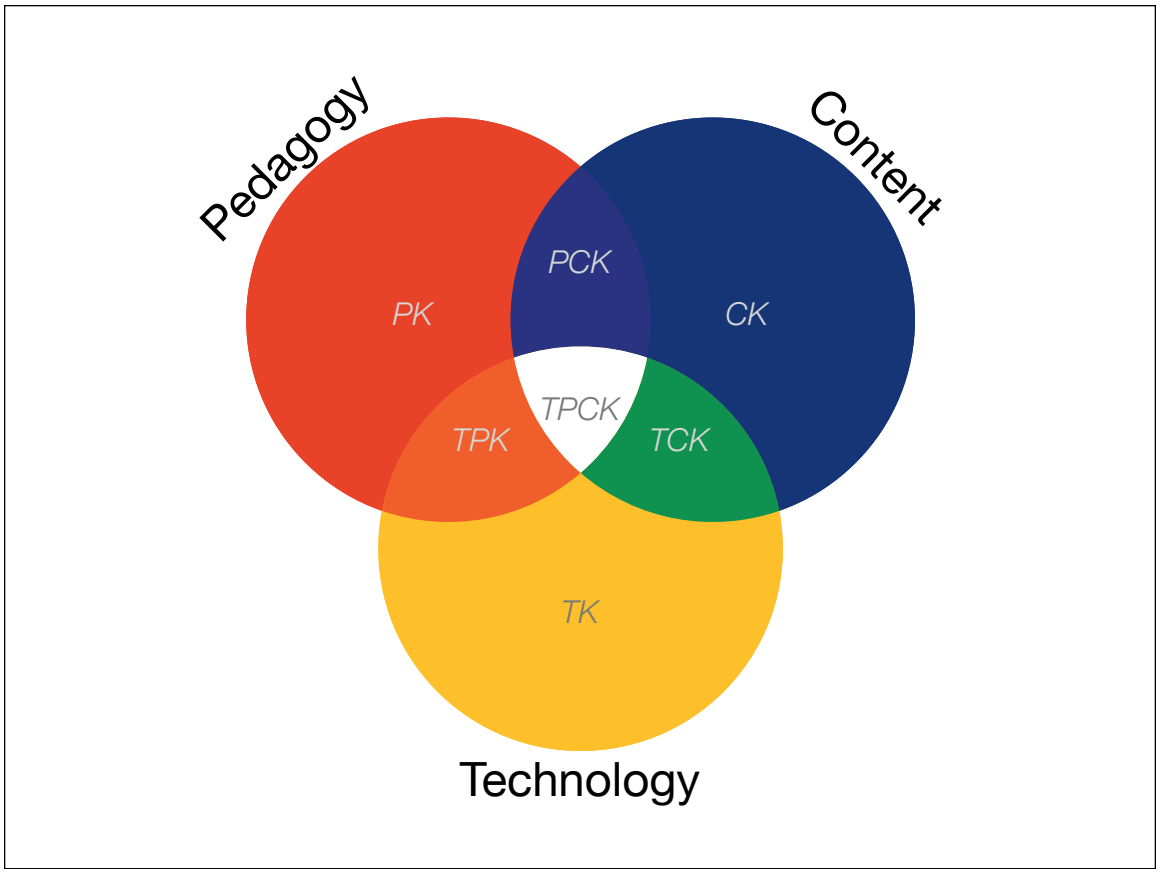
A Toolkit for Course Design: TPCK + SAMR

Ruben R. Puentedura, Ph.D.

TPCK

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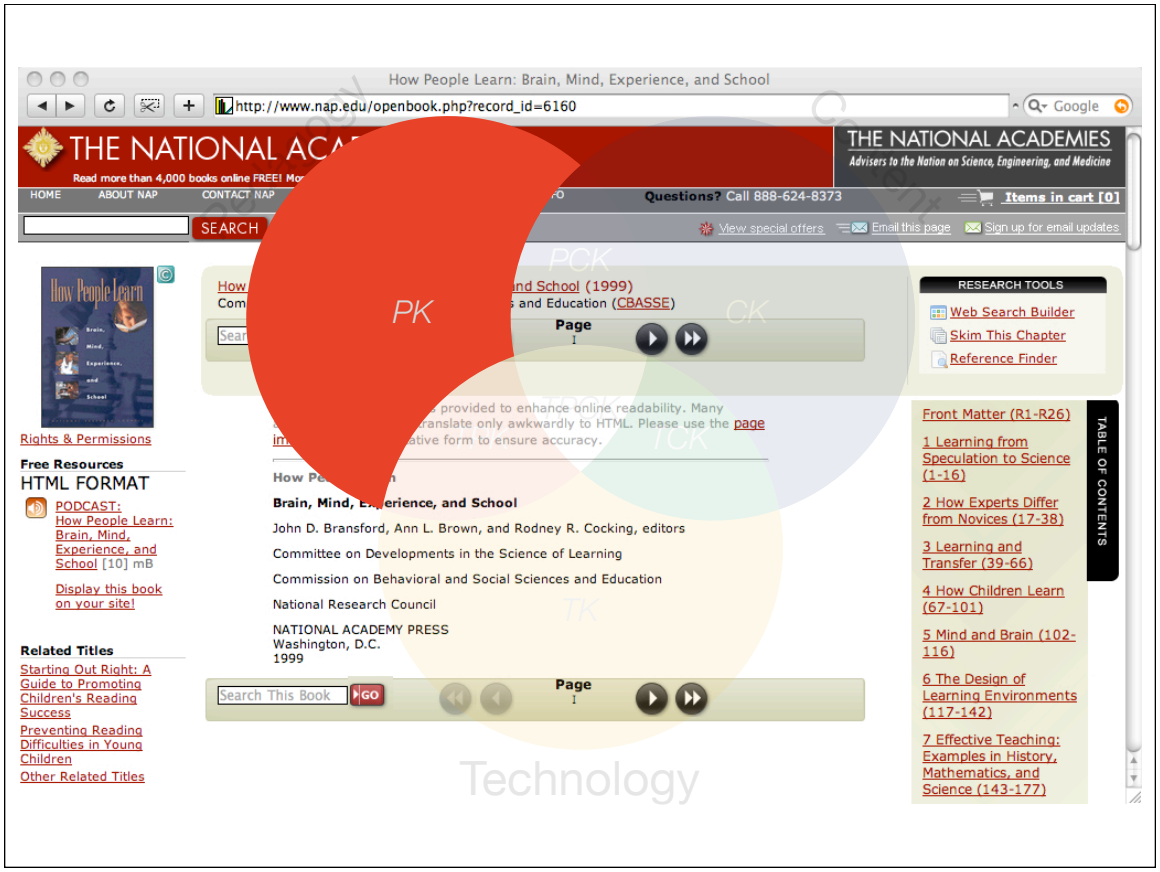
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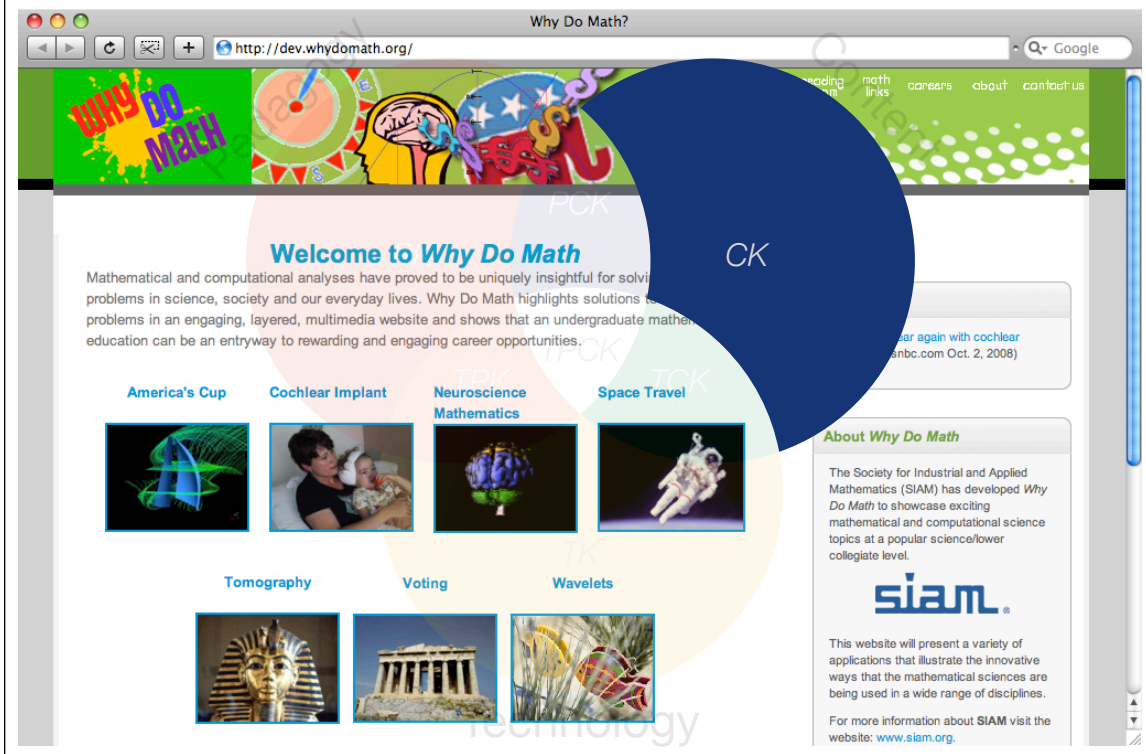
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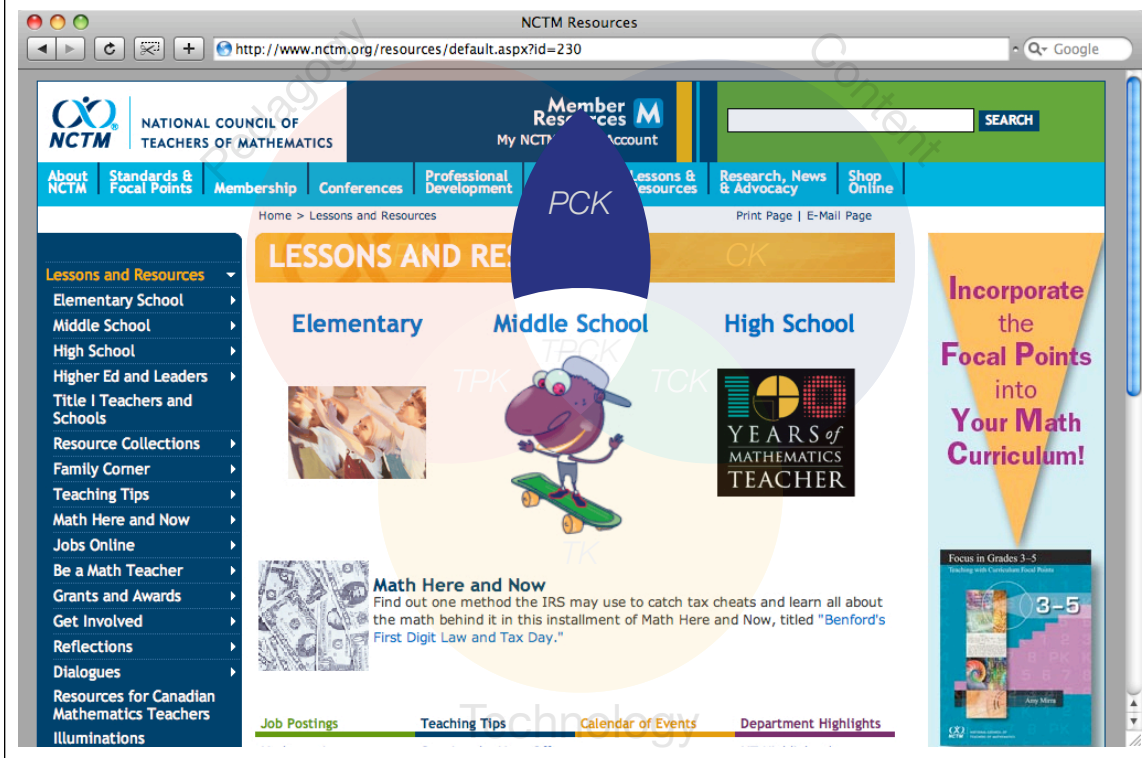
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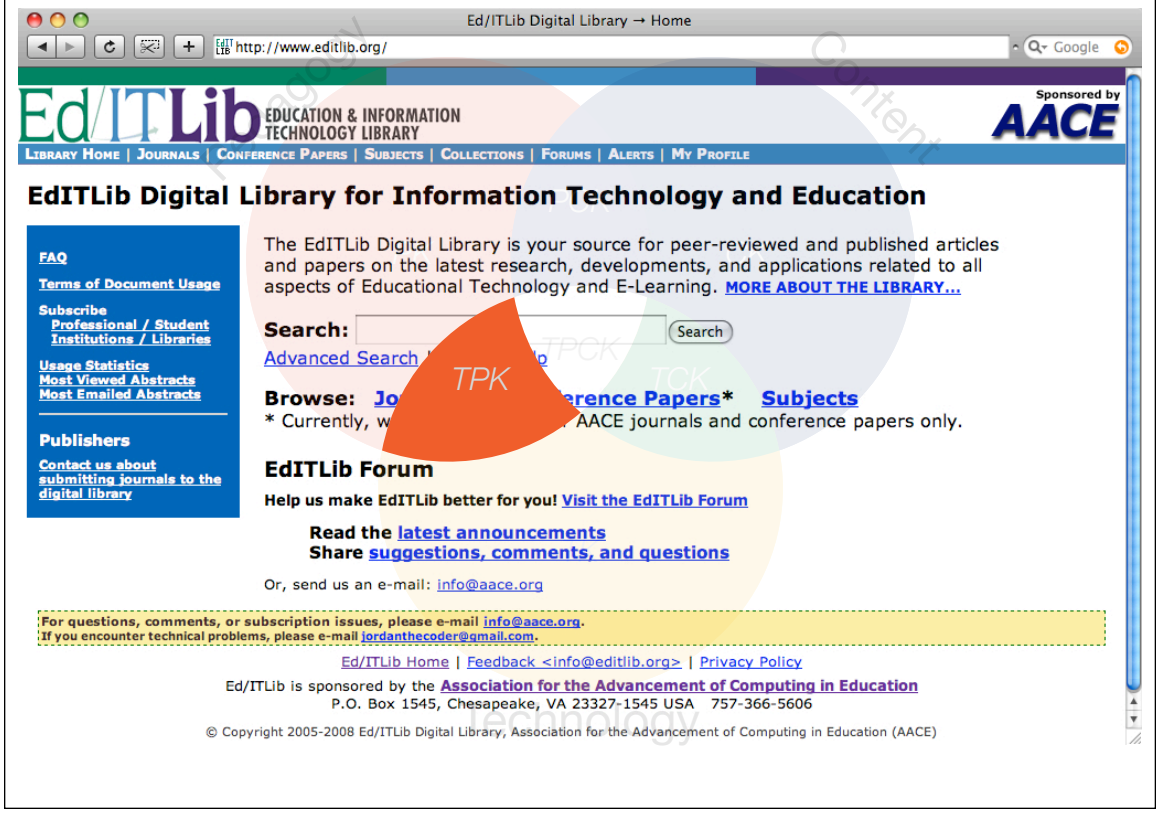
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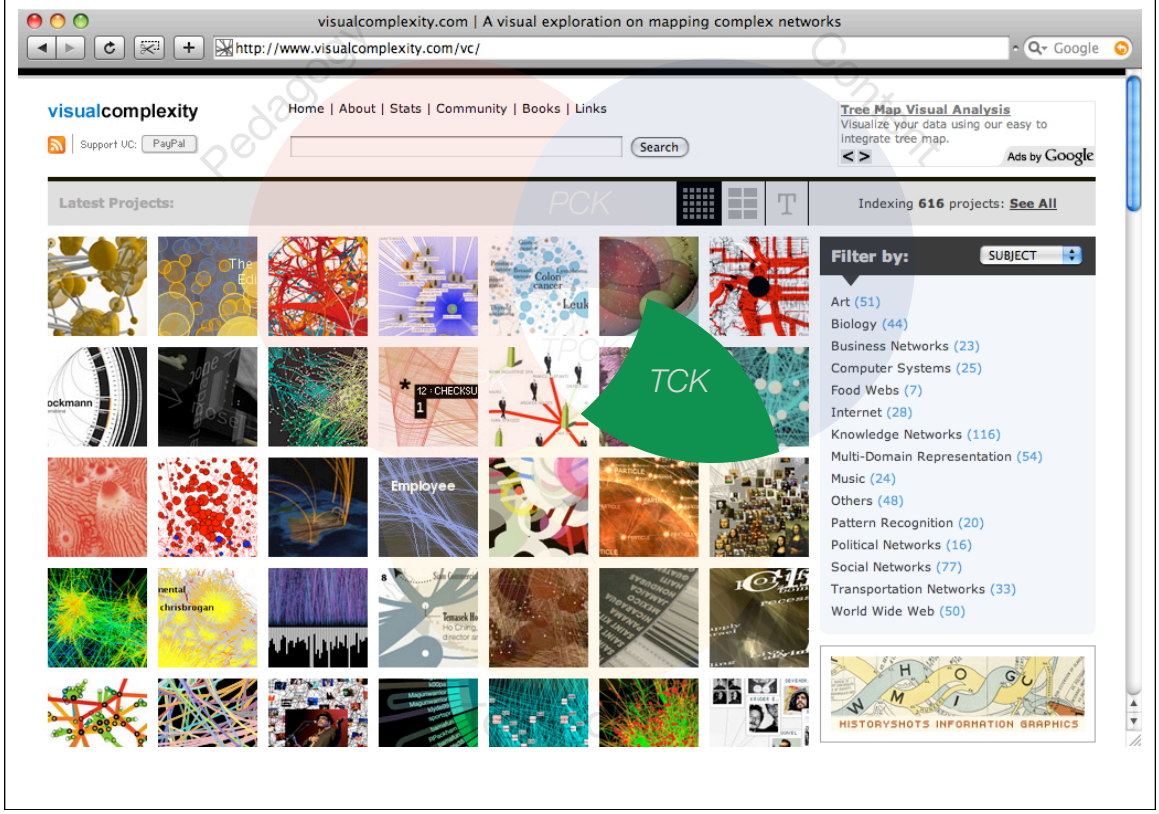
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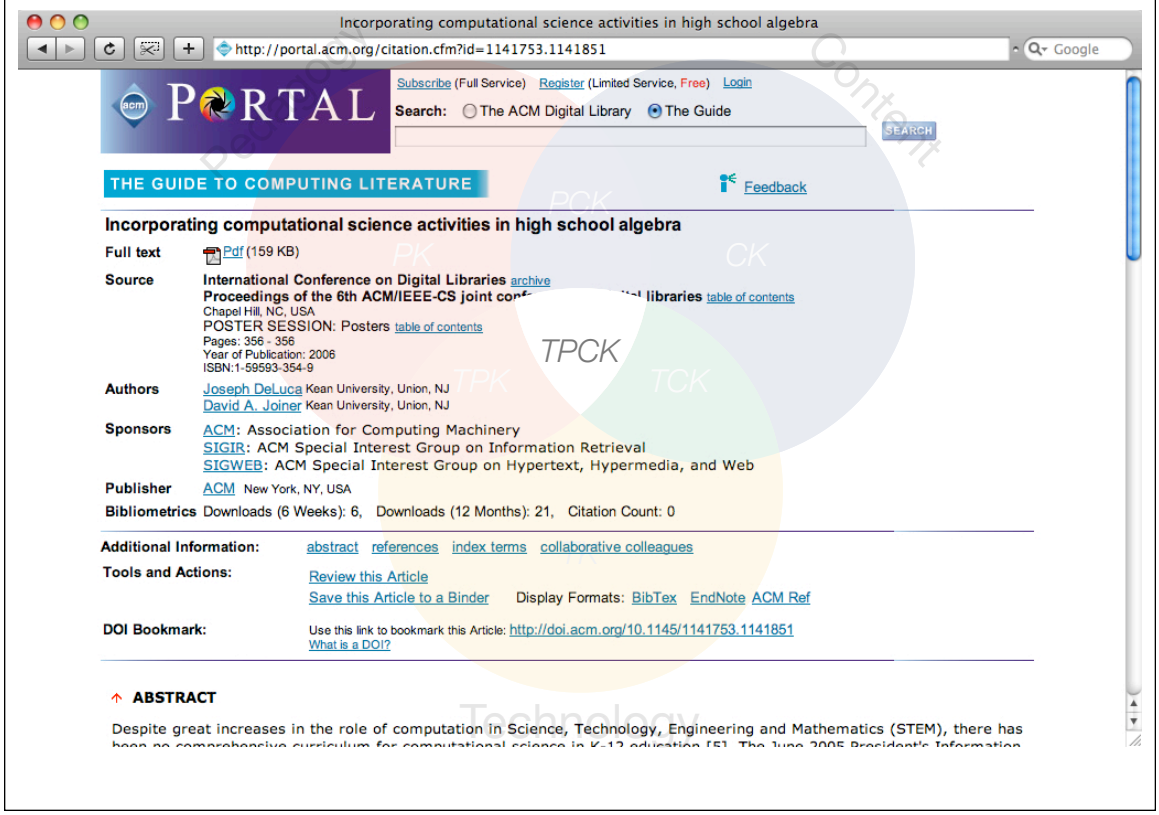
TCK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ABSTRACT
Despite great increases in the role of computation in Science, Technology, Engineering and Mathematics (STEM), there has
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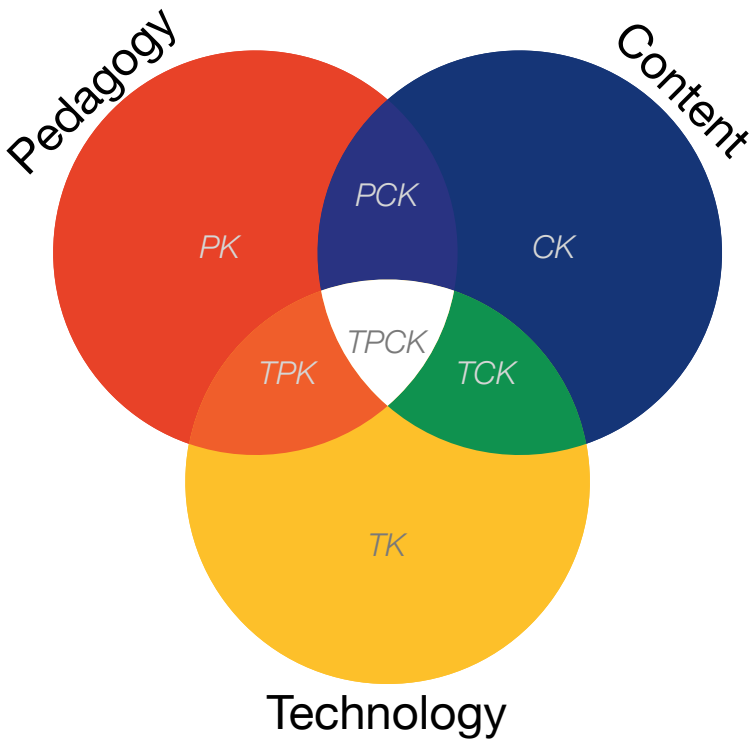

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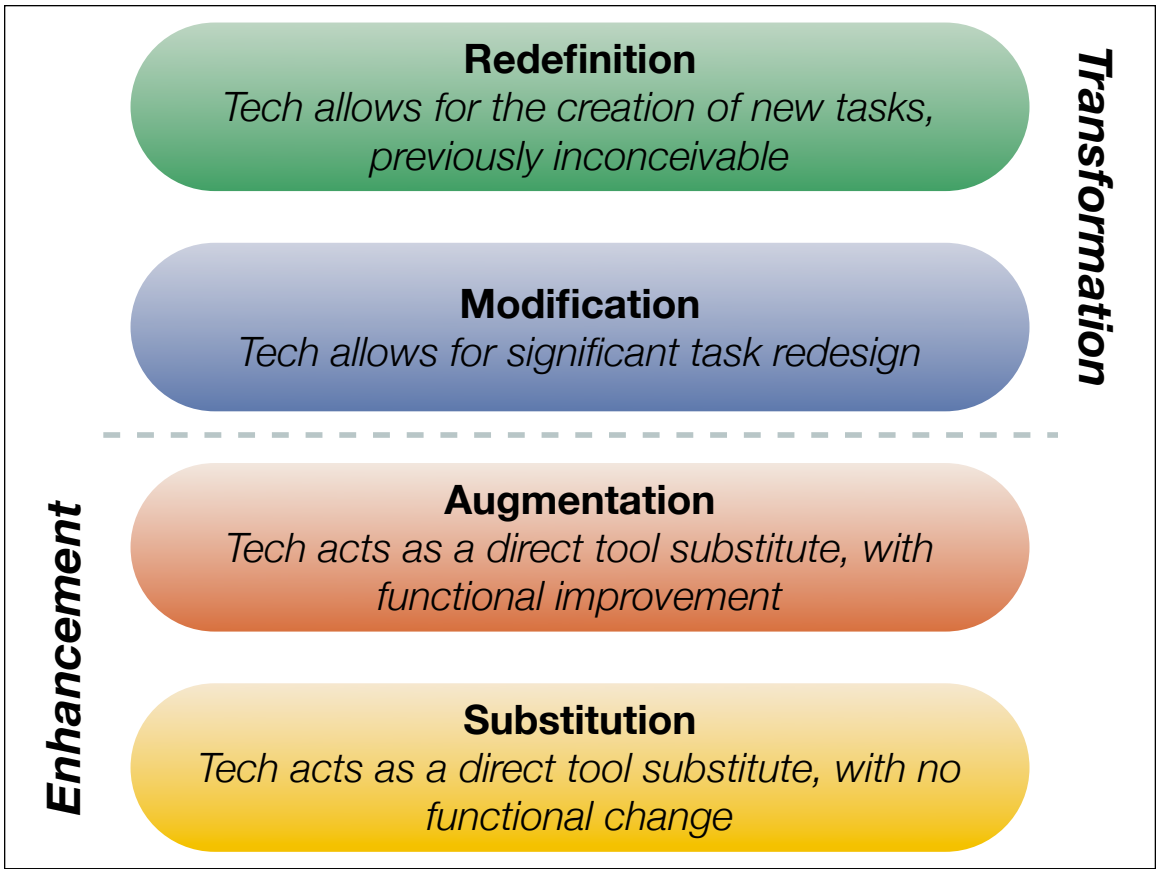
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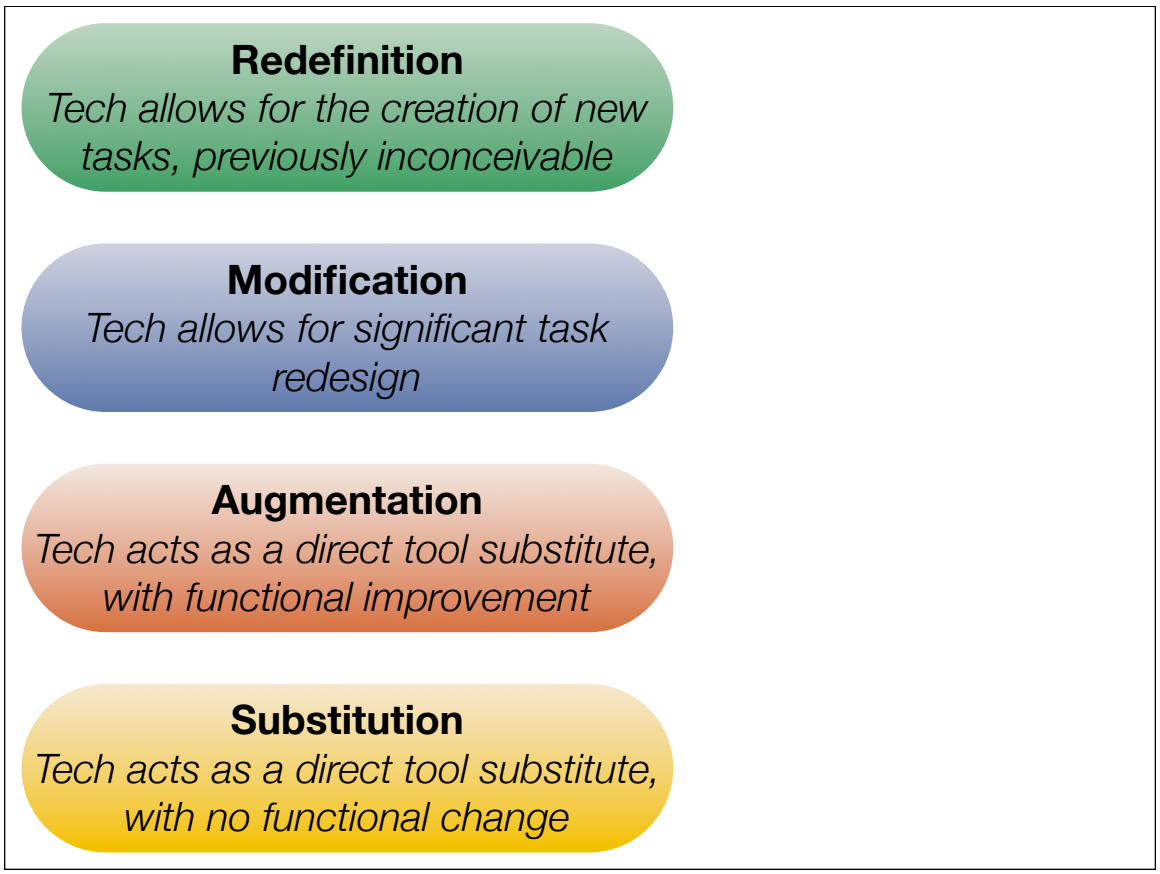
Tech allows for the creation of new tasks, previously inconceivable
Modification
Tech allows for significant task redesign
Augmentation
Tech acts as a direct tool substitute, with functional improvement
Substitution
Tech acts as a direct tool substitute, with no functional change
Transformation
Enhancement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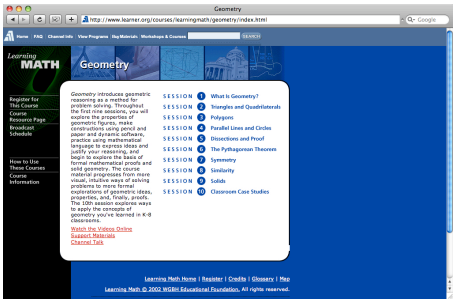

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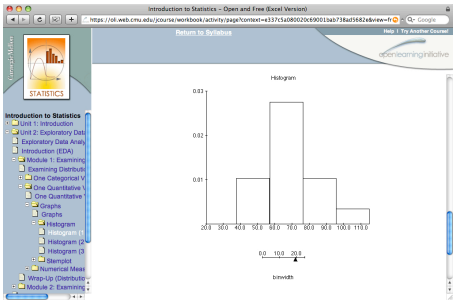

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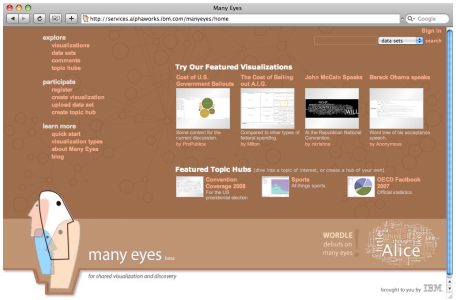

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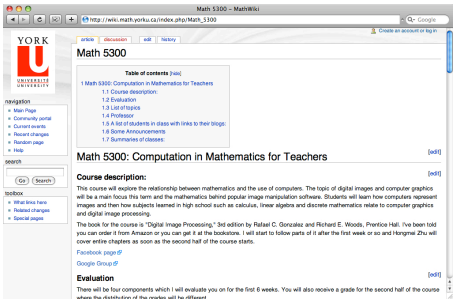

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Some Guiding Questions

Guiding Questions - TK

- Are the technology tools being used suitable for working on all levels of the SAMR model, or are they constrained in this regard?
- Is the use being made of the technology at the S/A, or M/R levels of the model?
- Are the technology tools well-suited to the task at hand, or are there other choices that would either fit the task better, or allow for greater flexibility in exploring all levels of the SAMR model?

Guiding Questions - TPCK

- Is the activity as described essentially analogous to a traditional learning activity (S/A), or does it present substantial transformations from it (M/R)?
- Is the activity essentially limited to itself in potential scope, or does it open paths for other future activities to build upon it?
- How could the activity accommodate modification or addition (including tool choice and use) in order to take the overall result to the next SAMR level?

Resources Cited

- **The TPCK Model:**
  - *TPCK - Technological Pedagogical Content Knowledge* 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.
- **The SAMR Model:**
  - Ruben R. Puentedura. *Transformation, Technology, and Education*. (2006) Online at: http://hippasus.com/resources/tte/

- **PK Example:**
  - John D. Bransford, Ann L. Brown, and Rodney R. Cocking (Eds.) *How People Learn: Brain, Mind, Experience, and School*. (1999) Online at:
    http://www.nap.edu/openbook.php?record_id=6160
- **CK Example:**
  - *Why Do Math*
    http://dev.whydomath.org/
- **PCK Example:**
  - *National Council of Teachers of Mathematics - Lessons and Resources*
    http://www.nctm.org/resources/default.aspx?id=230

- **TK Example:**
  - *EDUCAUSE Learning Initiative - 7 Things You Should Know About…*
    http://www.educause.edu/7495&bhcp=1
- **TPK Example:**
  - *Education & Information Technology Library*
    http://www.editlib.org/
- **TCK Example:**
  - *VisualComplexity*
    http://www.visualcomplexity.com/vc/
- **TPCK Example:**
  - Joseph DeLuca and David A. Joiner. *Incorporating computational science activities in high school algebra*. (2006) Online at:
    http://portal.acm.org/citation.cfm?id=1141753.1141851

- **SAMR Examples:**
  - *Learning Math - Geometry*
    http://www.learner.org/courses/learningmath/geometry/index.html
  - *Prof. Oded Meyer: Carnegie Mellon Open Learning Initiative - Introduction to Statistics*
    https://oli.web.cmu.edu/jcourse/webui/guest/look.do?section=stats-excel
  - *Many Eyes*
    http://services.alphaworks.ibm.com/manyeyes/home
  - *Prof. Mike Zabrocki: Math 5300: Computation in Mathematics for Teachers*
    http://wiki.math.yorku.ca/index.php/Math_5300

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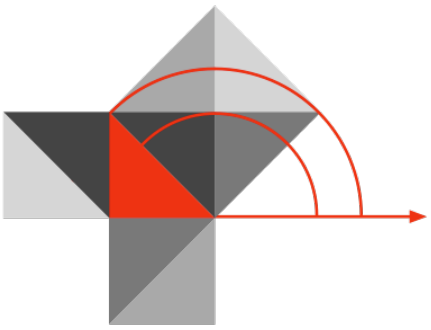

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