

Frameworks for Educational Technology: SAMR, the EdTech Quintet, and the Horizon Report

Ruben R. Puentedura, Ph.D.

Transformation

Redefinition

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

Modification

Tech allows for significant task redesign

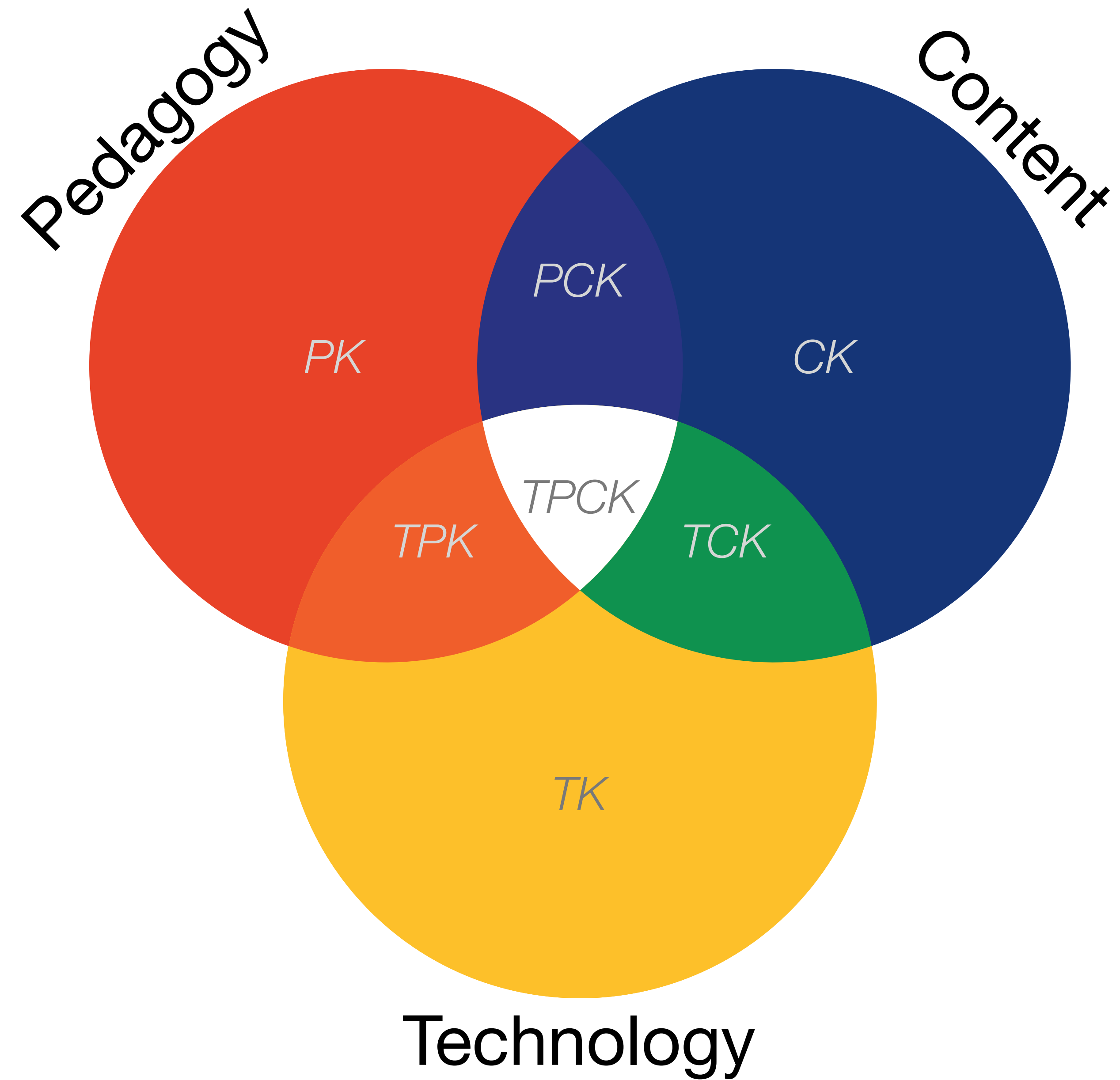
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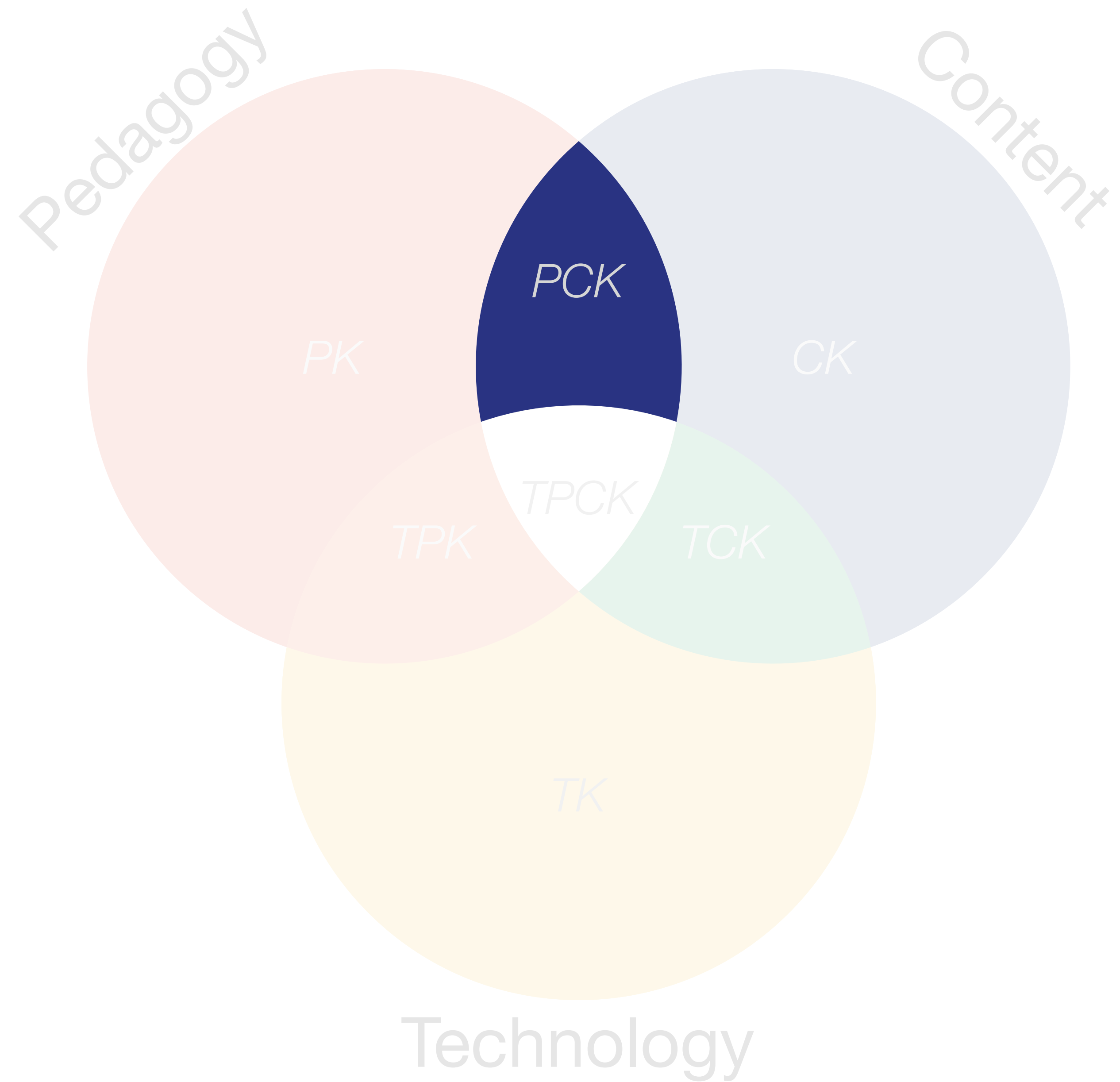
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functional improvement*

Substitution

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Enhancement





Location

Position in space

Condition

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

Links

*Connections between
places*

Formal Region

*Group of places with
similar conditions*

Functional Region

*Group of places linked
together by a flow*

Spatial Thinking Skills

Comparison

How are places similar or different?

Aura

What is this place's influence on nearby places?

Region

What nearby places are similar to this one?

Transition

How do things change between two places?

Hierarchy

What larger area is this area inside? What smaller areas are inside it?

Analogy

What places have similar conditions?

Pattern

What distinctive arrangements can you see on a map?

Association

Are these patterns similar?

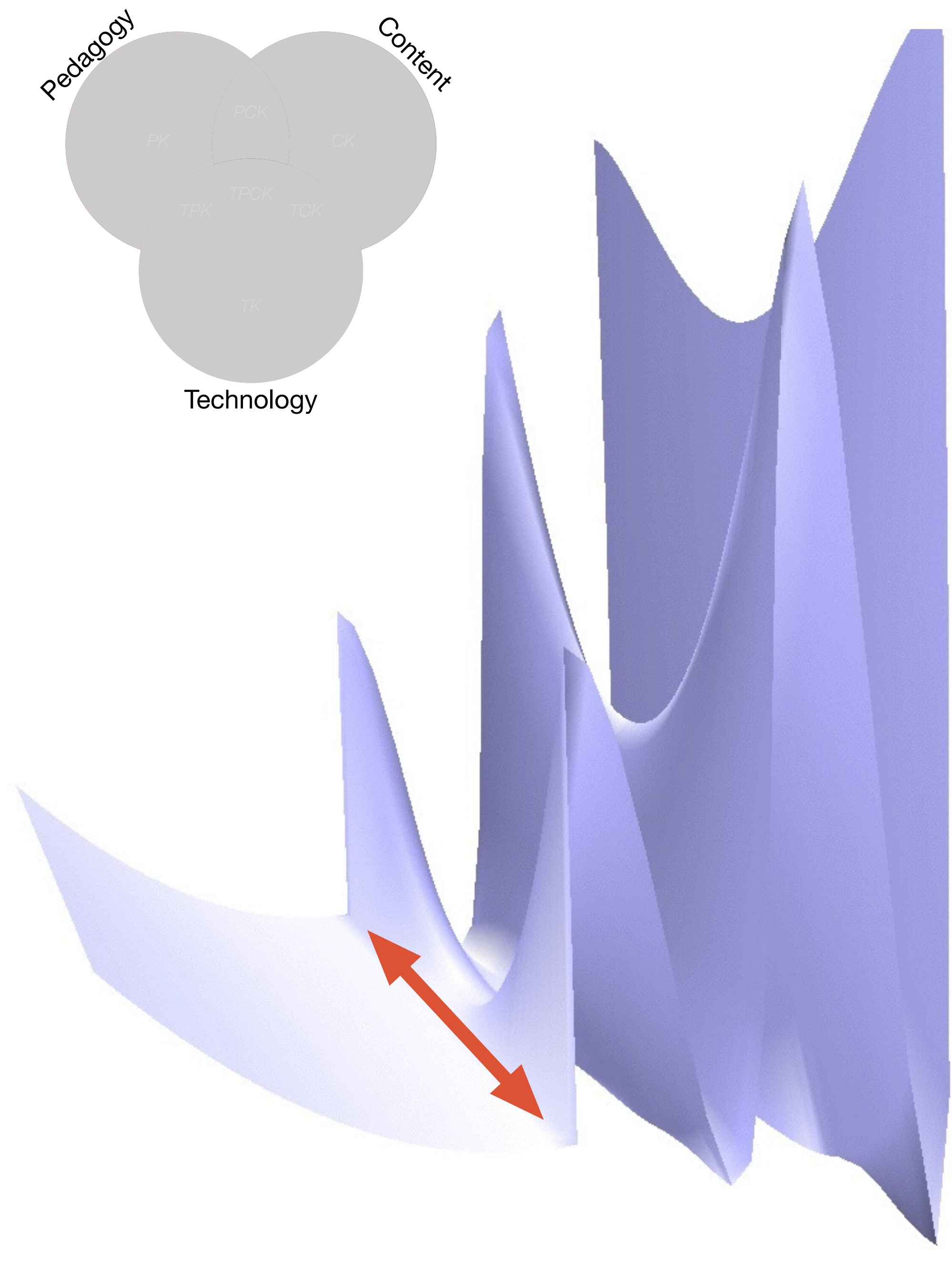


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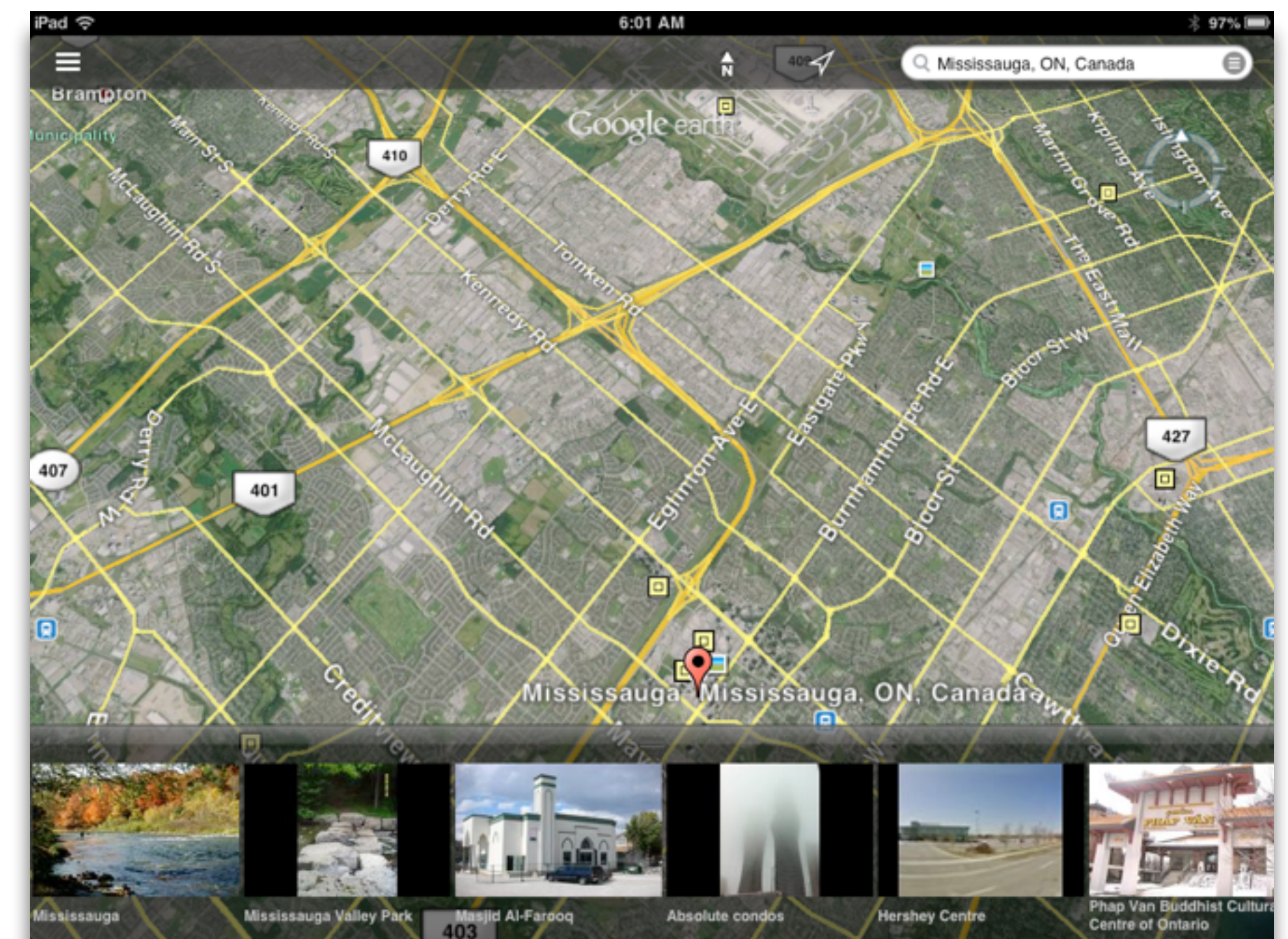
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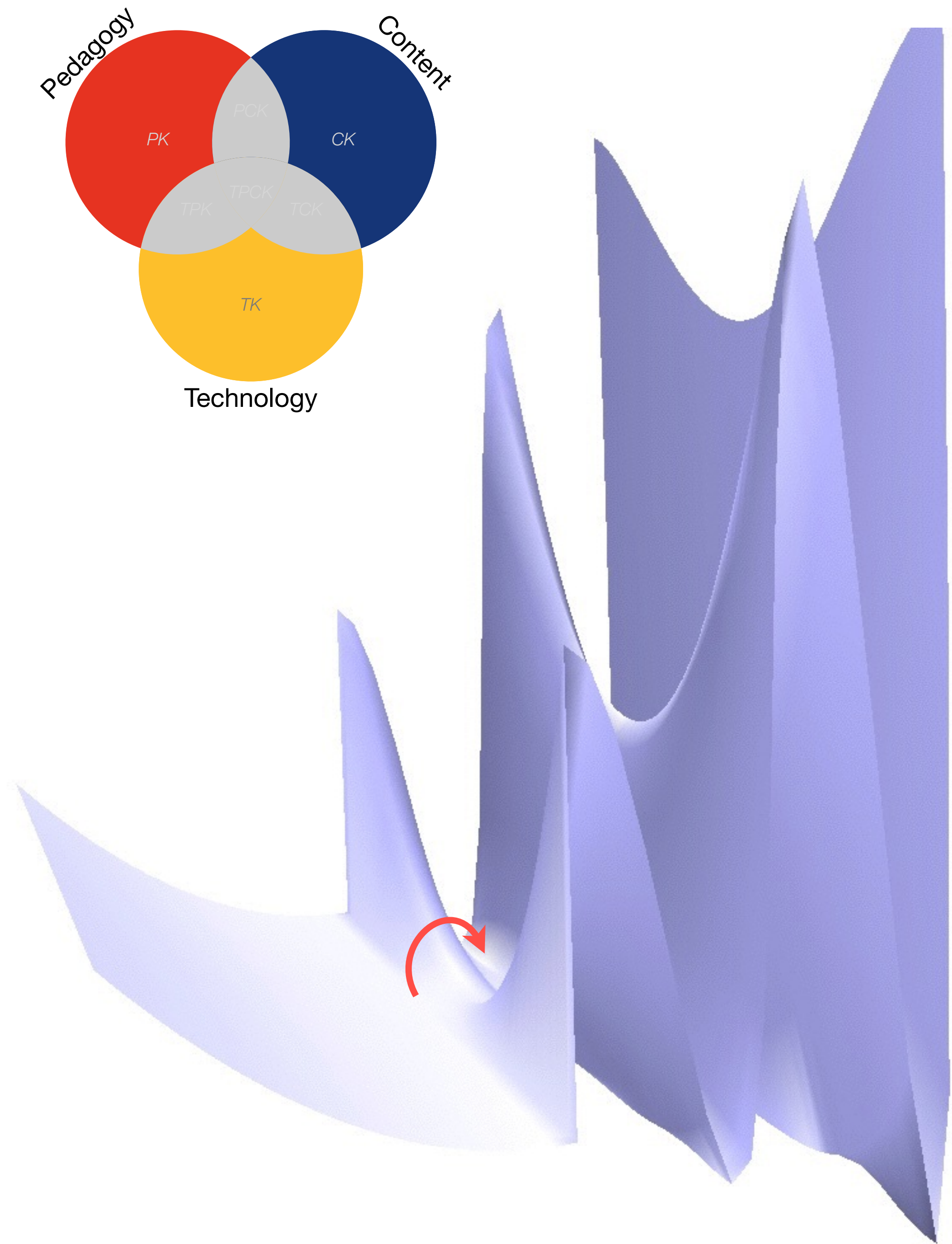


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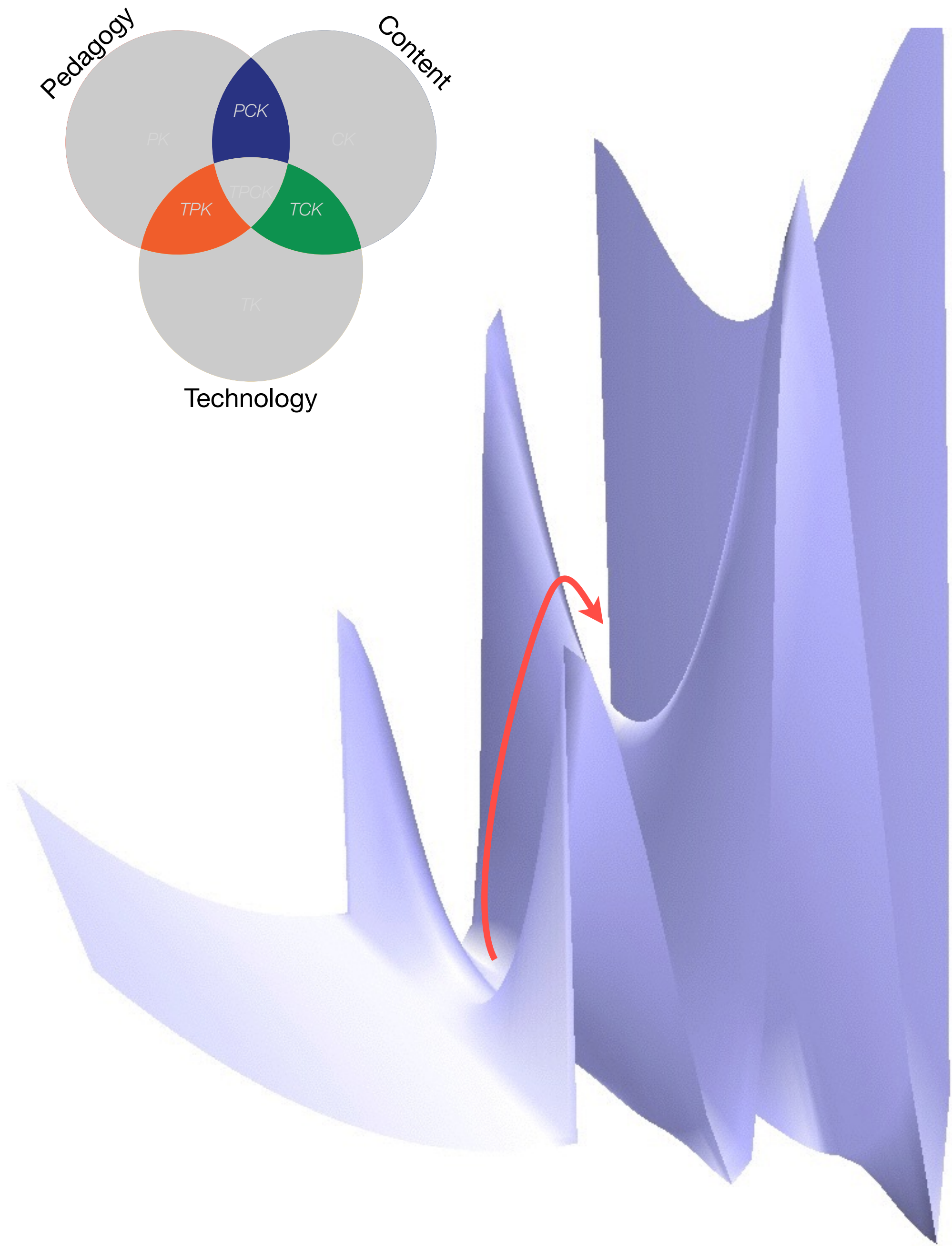


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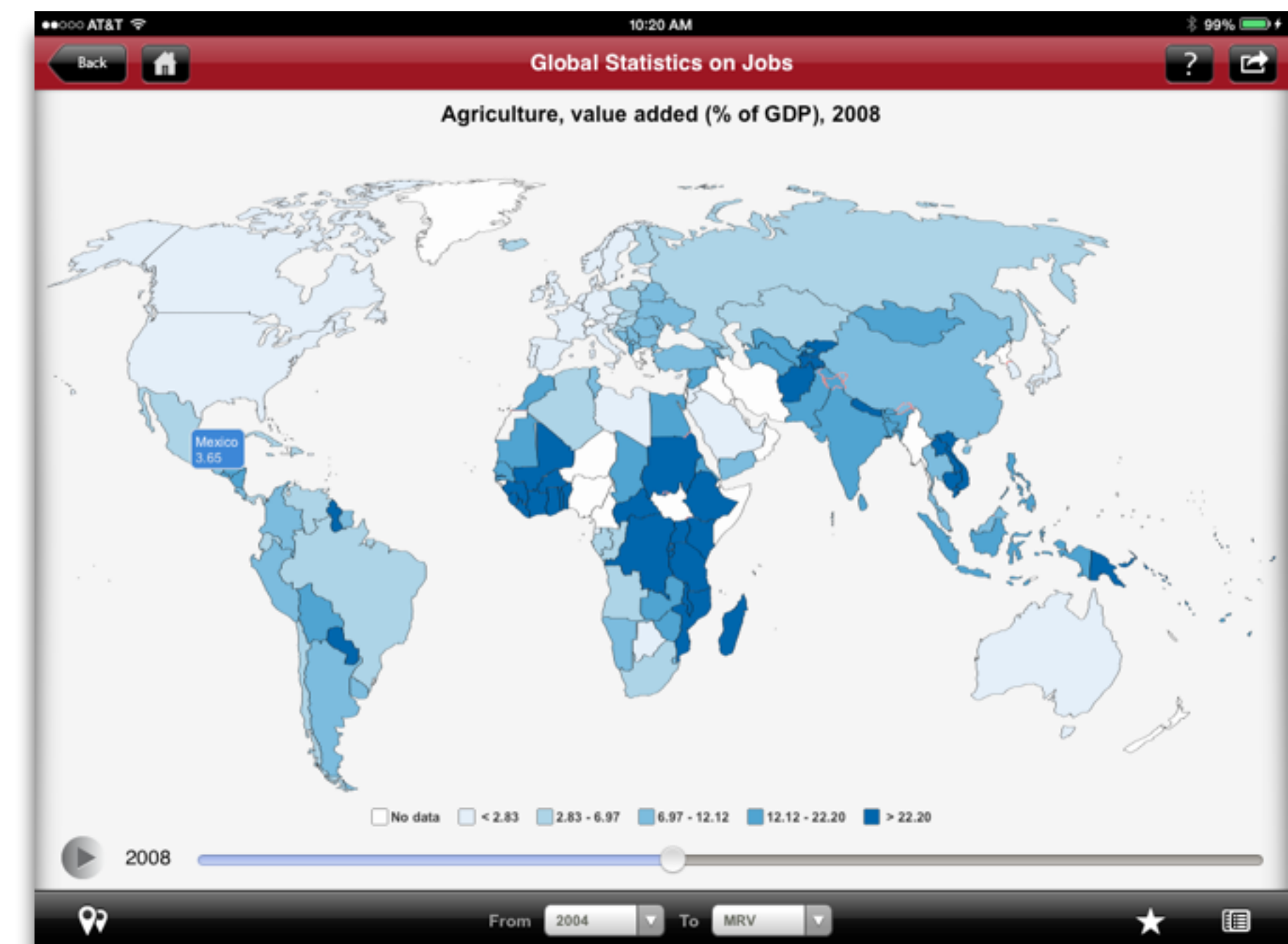
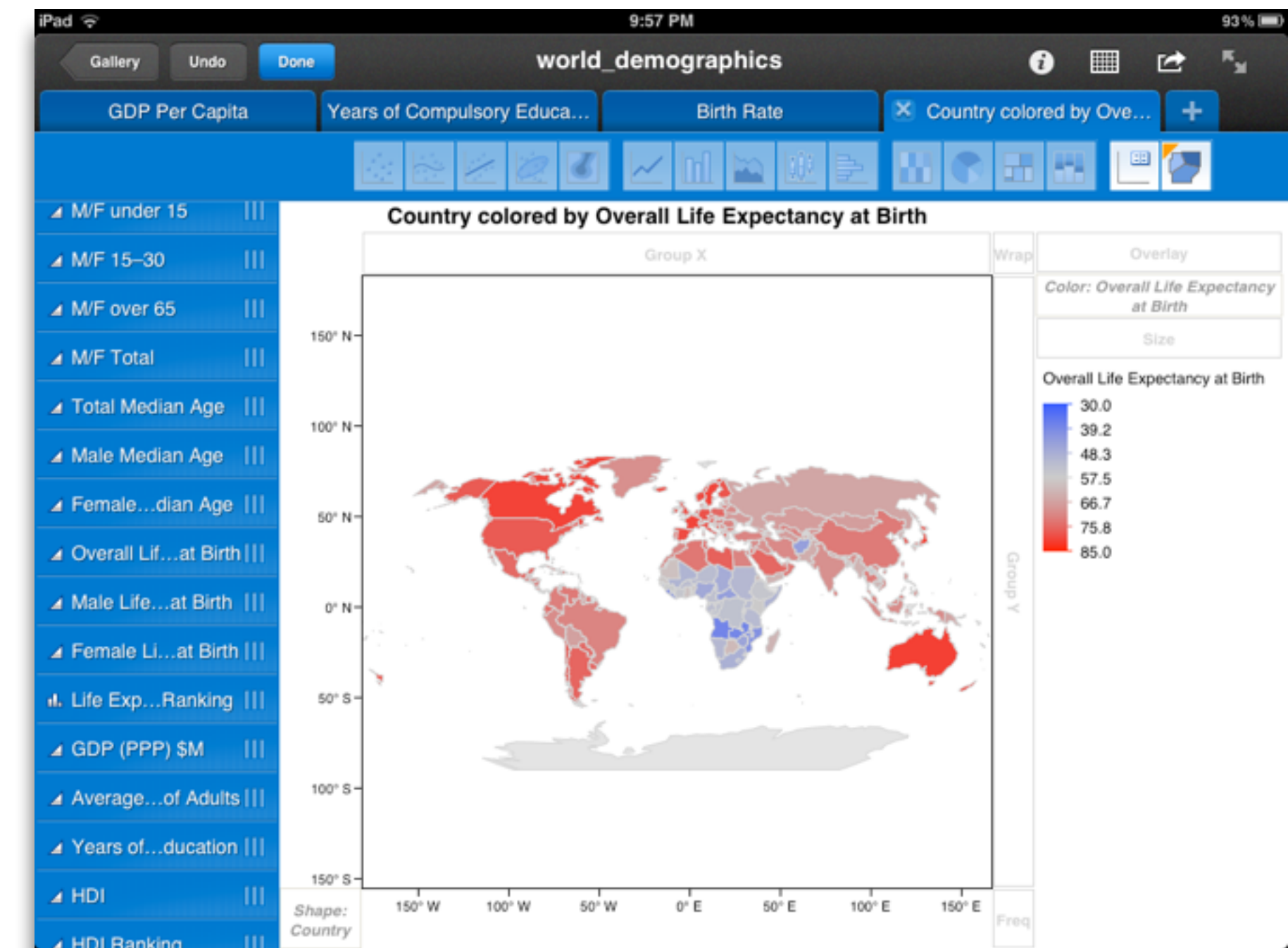
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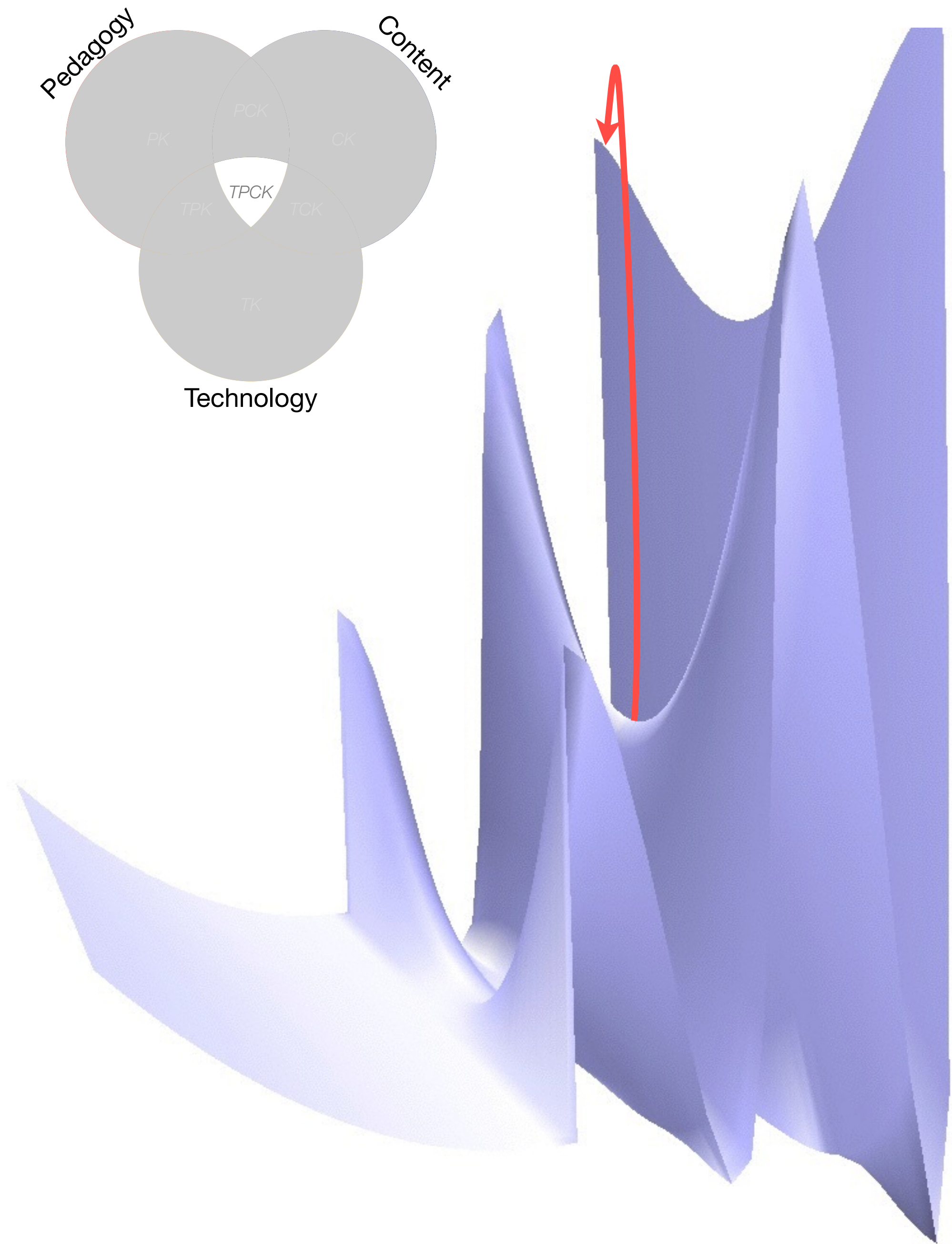


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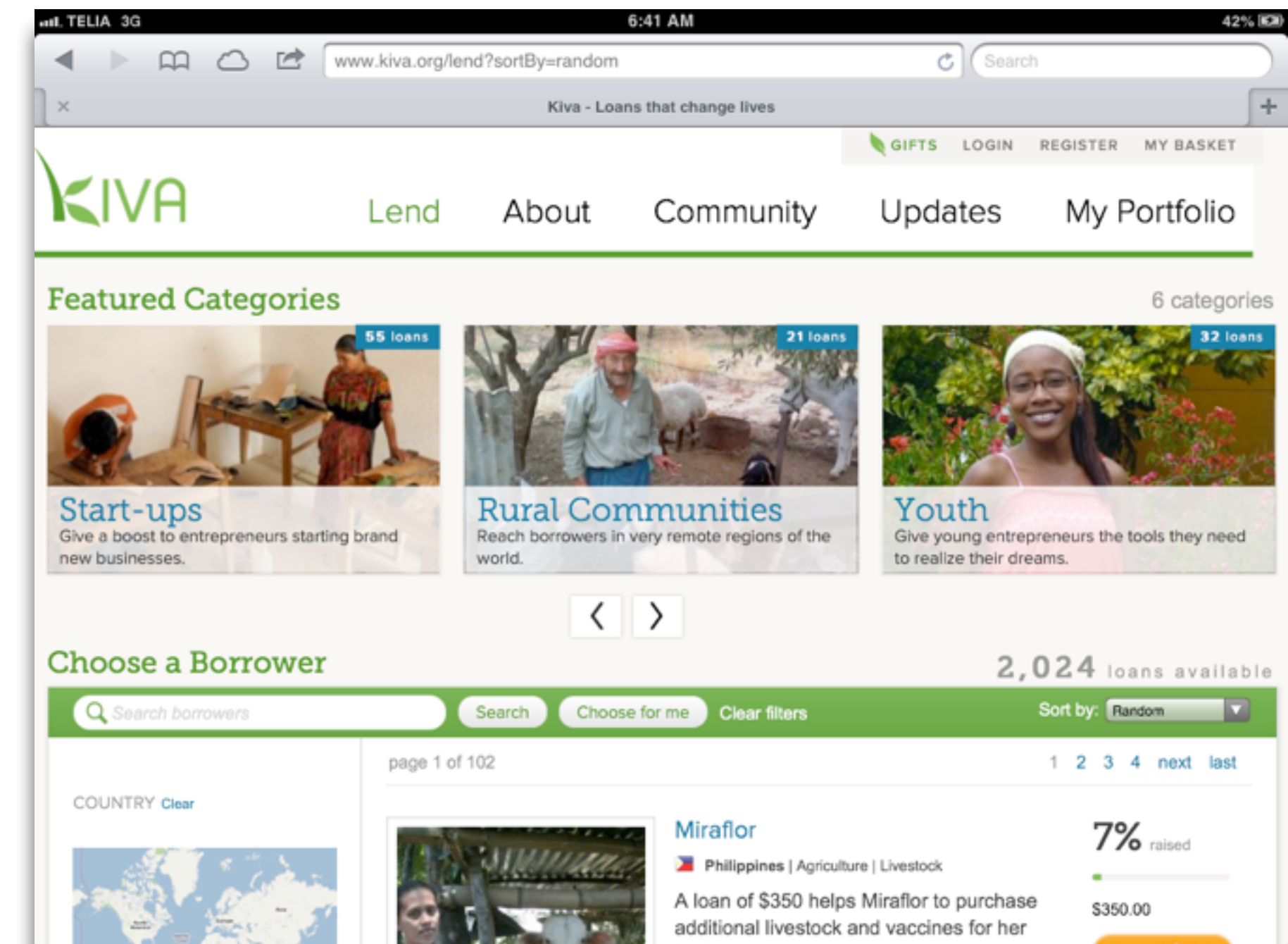
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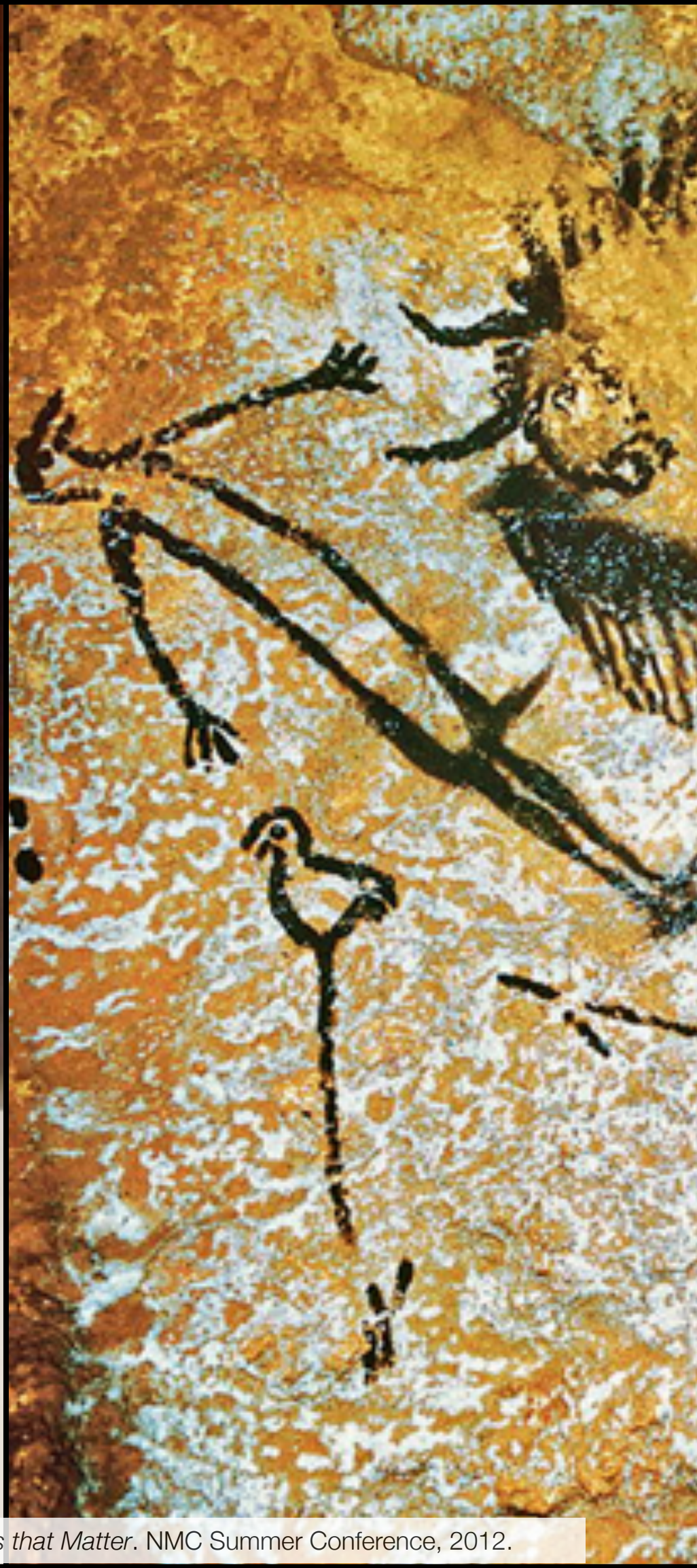

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| Study | SAMR Level | Description | Effect Size |
|---|------------|---|--------------|
| Ligas (2002) | S | CAI system used to support direct instruction approach for at-risk students. | 0.029 |
| Xin & Reith (2001) | A | Multimedia resources provided to contextualize learning of word meanings and concepts. | 0.264 |
| Higgins & Raskind (2005) | M | Software/hardware used for text-to-speech, definitions, pronunciation guide for children with reading disabilities. | 0.600 |
| Salomon, Globerson & Guterman (1989) | R | Software presents students with reading principles and metacognitive questions as part of the reading process. | 1.563 |

| Study | SAMR Classification | Description | Effect Size |
|--|---------------------|--|---|
| Algebra I <i>Effectiveness of Cognitive Tutor Algebra I at Scale</i> , by John F. Pane, Beth Ann Griffin, Daniel F. McCaffrey, Rita Karam | S to A | S: Computerized algebra drills, some tied to real-world scenarios A: Tools for basic visualization; adaptive response to student progress | ≈ 0.2 50th perc. → 58th perc. |
| Earth Science <i>Using Laptops to Facilitate Middle School Science Learning: The Results of Hard Fun</i> , by Alexis M. Berry, Sarah E. Wintle | A to M | A: Interactive tools for concept exploration and visualization M: Narrated animation as final project | ≈ 0.6 50th perc. → 73rd perc. (≈ 1.4 a month later) (50th perc. → 92nd perc.) |

| Social | Mobility | Visualization | Storytelling | Gaming |
|--|---|--|--|--|
| 200,000 years | 70,000 years | 40,000 years | 17,000 years | 8,000 years |
|  |  |  |  |  |

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|    |  |  |  |   |

Bookmarks



RSS Feeds

Discussions



Microblogging

Blogging











Wikis

Telepresence

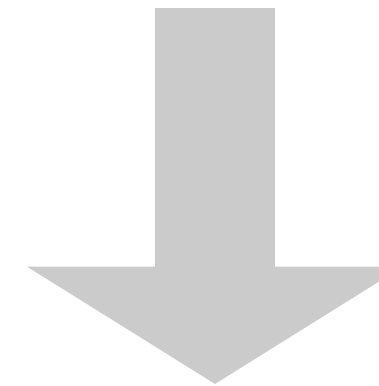


File Sharing

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|    |  |  |  |   |

Class

Homework



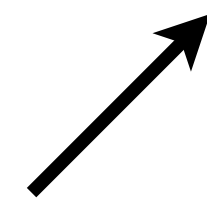
School

World

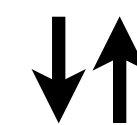
Home



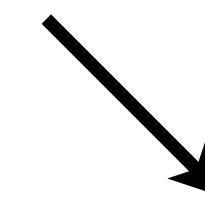
Learning Environments







Contextual Search
Augmented Reality

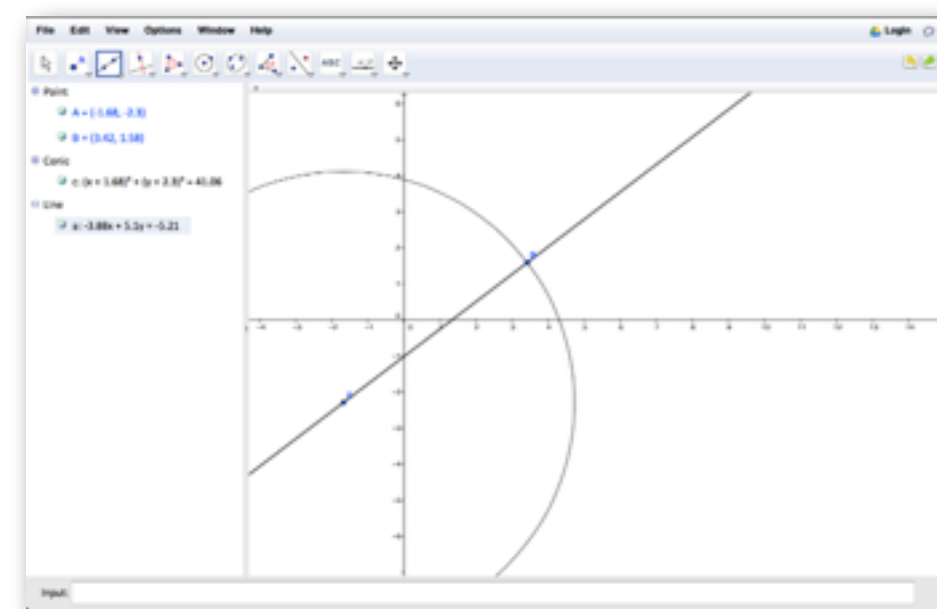
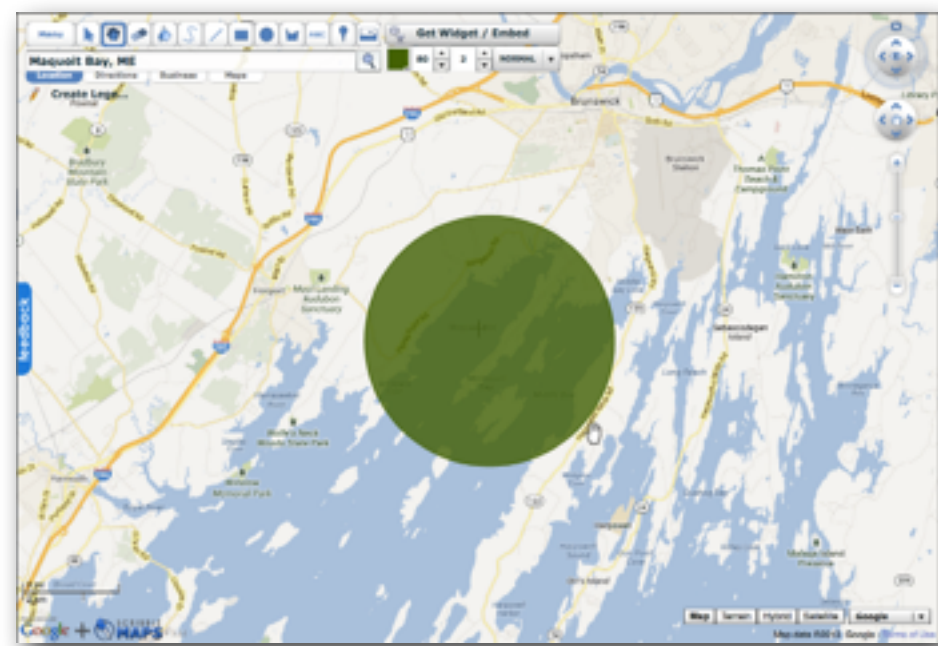
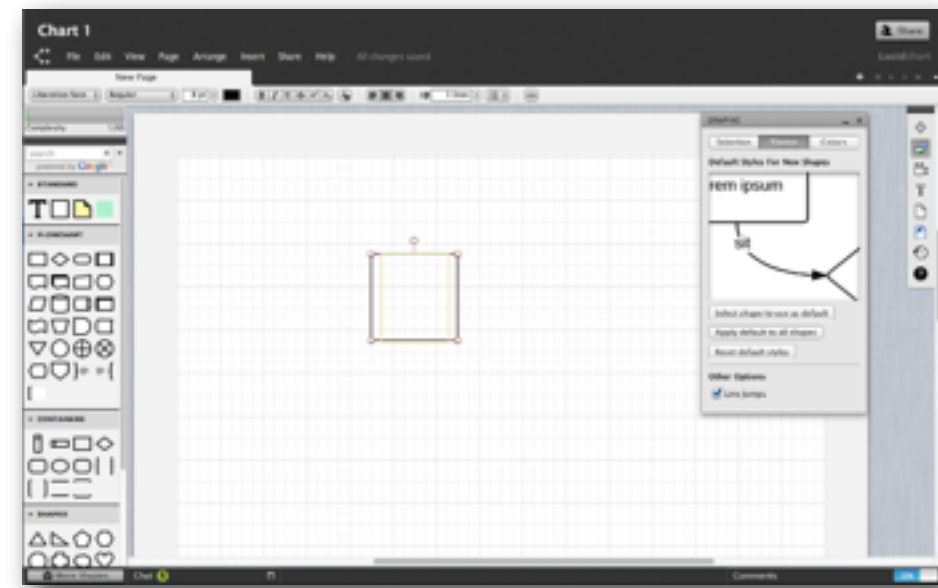


Cloud Resources
Mobile Tools

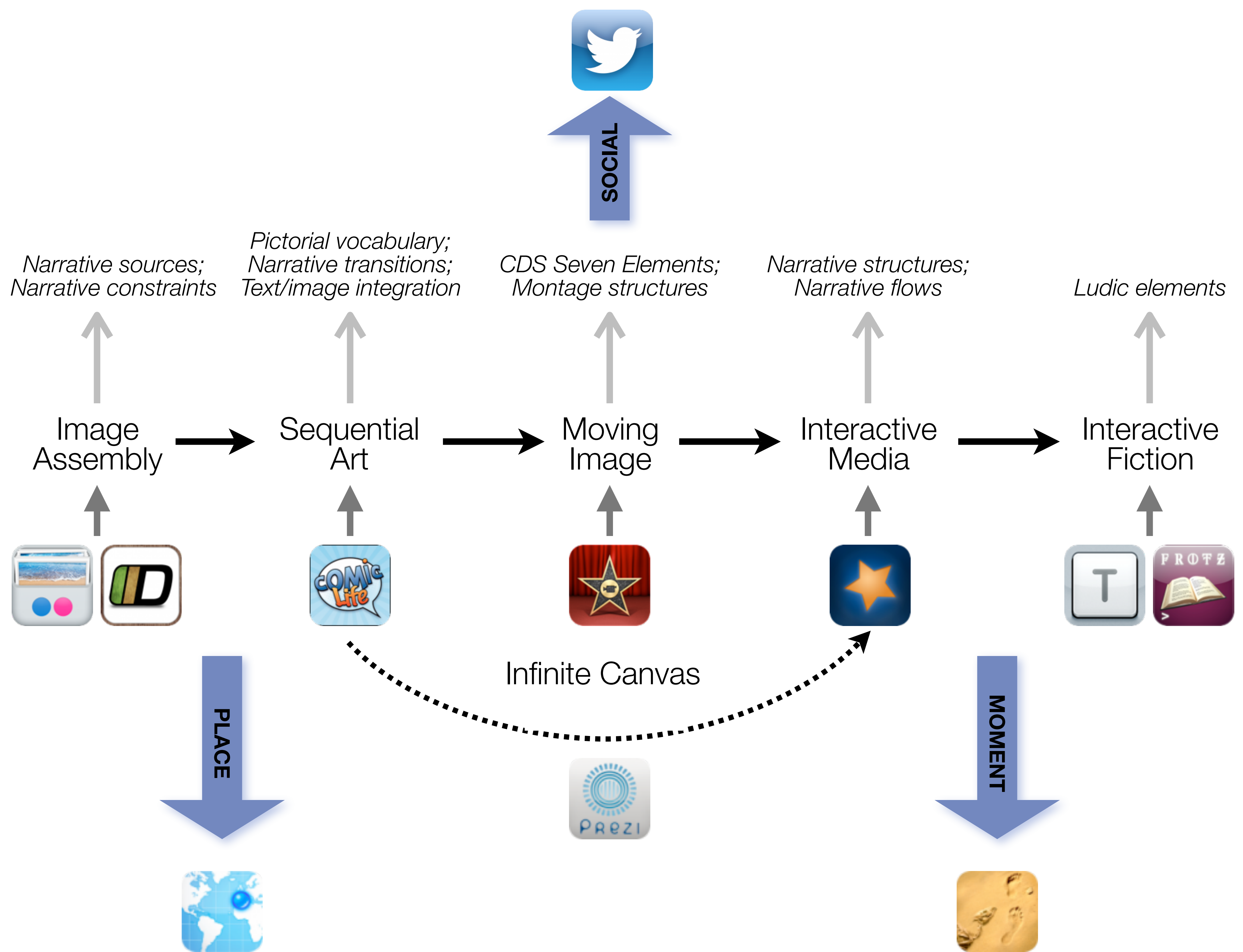


Sensors
Recorders

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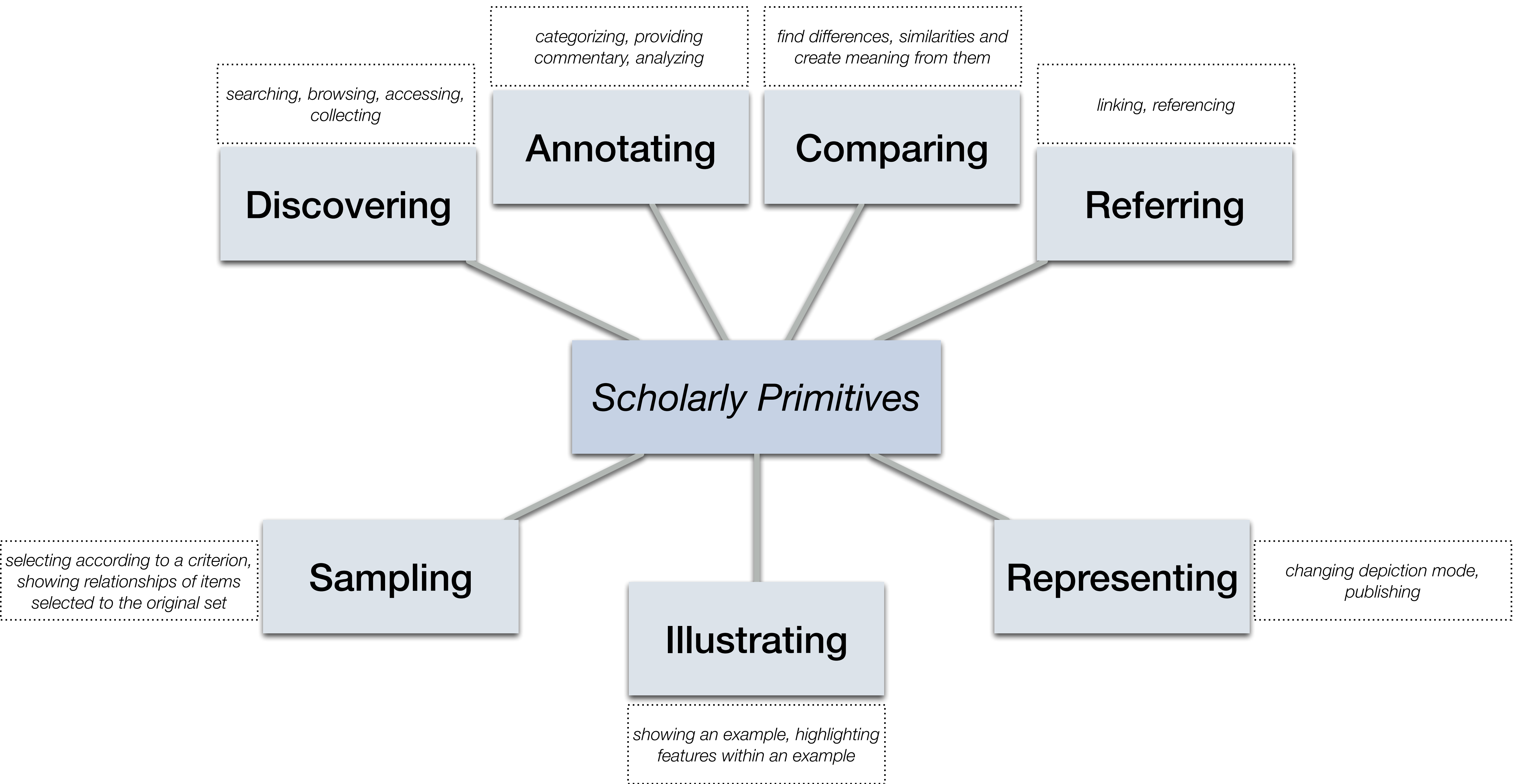


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Formal Definition of **Game** (Salen & Zimmerman)

“A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome.”





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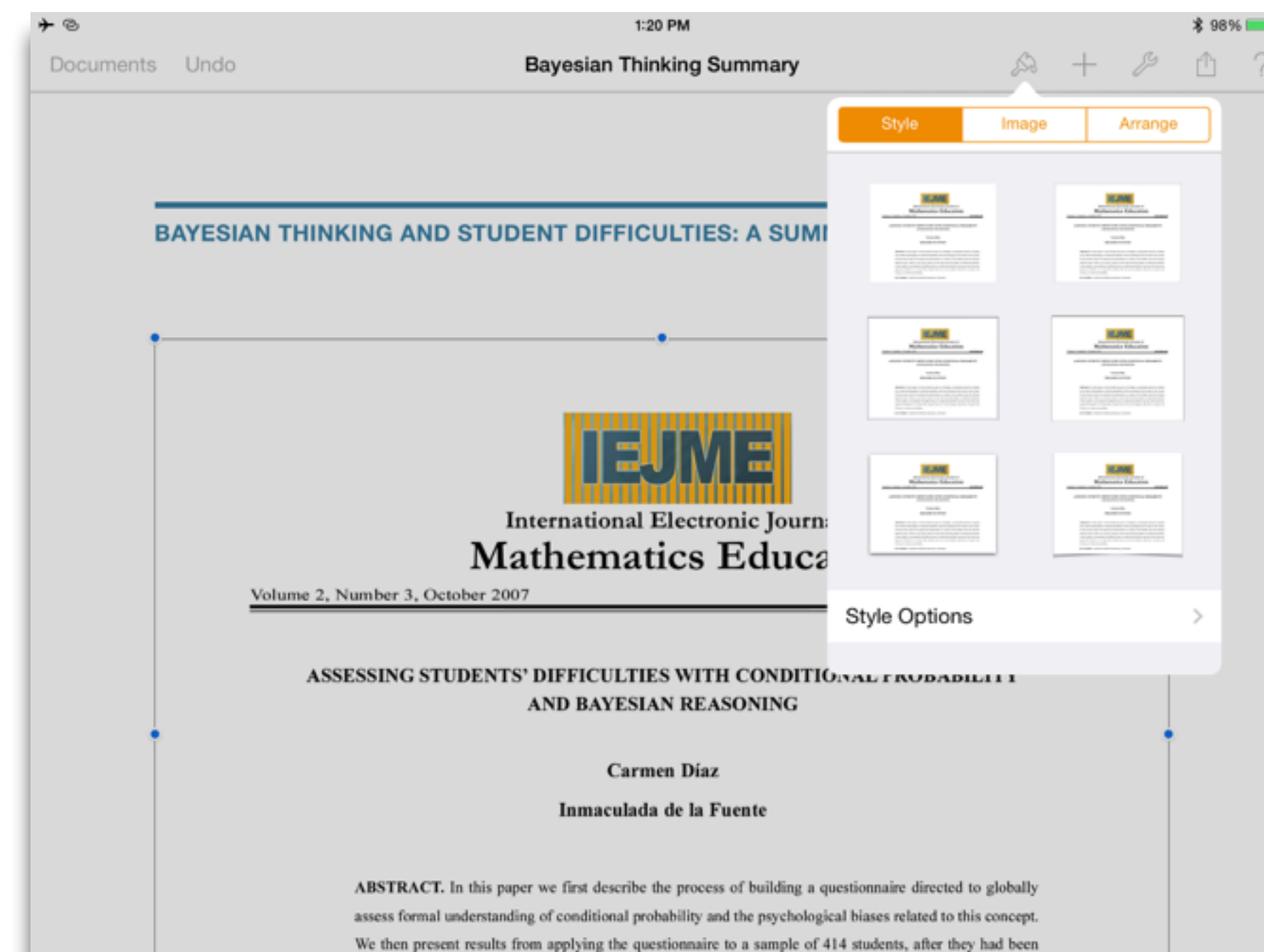
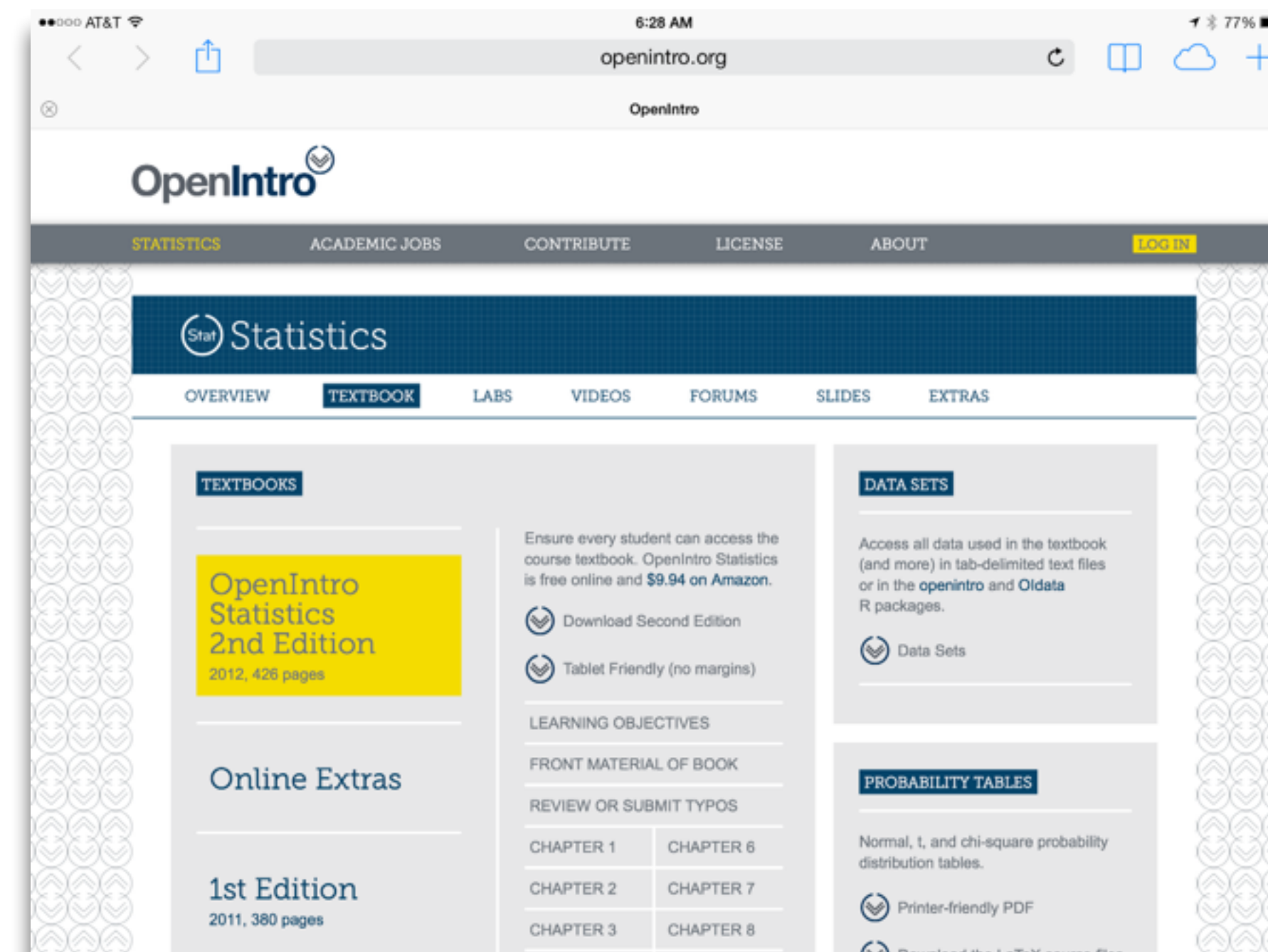
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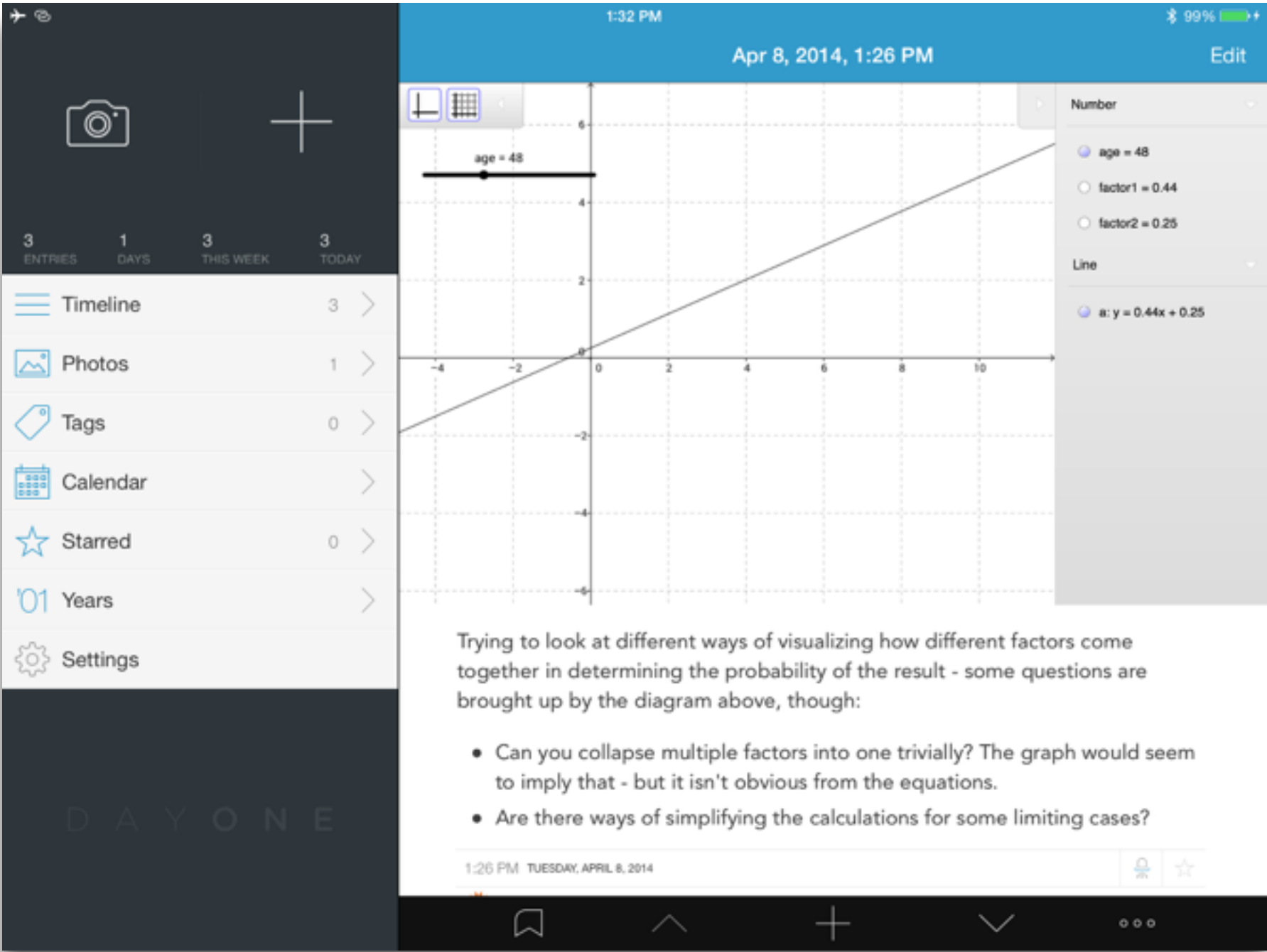
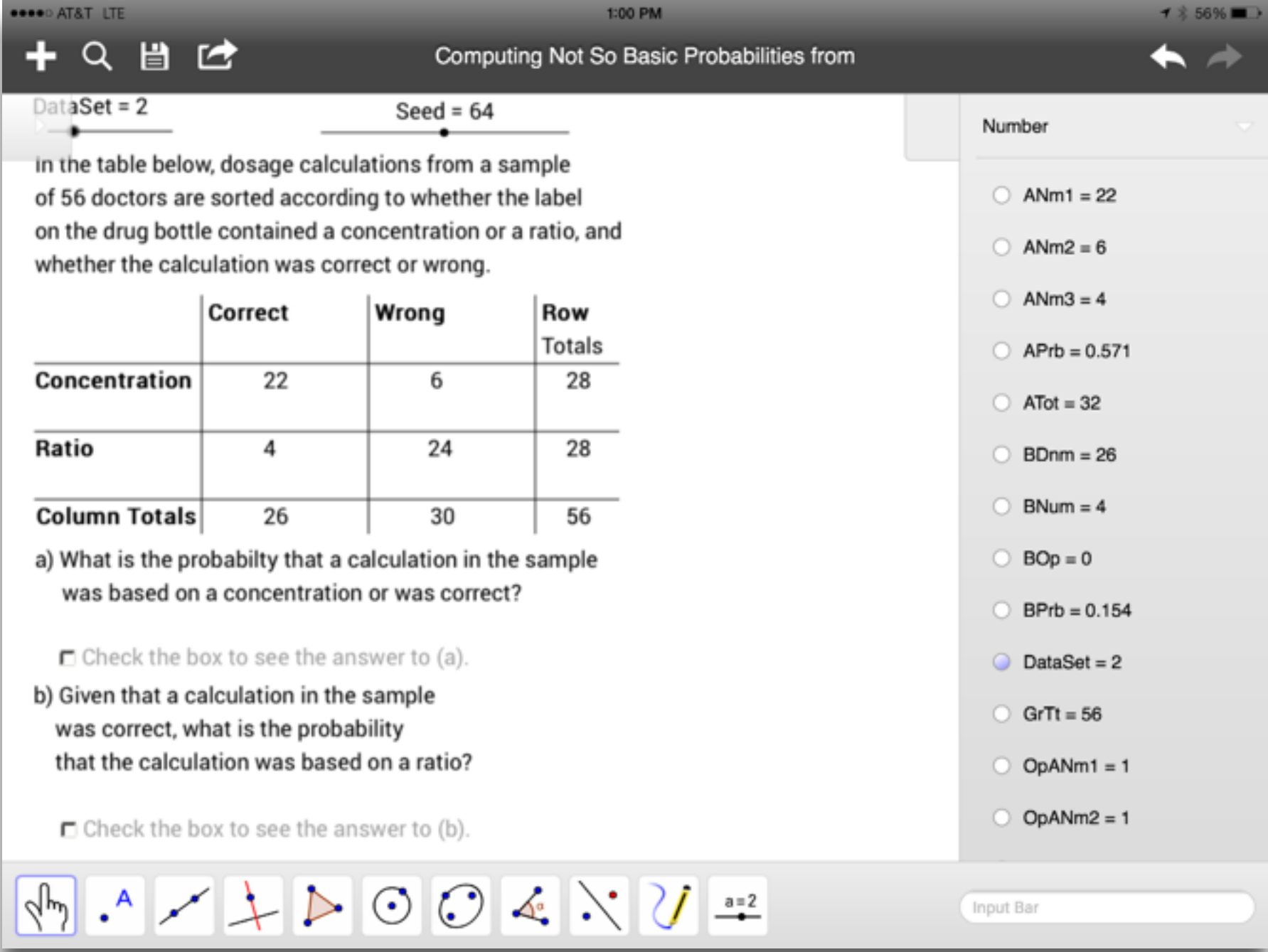
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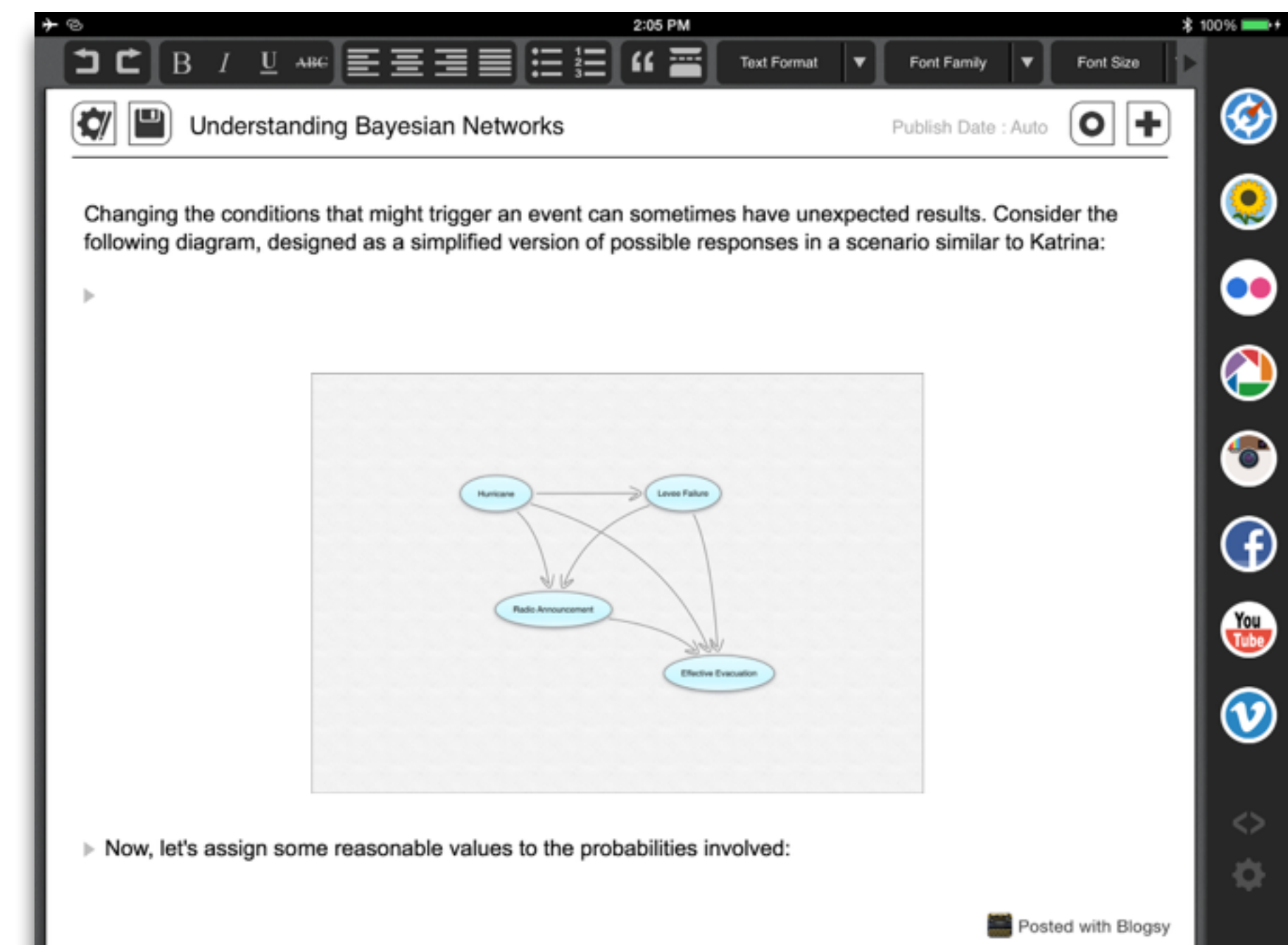
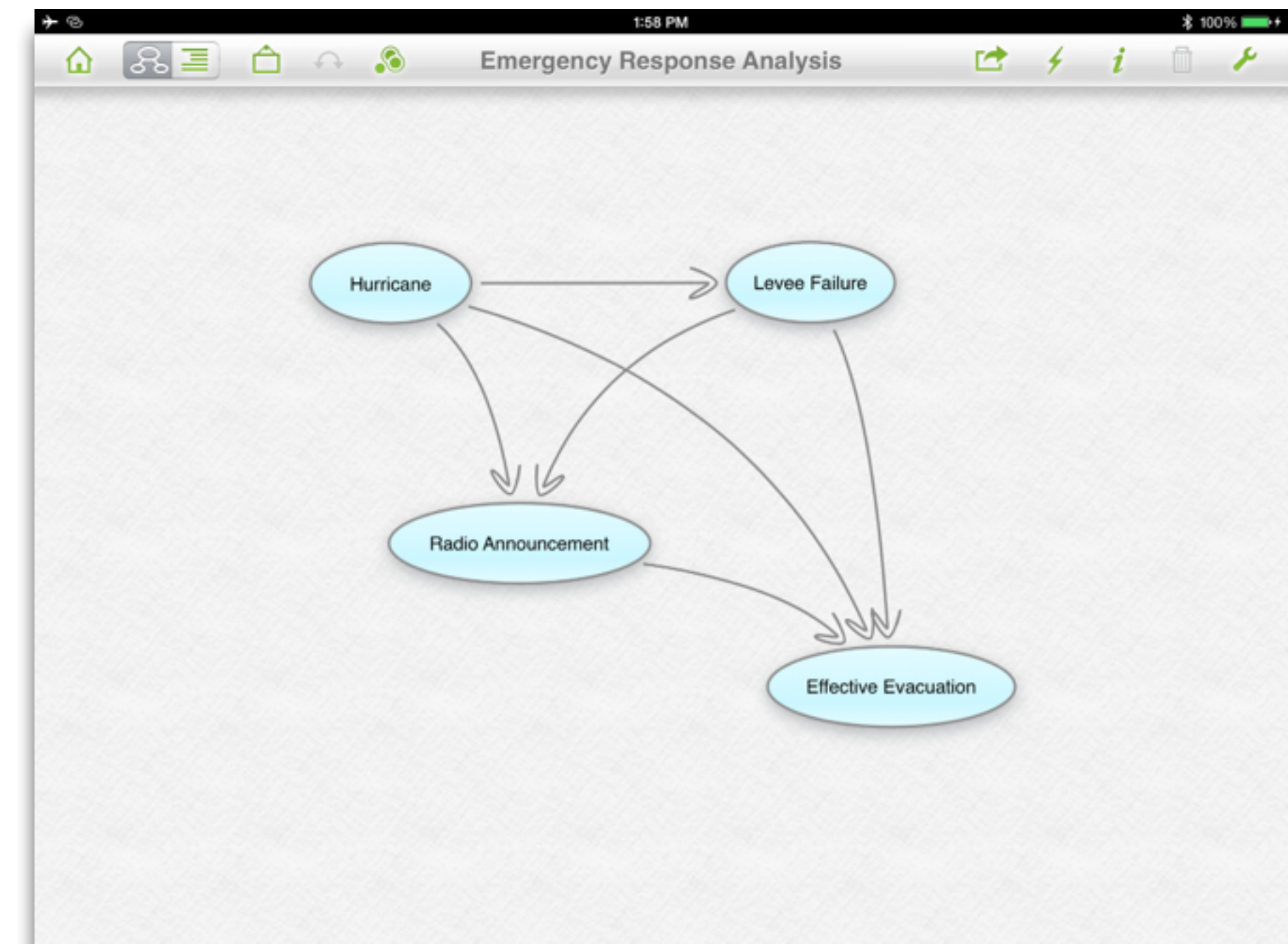
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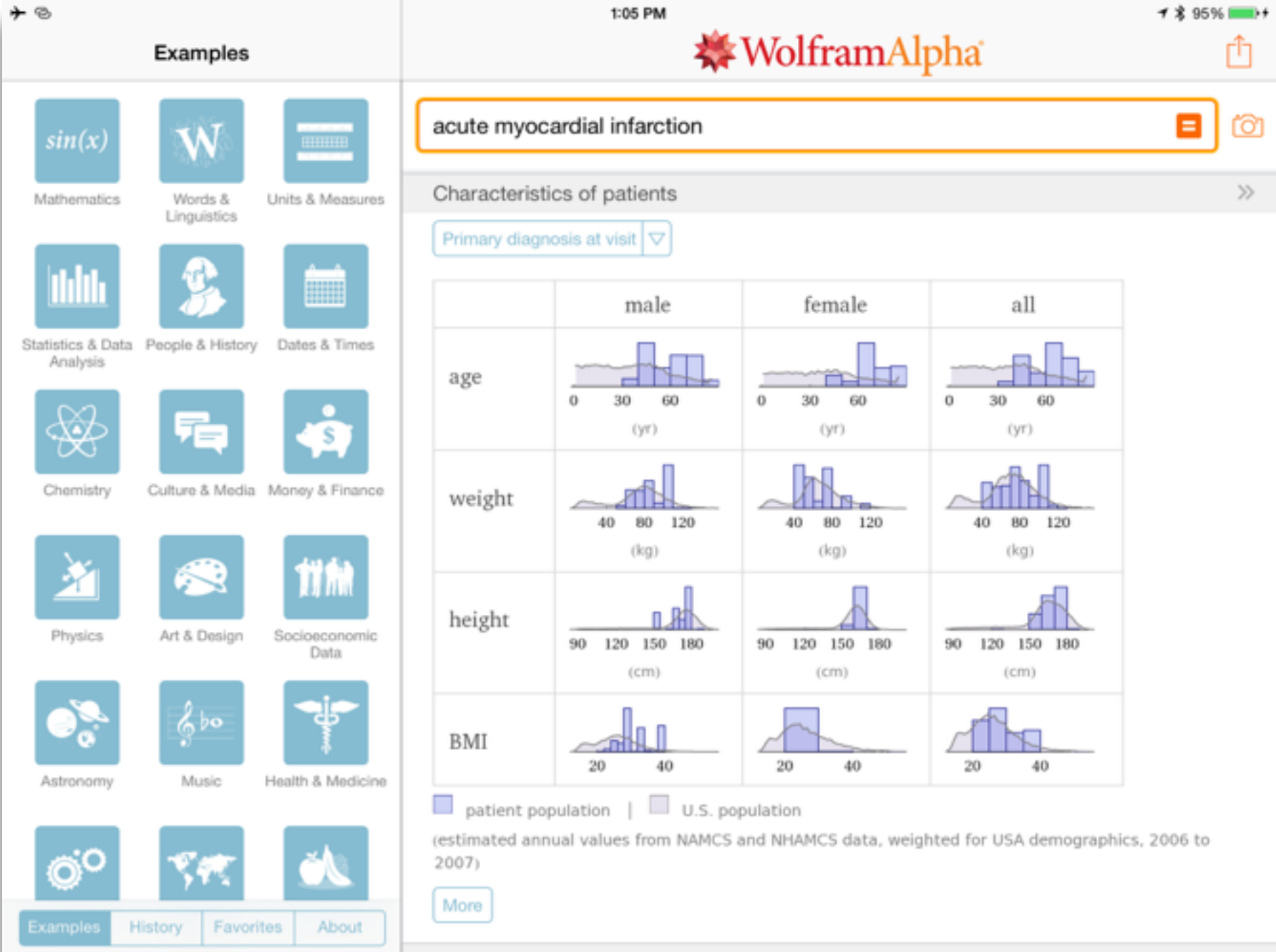
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Stent Policy Analysis

| Independent Predictor | Hazard Ratio | 95% CI | P Value |
|--|--------------|-------------|---------|
| 30-Day Major Adverse Cardiac or Cerebrovascular Event | | | |
| >1 vessel treated | 1.416 | 1.138-1.762 | 0.0018 |
| Urgent procedure | 3.27 | 2.5-5.54 | <0.0001 |
| Female sex | 1.464 | 1.03-2.07 | 0.0321 |
| Chronic obstructive pulmonary disease | 1.541 | 1.04-2.276 | 0.03 |
| Hypertension | 1.622 | 1.037-2.535 | 0.0339 |
| 3-Year Survival | | | |
| >1 vessel treated | 1.252 | 1.072-1.462 | 0.0045 |
| NYHA functional class III or IV | 1.35 | 1.015-1.796 | 0.0389 |
| Prior myocardial infarction | 1.411 | 1.077-1.848 | 0.0047 |
| Age >65 yr | 2.182 | 1.663-2.864 | <0.0001 |
| Chronic renal insufficiency | 1.963 | 1.481-2.602 | <0.0001 |
| Valvulopathy | 1.641 | 1.183-2.277 | 0.0031 |
| Family history of coronary artery disease | 0.615 | 0.437-0.865 | 0.0039 |
| Hyperlipidemia | 0.66 | 0.518-0.841 | 0.0002 |
| Congenital heart disease | 2.312 | 1.692-3.16 | <0.0001 |
| Peripheral vascular disease | 1.921 | 1.452-2.541 | <0.0001 |

Will Stent Revascularization Replace Coronary Artery Bypass Grafting?
James M. Wilson, MD

Location

Position in space

Condition

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

Links

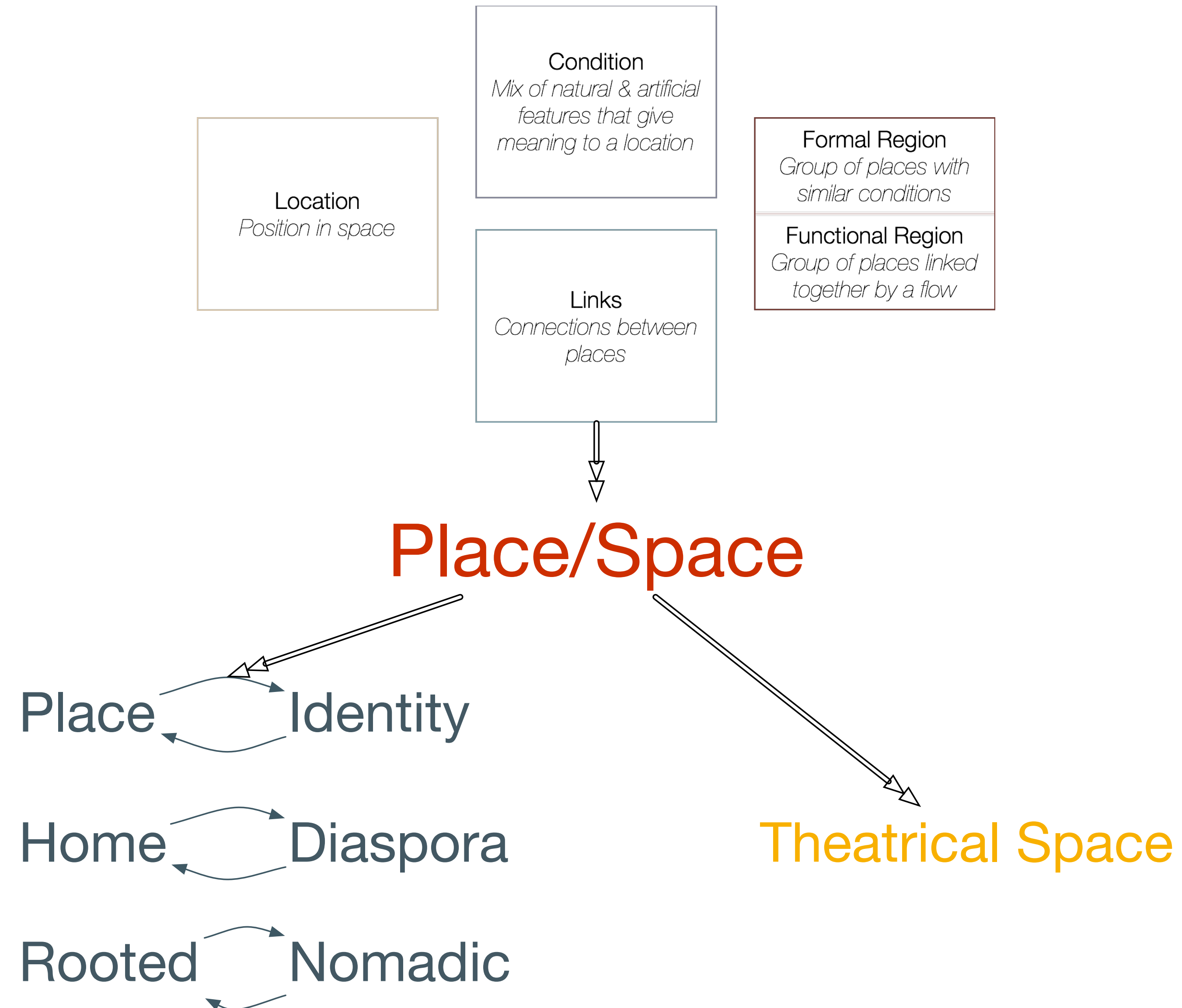
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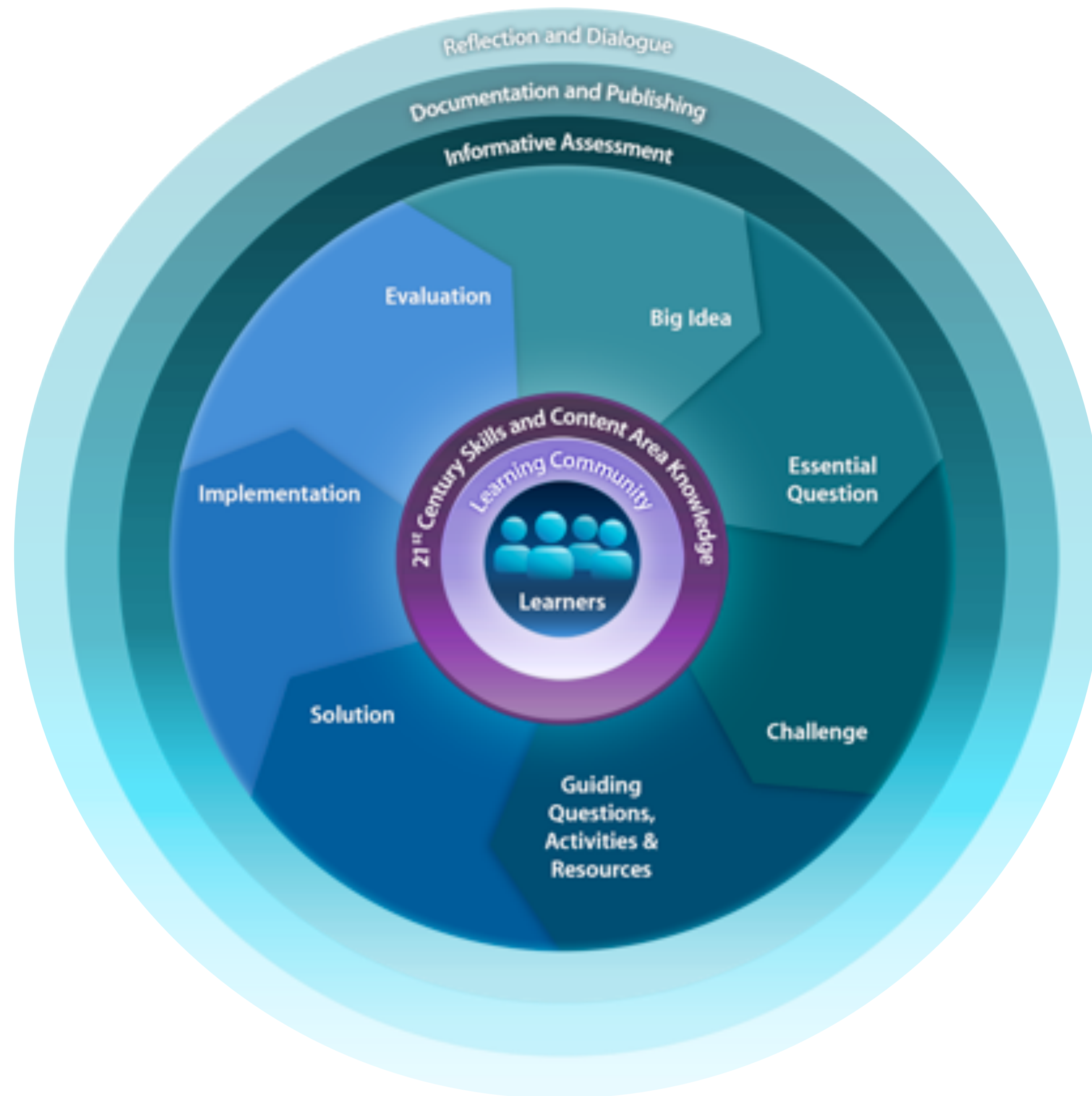




Shigeru Ban - Log House, Kobe – Photo by Forgemind ArchiMedia



Shigeru Ban - The Nomadic Museum – Photo by weird tramp



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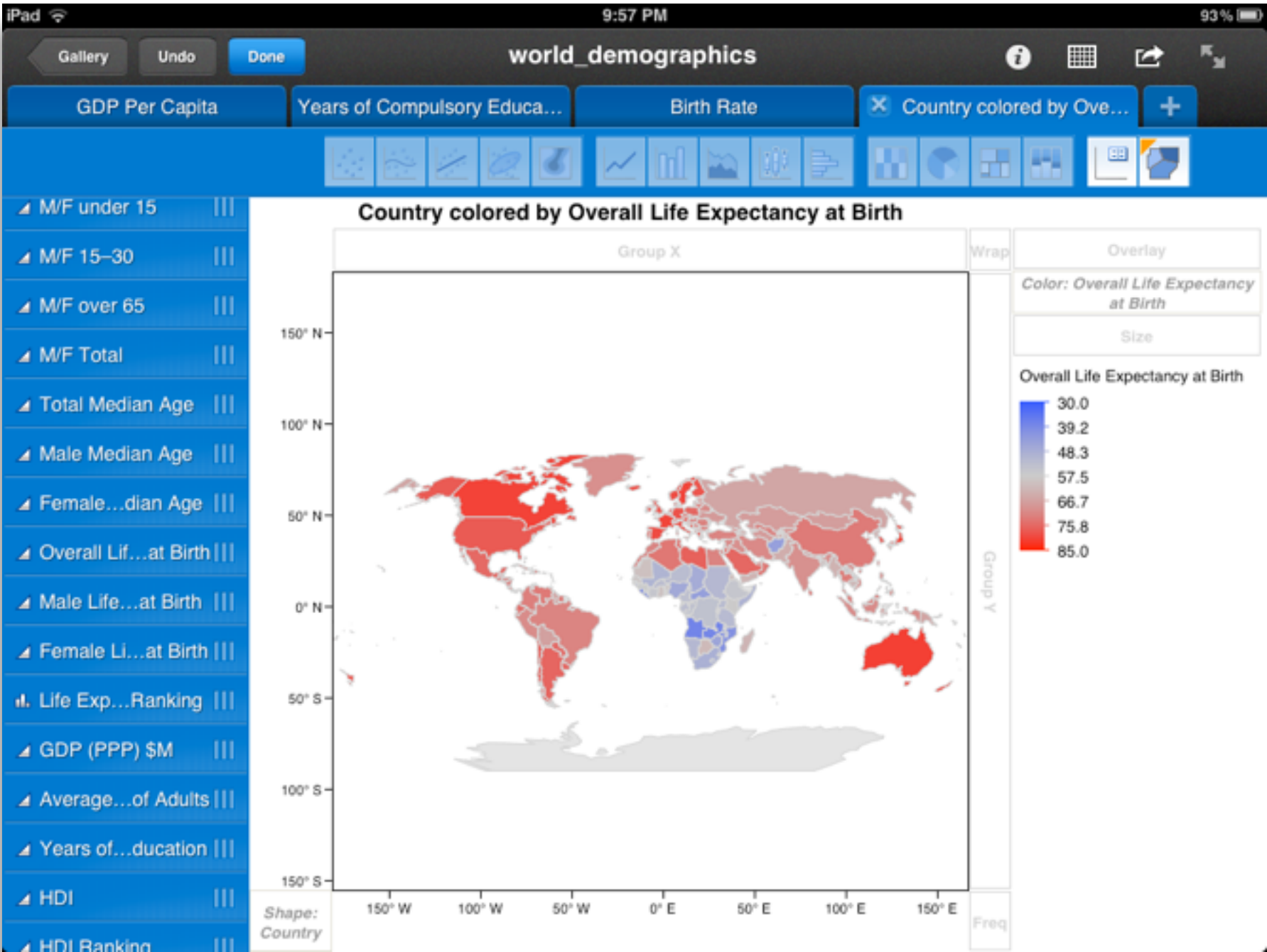
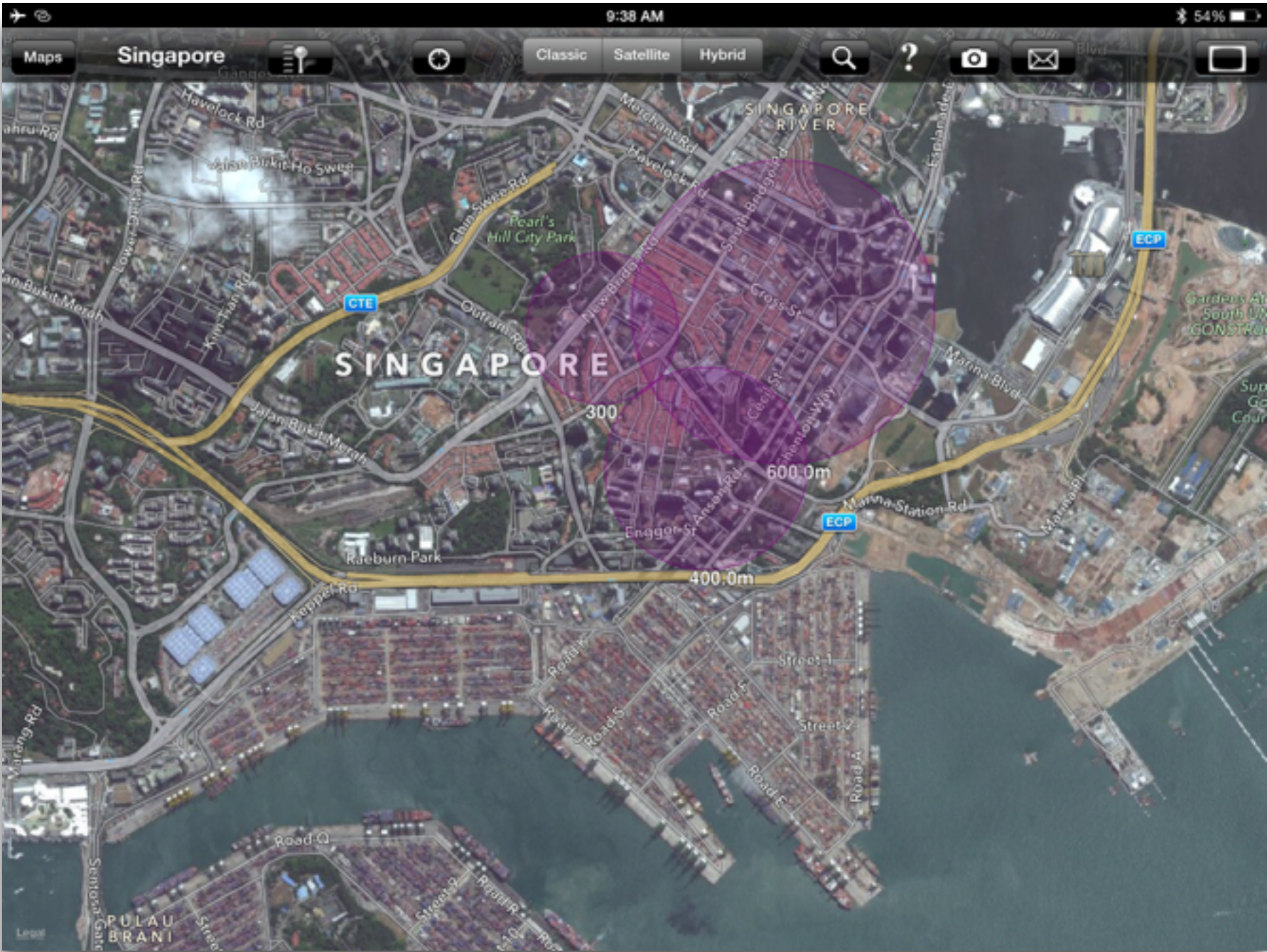
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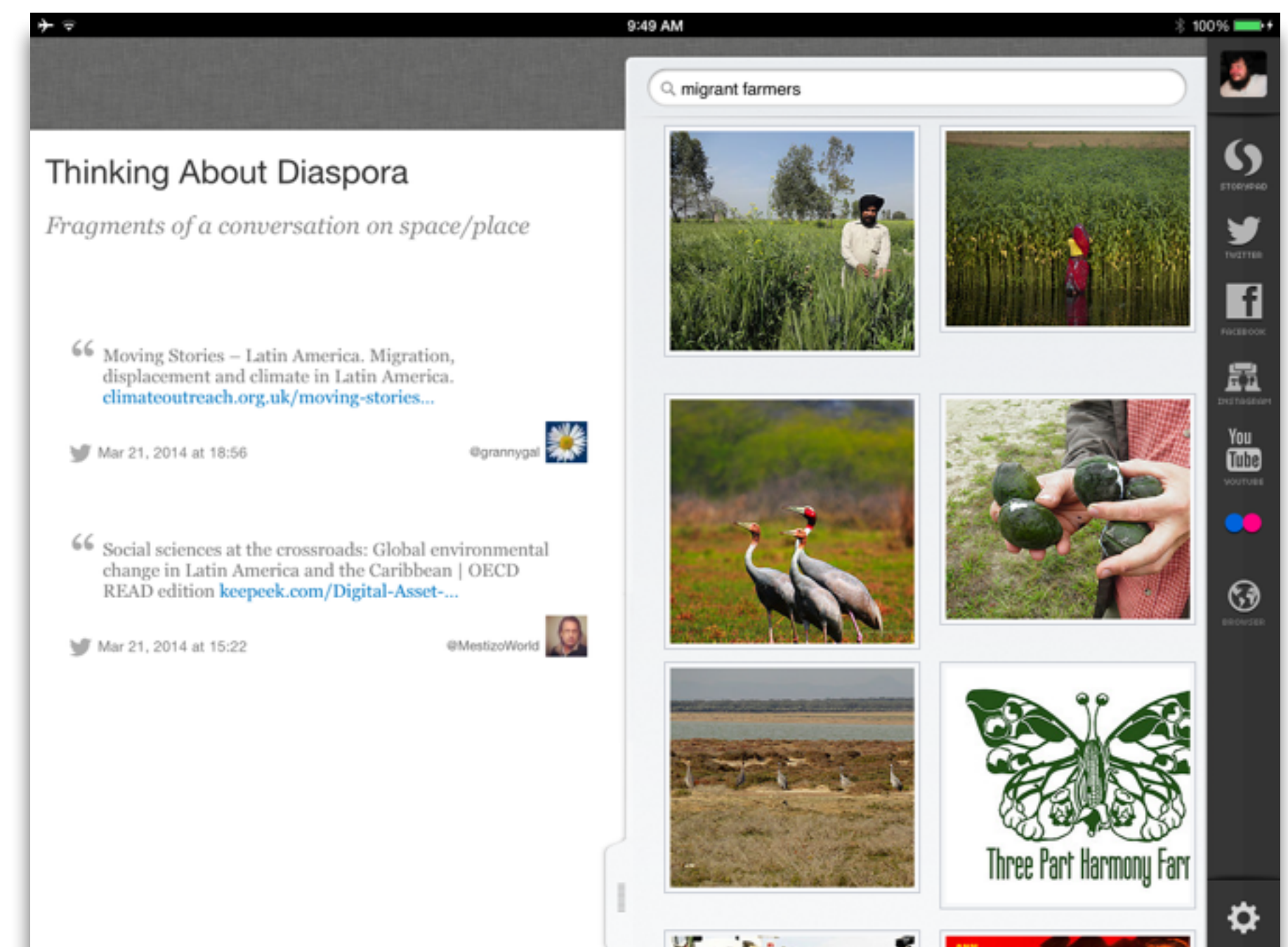
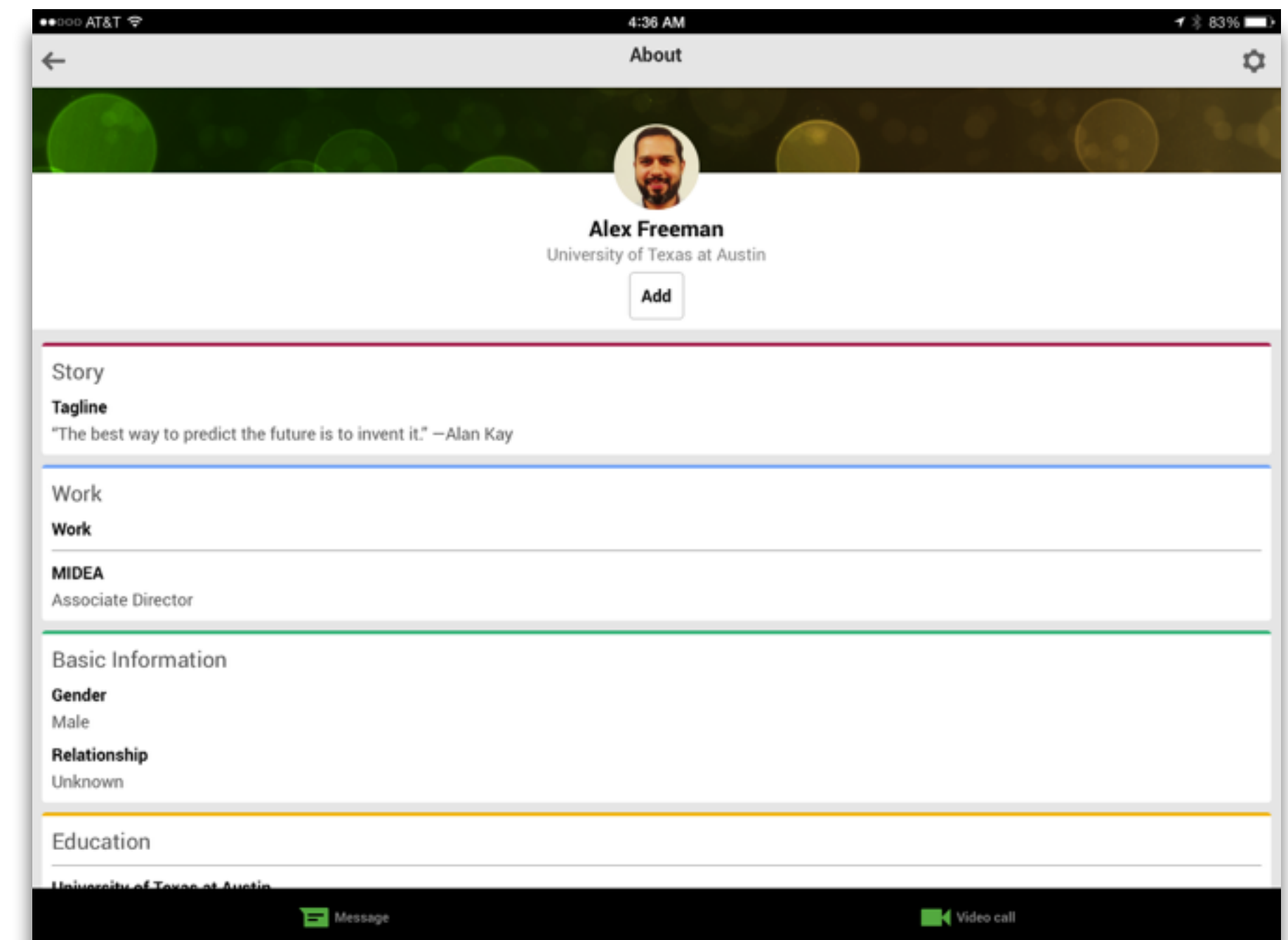
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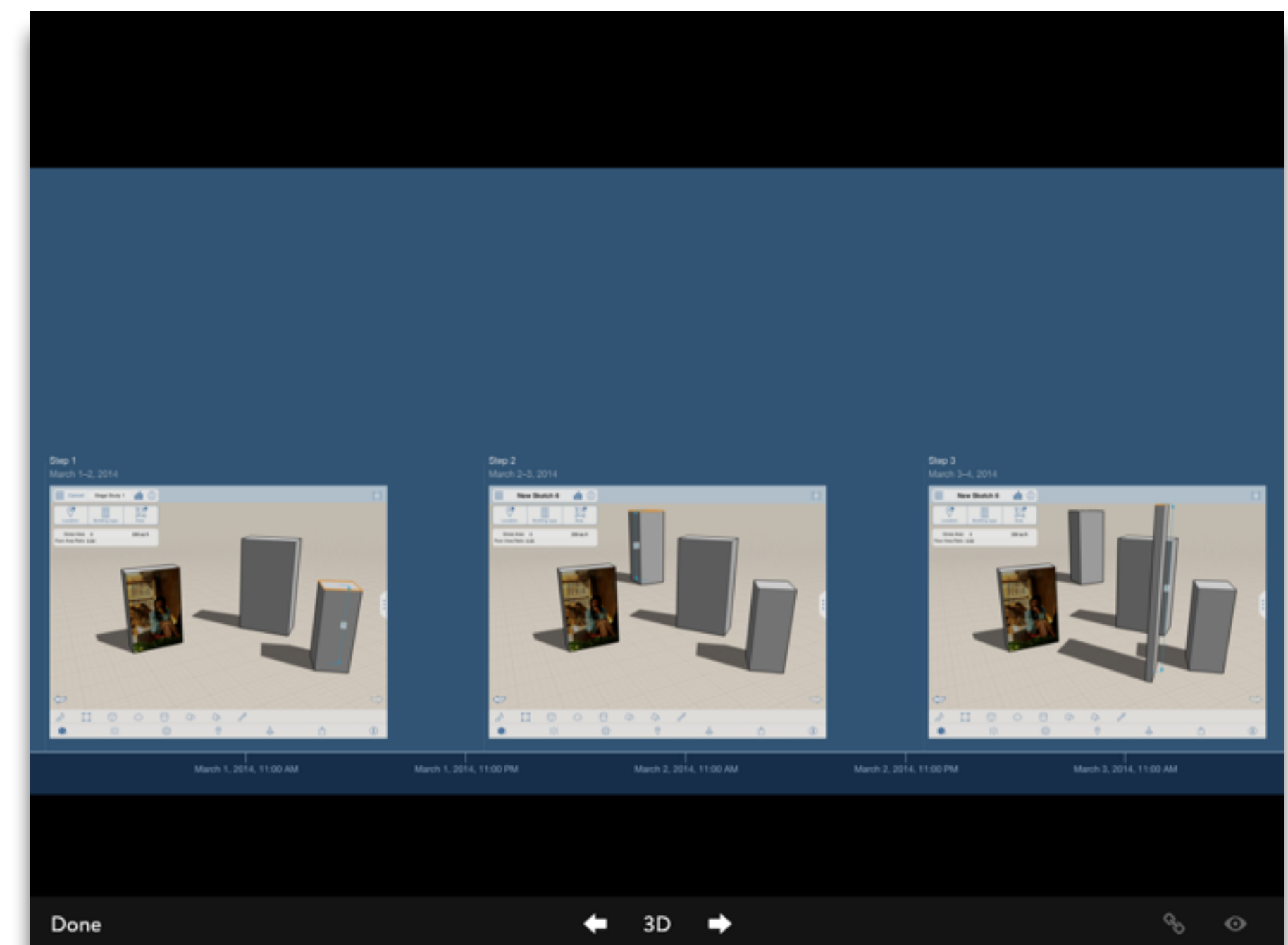
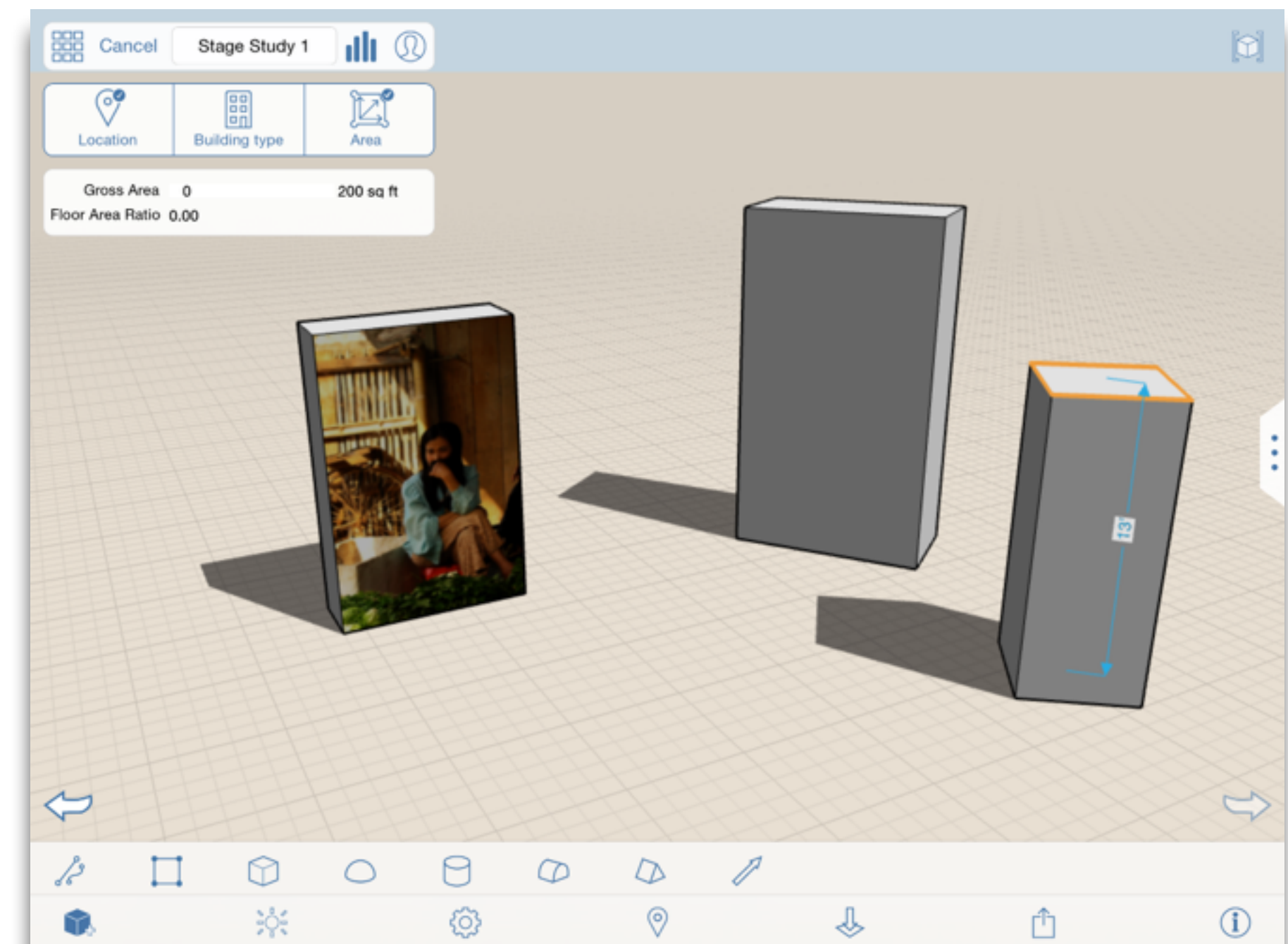
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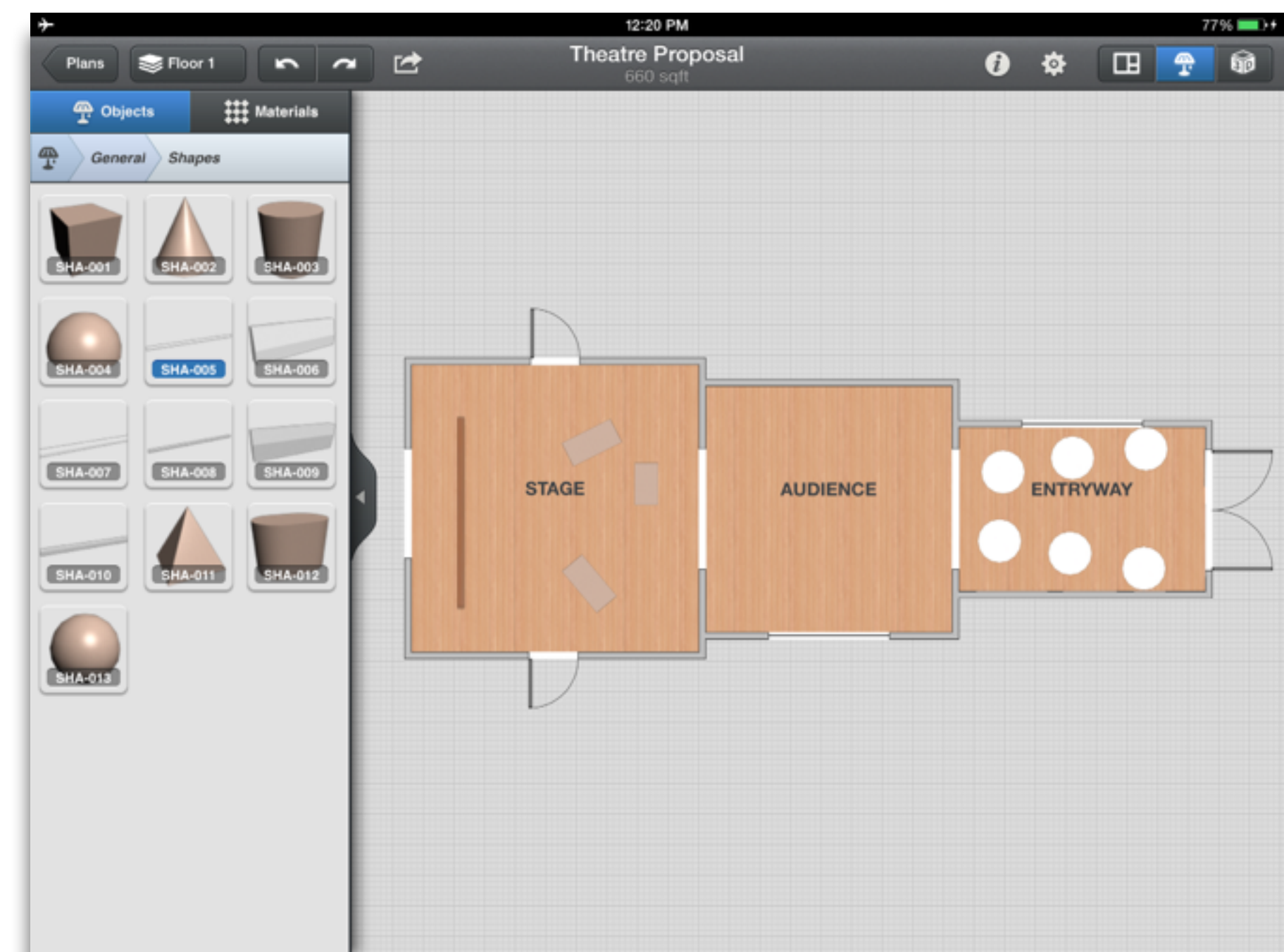
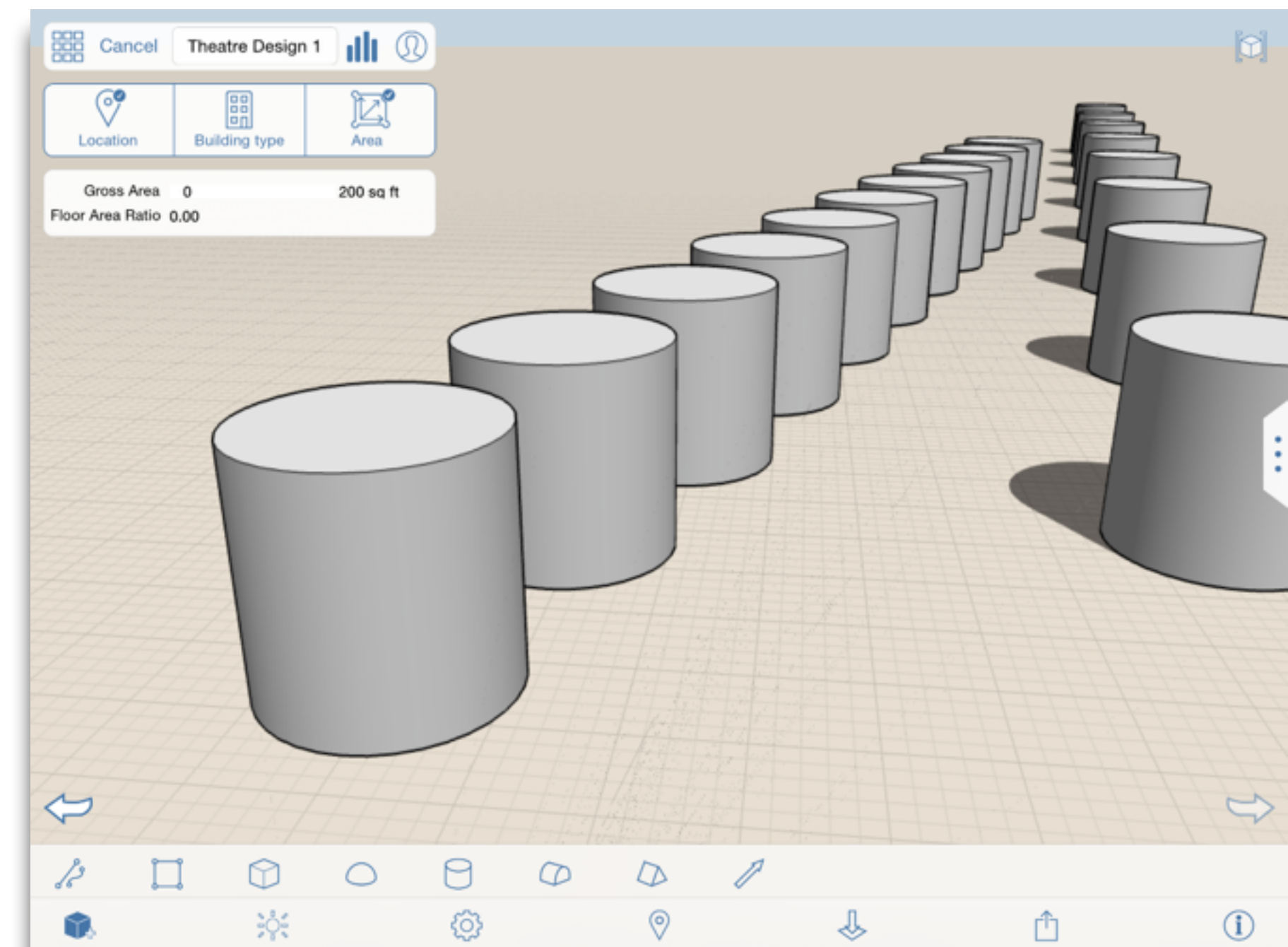
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| Fast (1-2 yrs.) | Rethinking the Roles of Teachers Shift to Deep Learning Approaches |
| Mid-Range (3-5 yrs.) | Increasing Focus on Open Content Increasing Use of Hybrid Learning Designs |
| Long-Range (5+ yrs.) | Rapid Acceleration of Intuitive Technology Rethinking How Schools Work |

| Important Ed Tech Developments | |
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| Adoption: 1 yr. or less | BYOD Cloud Computing |
| Adoption: 2-3 yrs. | Games and Gamification Learning Analytics |
| Adoption: 4-5 yrs. | The Internet of Things Wearable Technology |

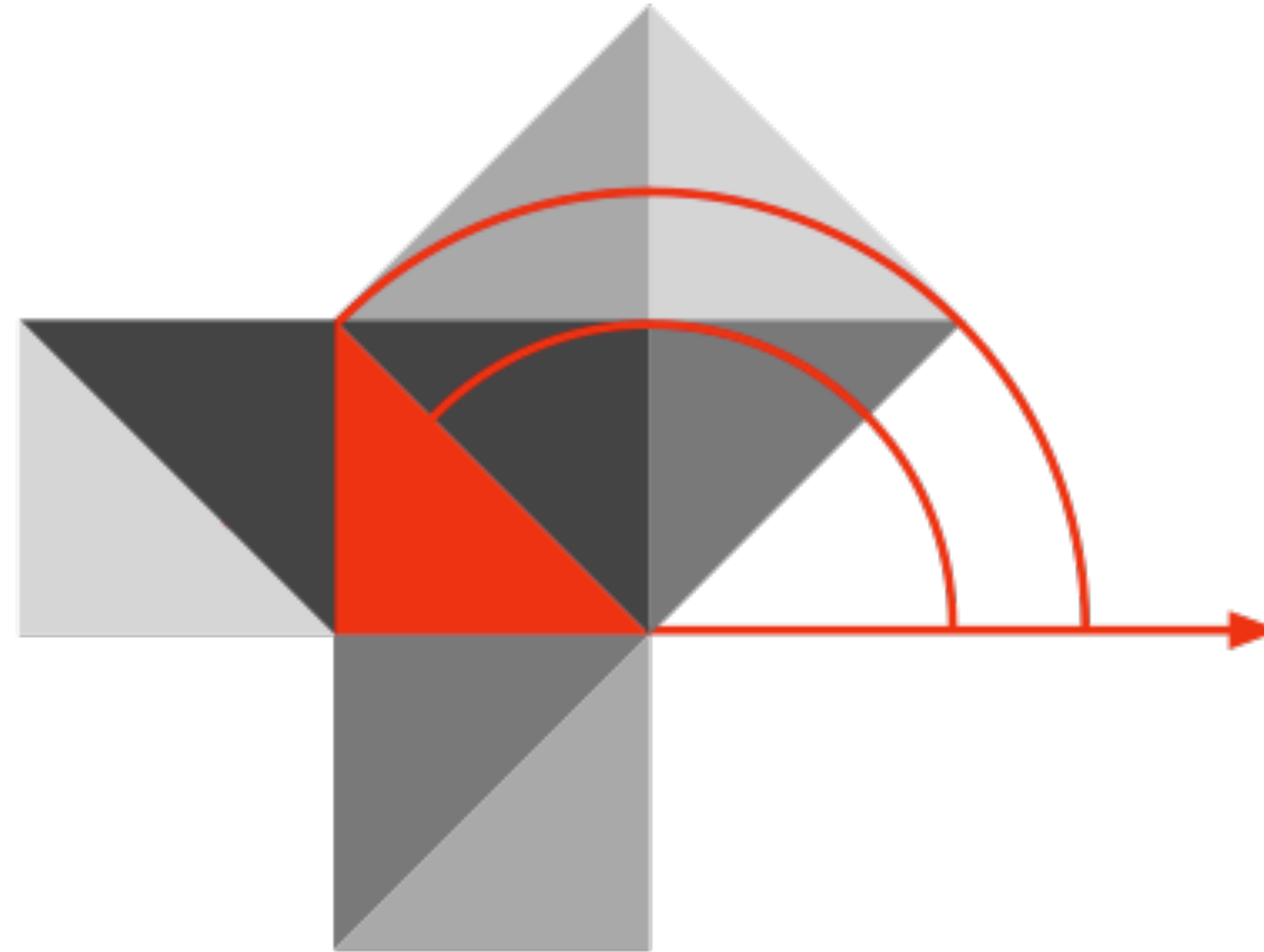
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| Solvable <i>understand and know how to solve</i> | Difficult <i>understand but solutions are elusive</i> | Wicked <i>complex to define, much less address</i> |
| Authentic Learning Opportunities Integrating Personalized Learning | Complex Thinking & Communication Increased Privacy Concerns | Competition from New Models of Ed Keeping Formal Education Relevant |

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Hippasus



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Email: rubenrp@hippasus.com

Twitter: @rubenrp

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