

Frameworks for Educational Technology: SAMR and the EdTech Quintet

Ruben R. Puentedura, Ph.D.

Transformation

Redefinition

*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*

Enhancement

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 do activities that help them add to their knowledge of vocabulary terms

Step 5

Students are asked to discuss the terms with one another

Step 6

Students are involved in games that allow them to play with the terms

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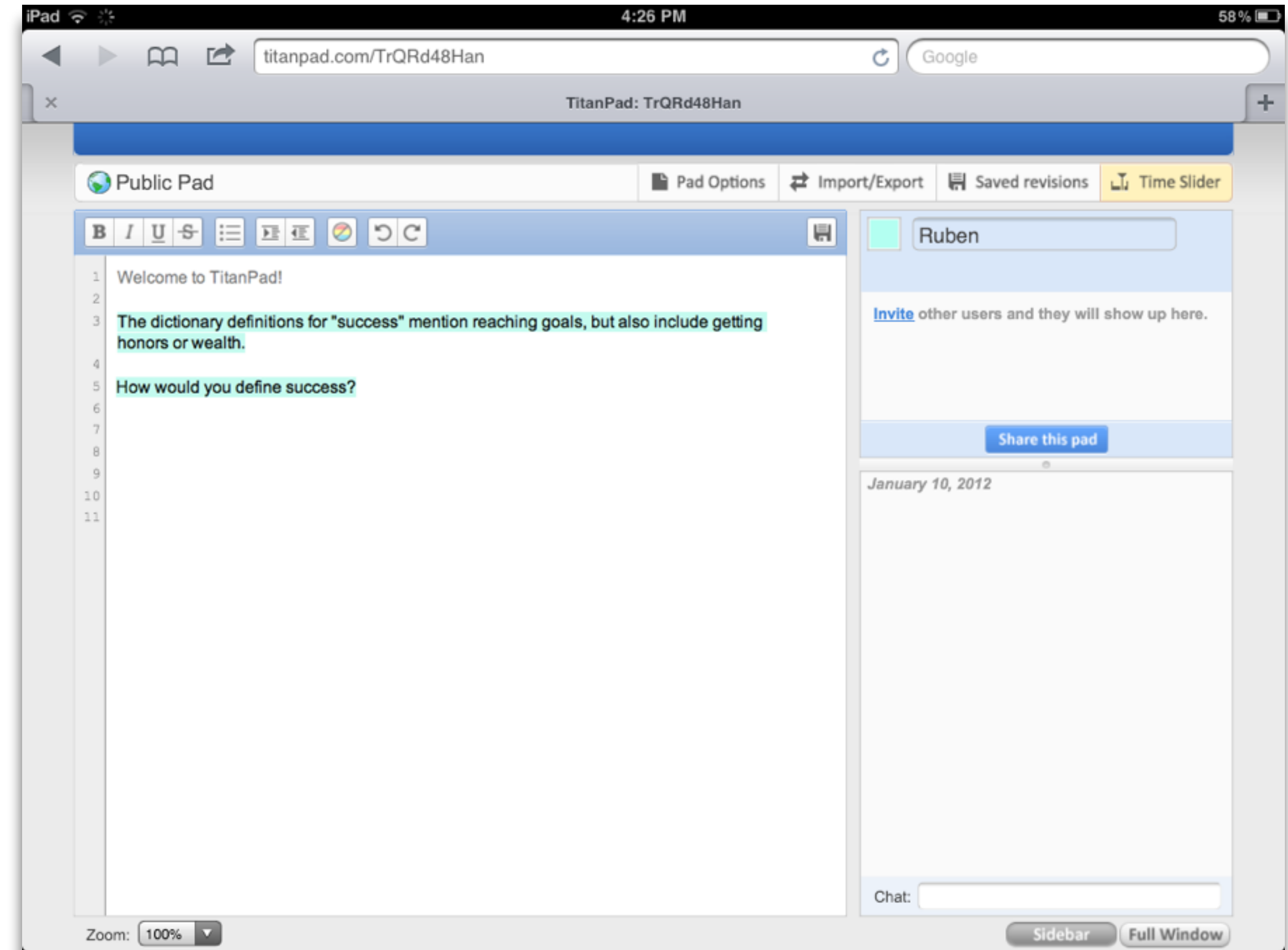
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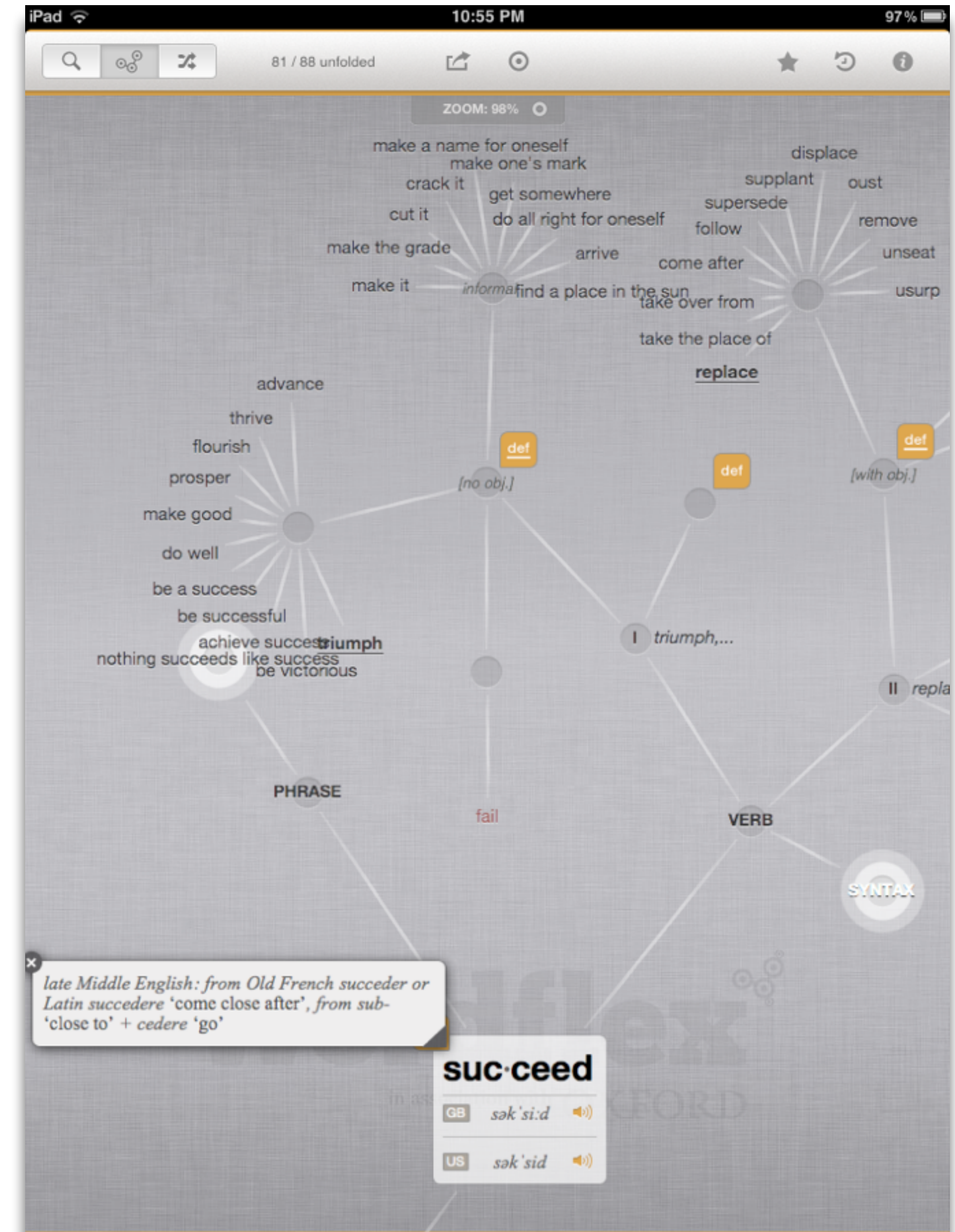
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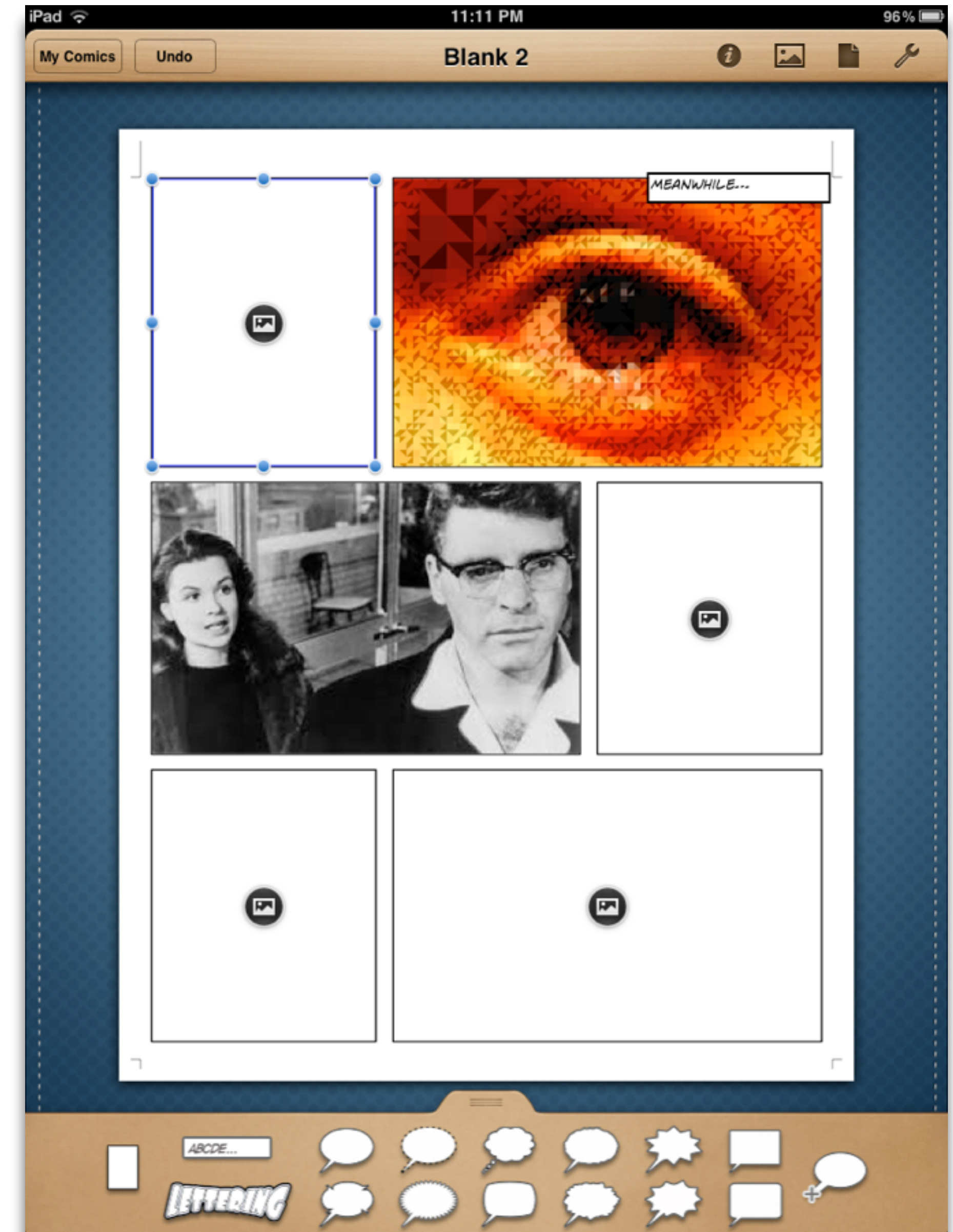
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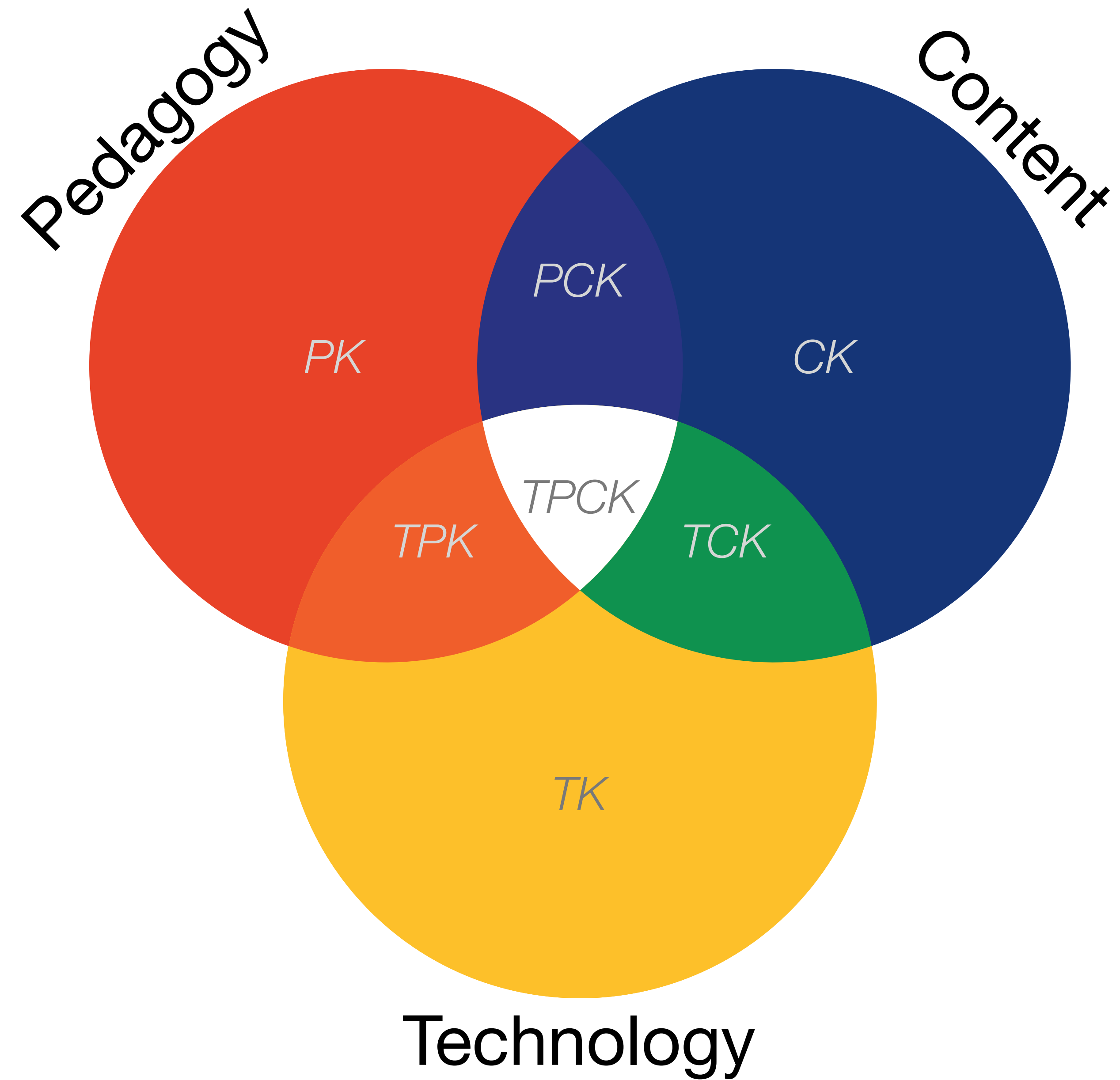
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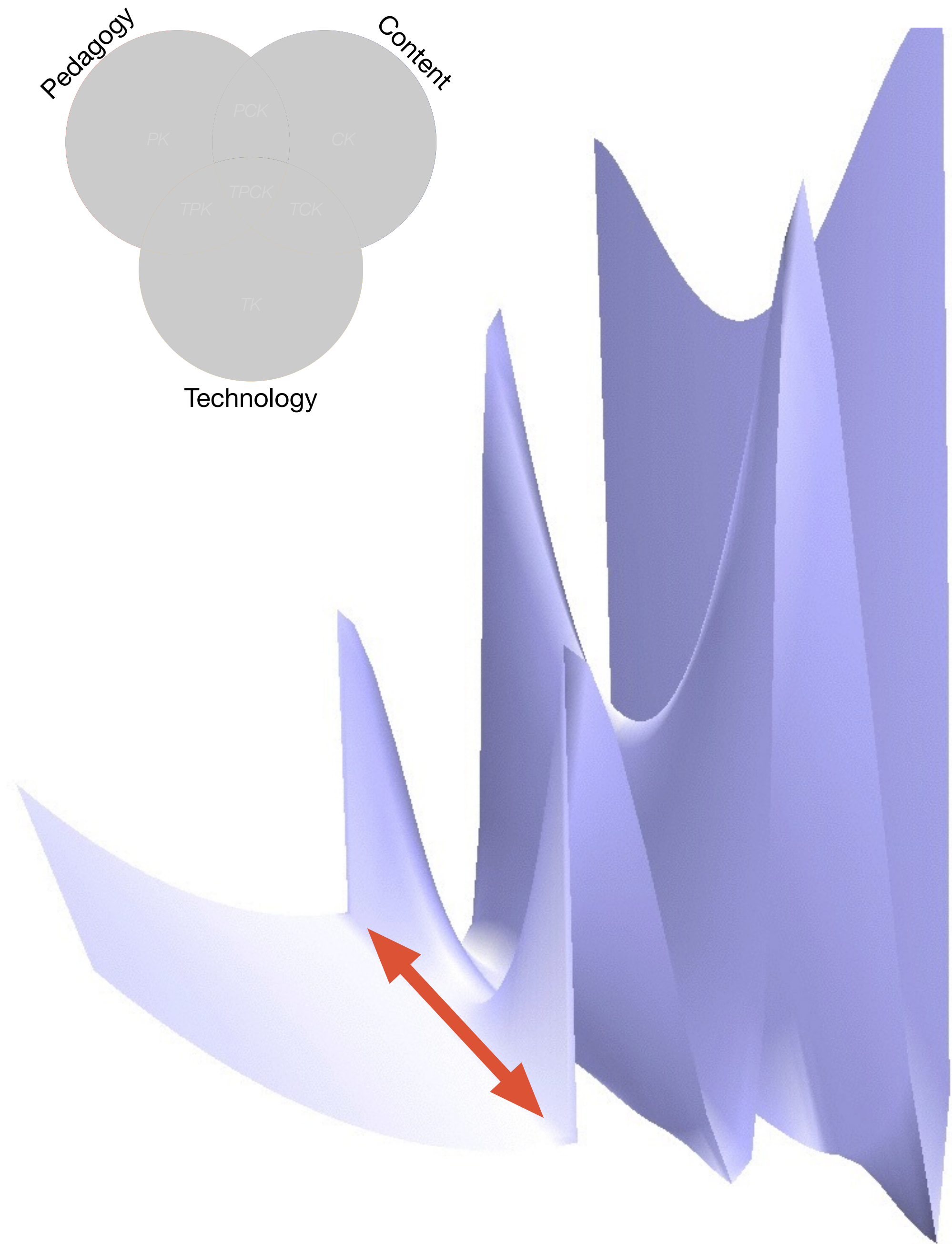


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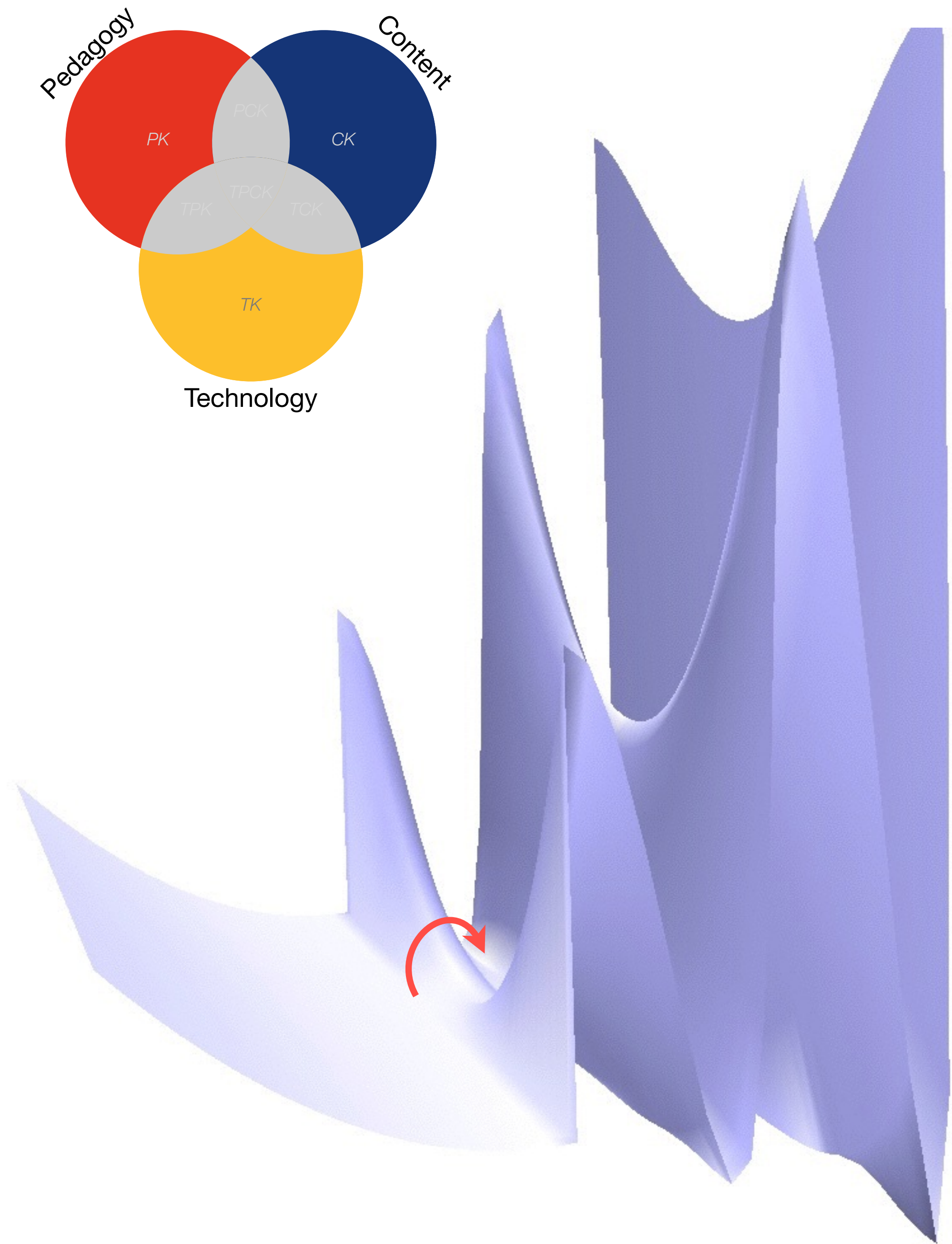


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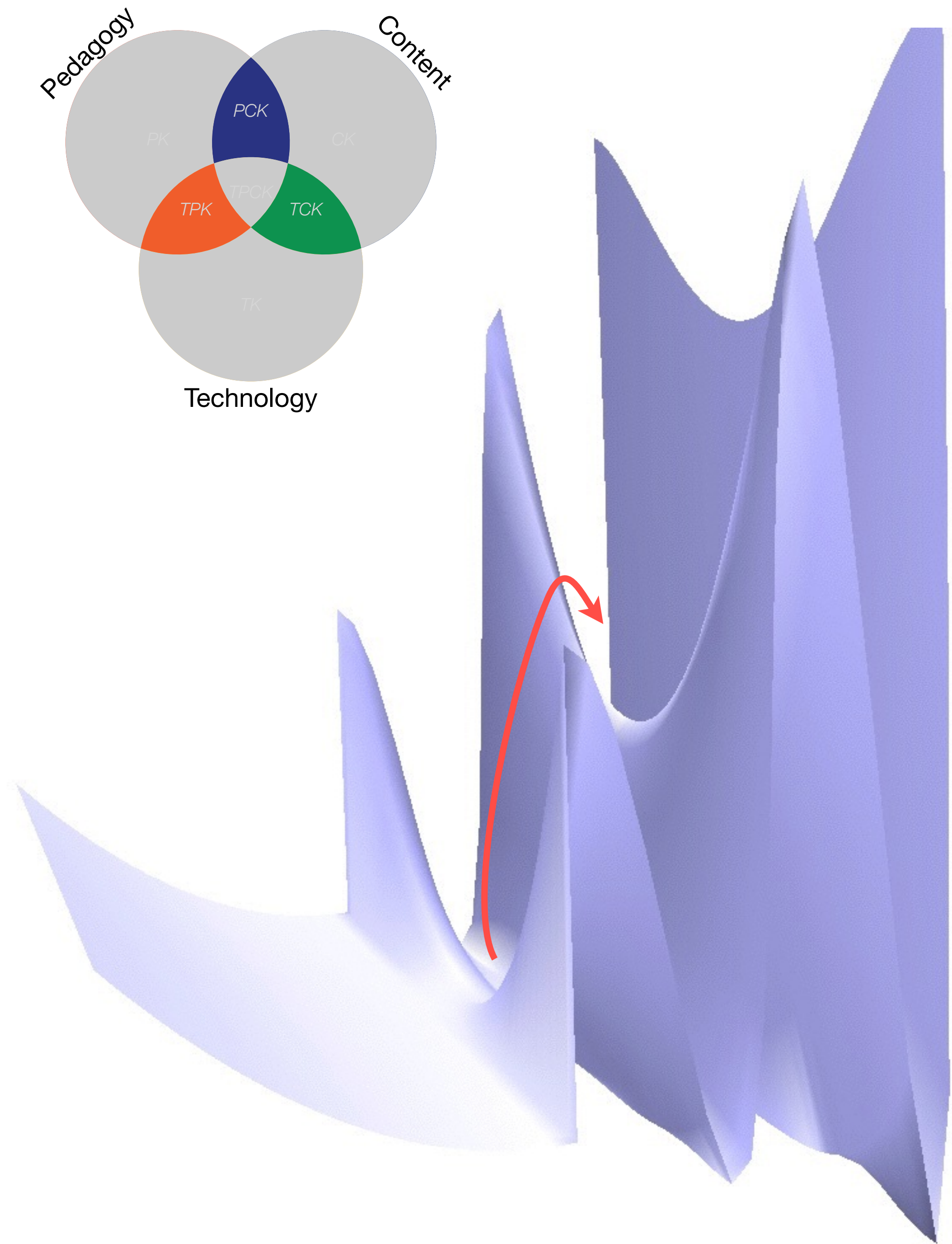


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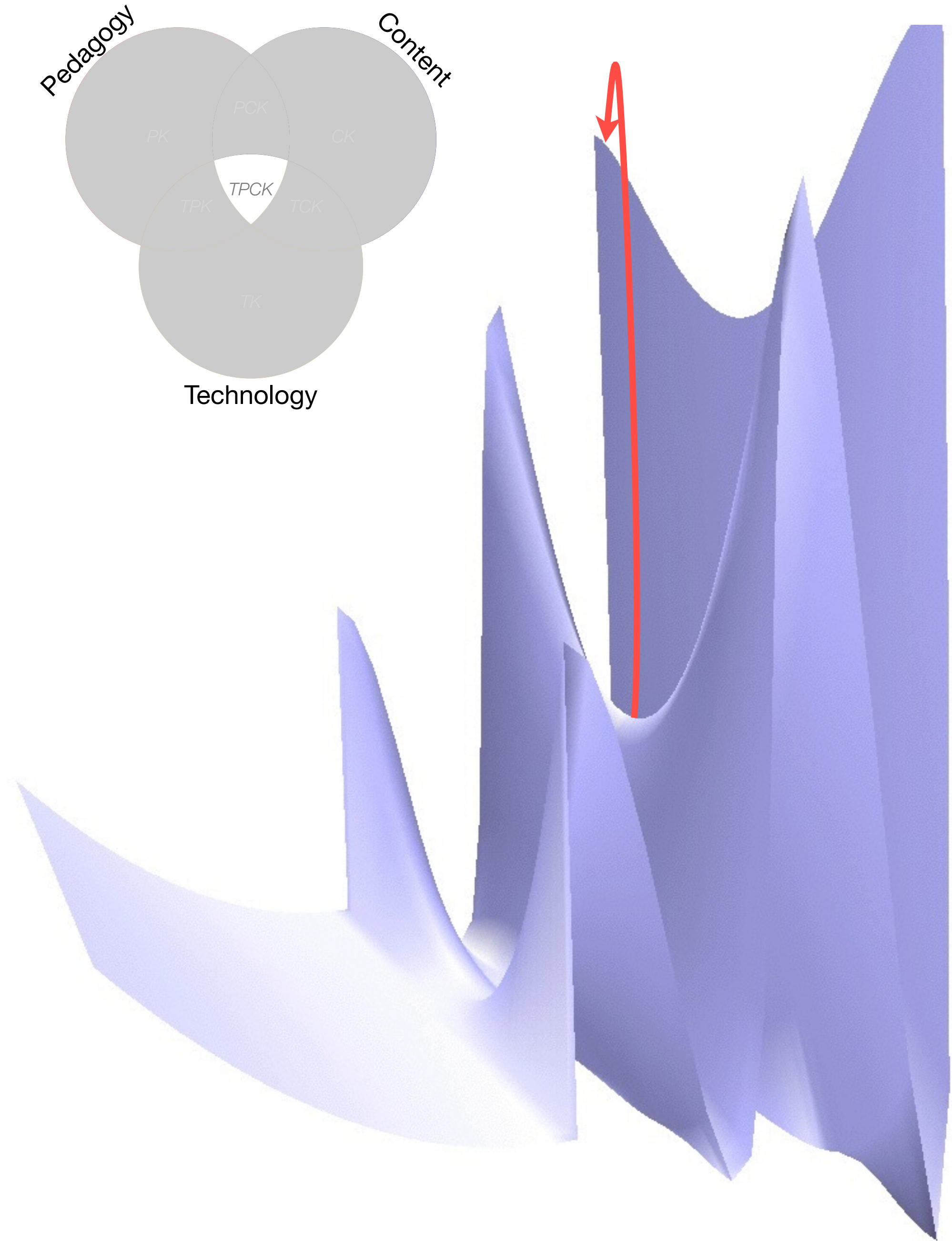


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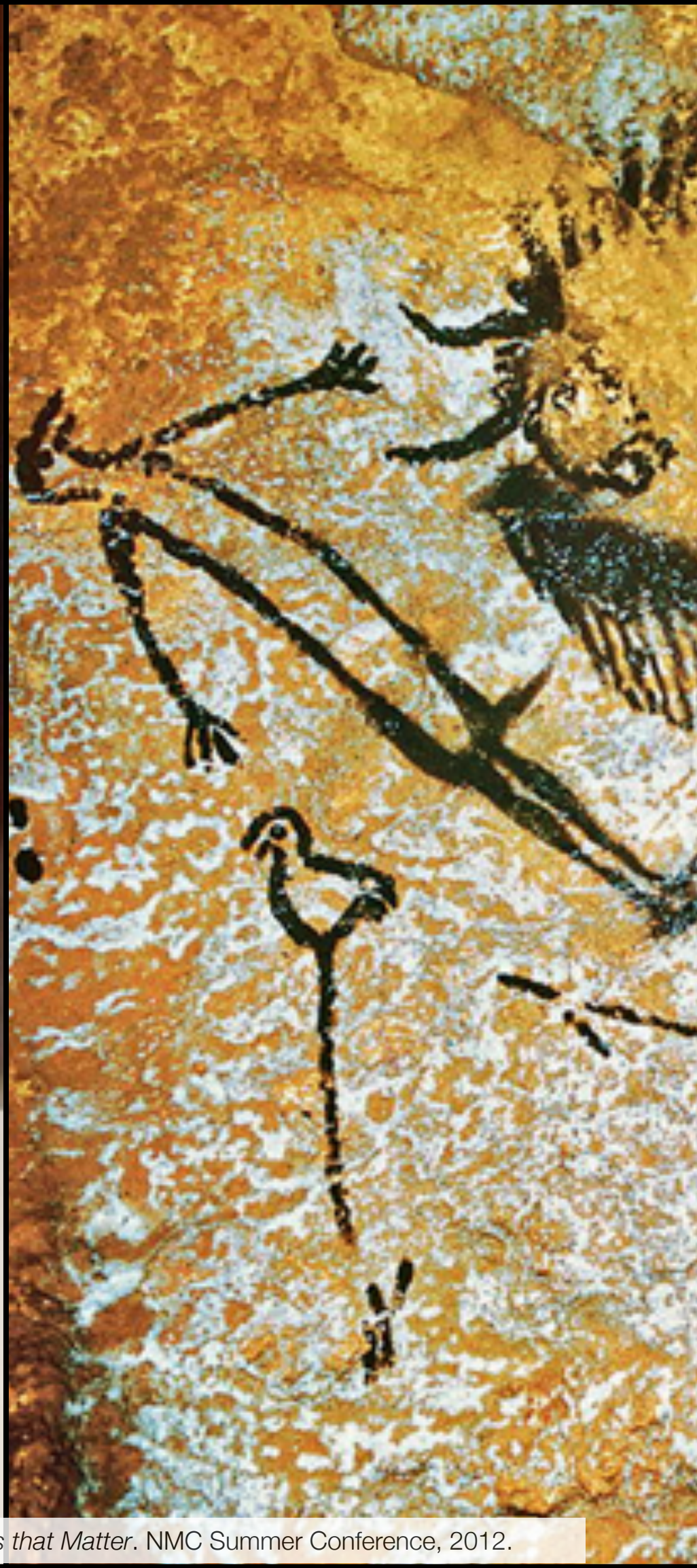

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Study	SAMR Level	Description	Effect Size
Ligas (2002)	S	CAI system used to support direct instruction approach for at-risk students.	0.029
Xin & Reith (2001)	A	Multimedia resources provided to contextualize learning of word meanings and concepts.	0.264
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
<p>Algebra I</p> <p><i>Effectiveness of Cognitive Tutor Algebra I at Scale</i>, by John F. Pane, Beth Ann Griffin, Daniel F. McCaffrey, Rita Karam</p>	S to A	<p>S: Computerized algebra drills, some tied to real-world scenarios</p> <p>A: Tools for basic visualization; adaptive response to student progress</p>	<p>≈ 0.2</p> <p>50th perc. → 58th perc.</p>
<p>Earth Science</p> <p><i>Using Laptops to Facilitate Middle School Science Learning: The Results of Hard Fun</i>, by Alexis M. Berry, Sarah E. Wintle</p>	A to M	<p>A: Interactive tools for concept exploration and visualization</p> <p>M: Narrated animation as final project</p>	<p>≈ 0.6</p> <p>50th perc. → 73rd perc. (≈ 1.4 a month later) (50th perc. → 92nd perc.)</p>

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

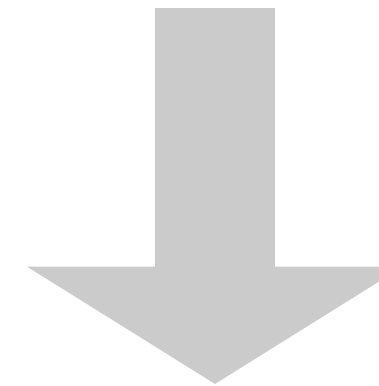


File Sharing

Social	Mobility	Visualization	Storytelling	Gaming
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Class

Homework



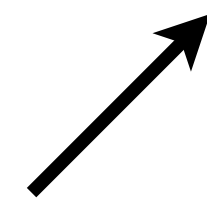
School

World

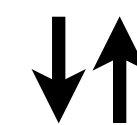
Home



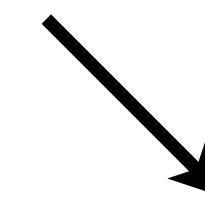
Learning Environments







Contextual Search
Augmented Reality



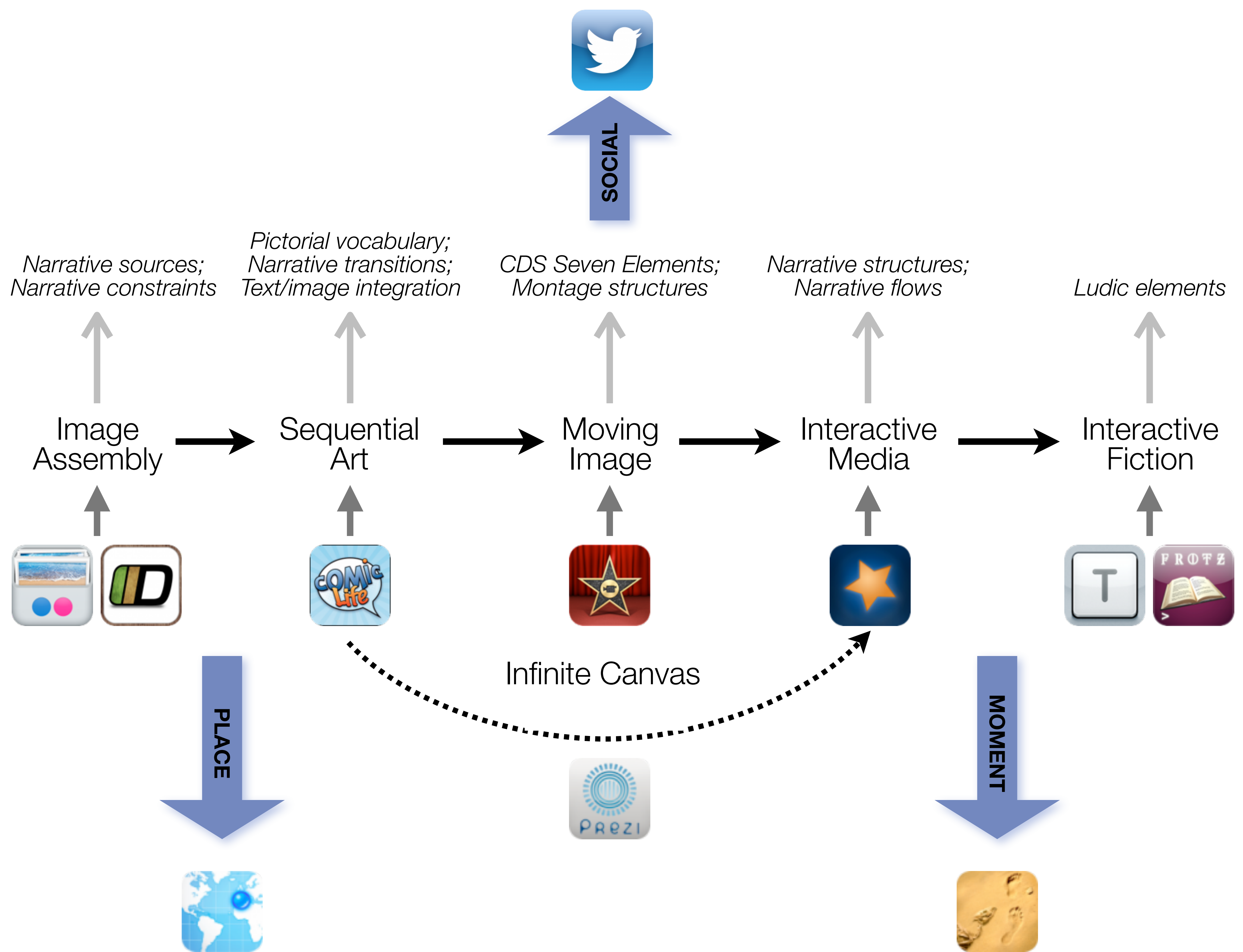
Cloud Resources
Mobile Tools



Sensors
Recorders

Social	Mobility	Visualization	Storytelling	Gaming
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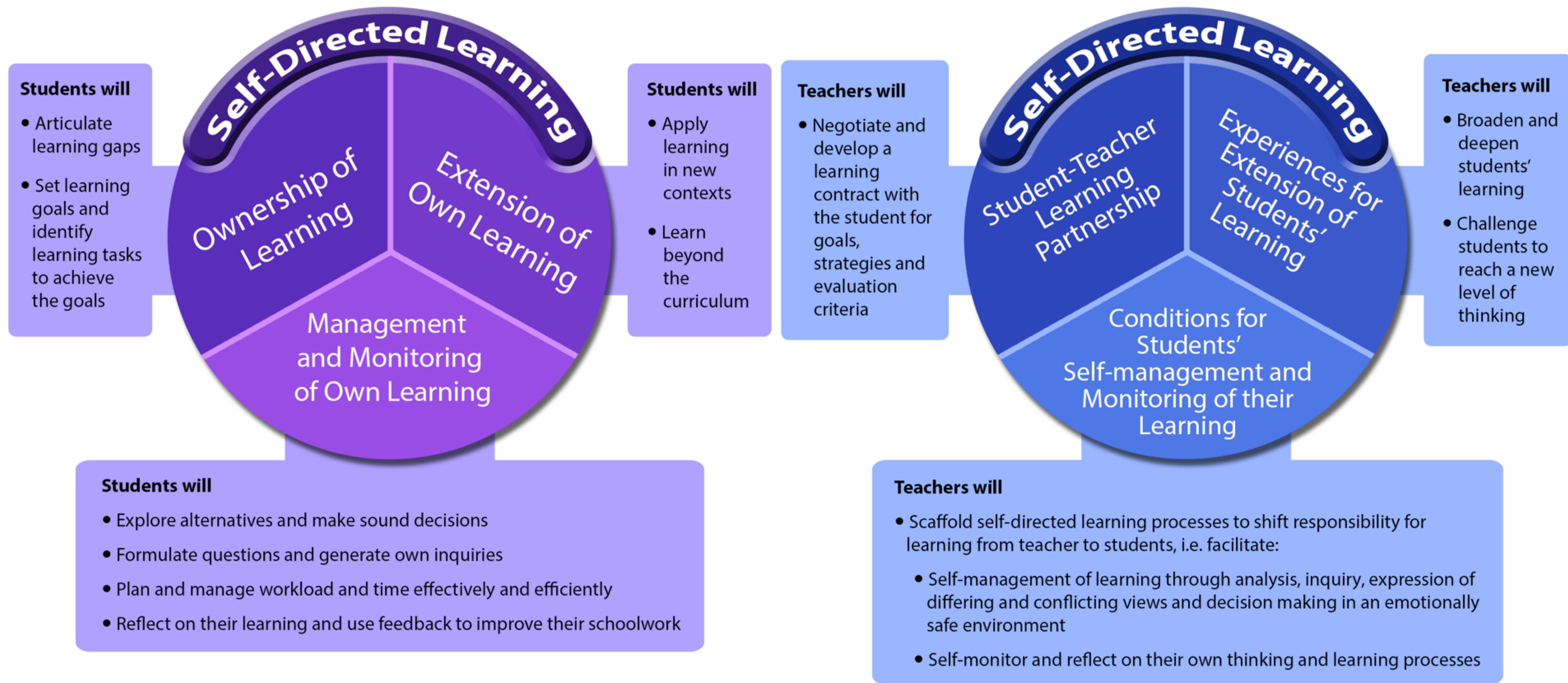


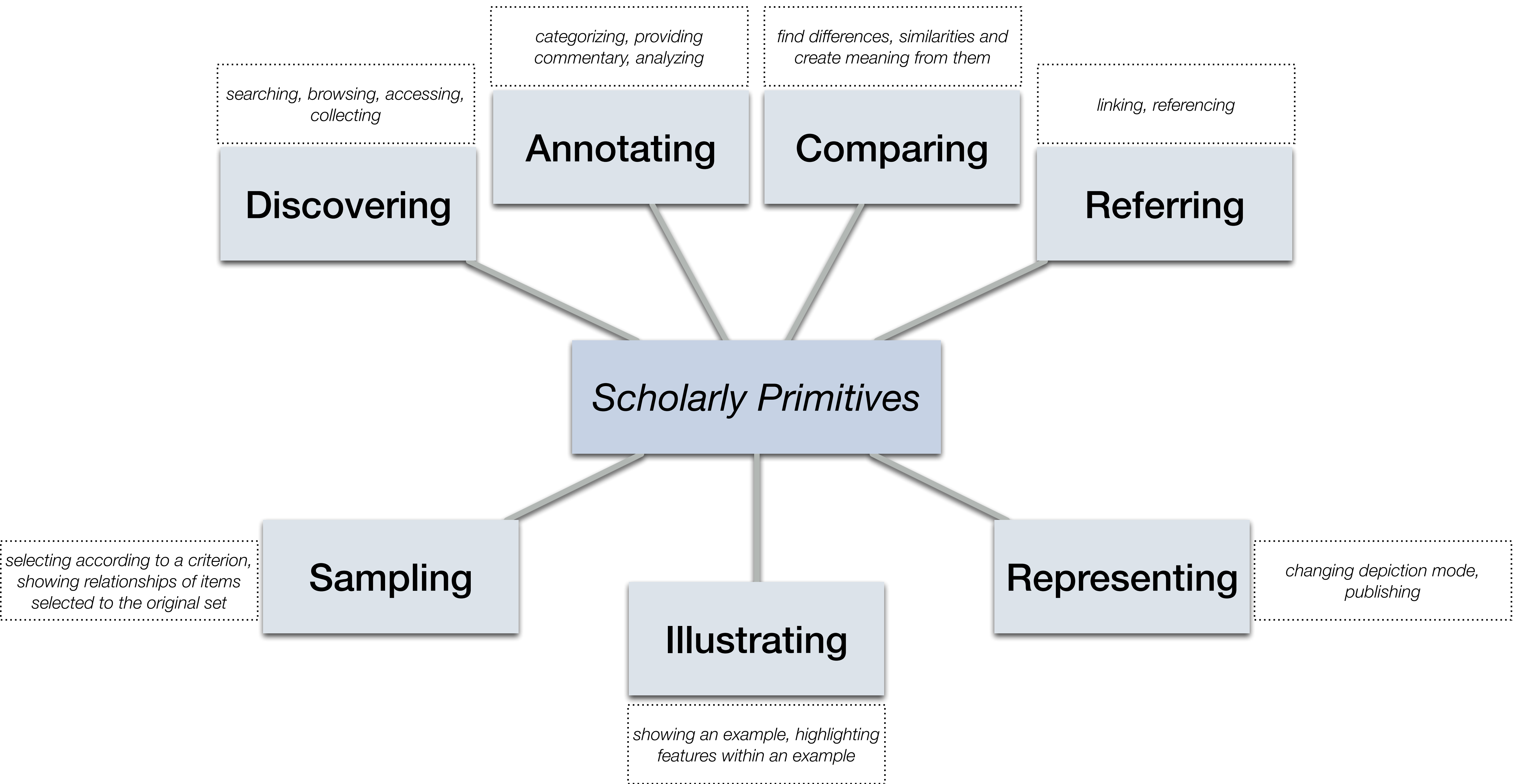
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Formal Definition of **Game** (Salen & Zimmerman)

“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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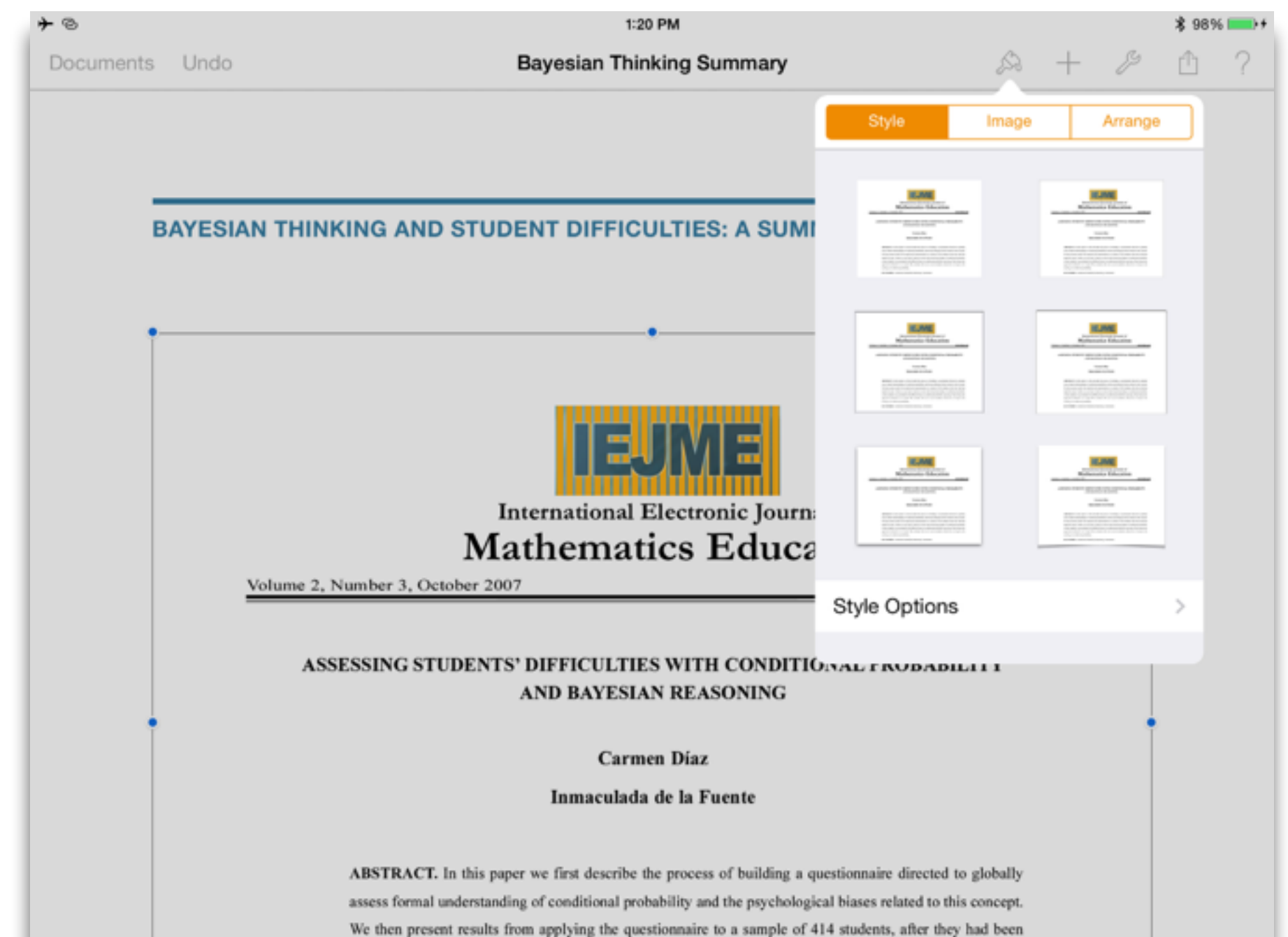
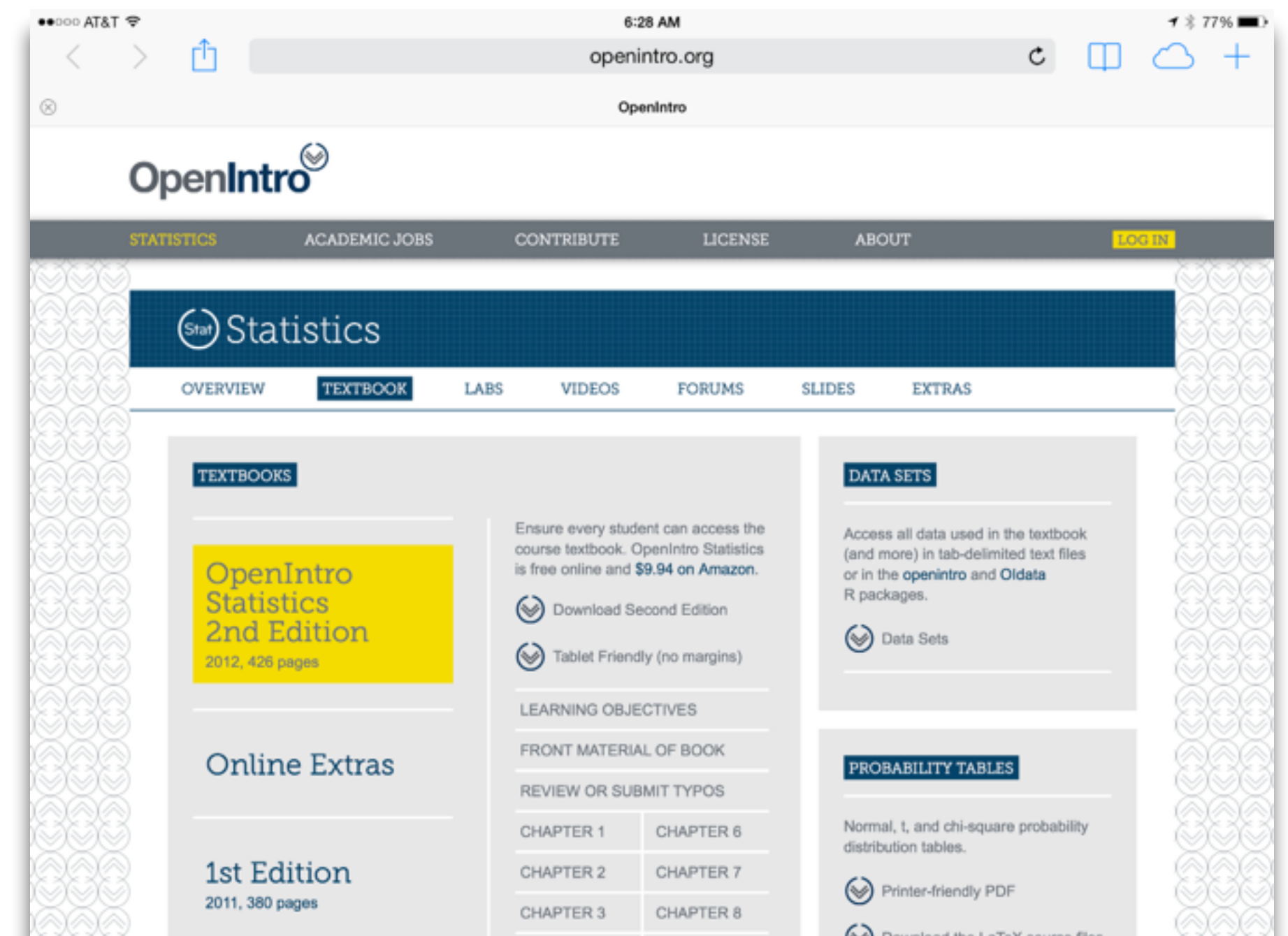
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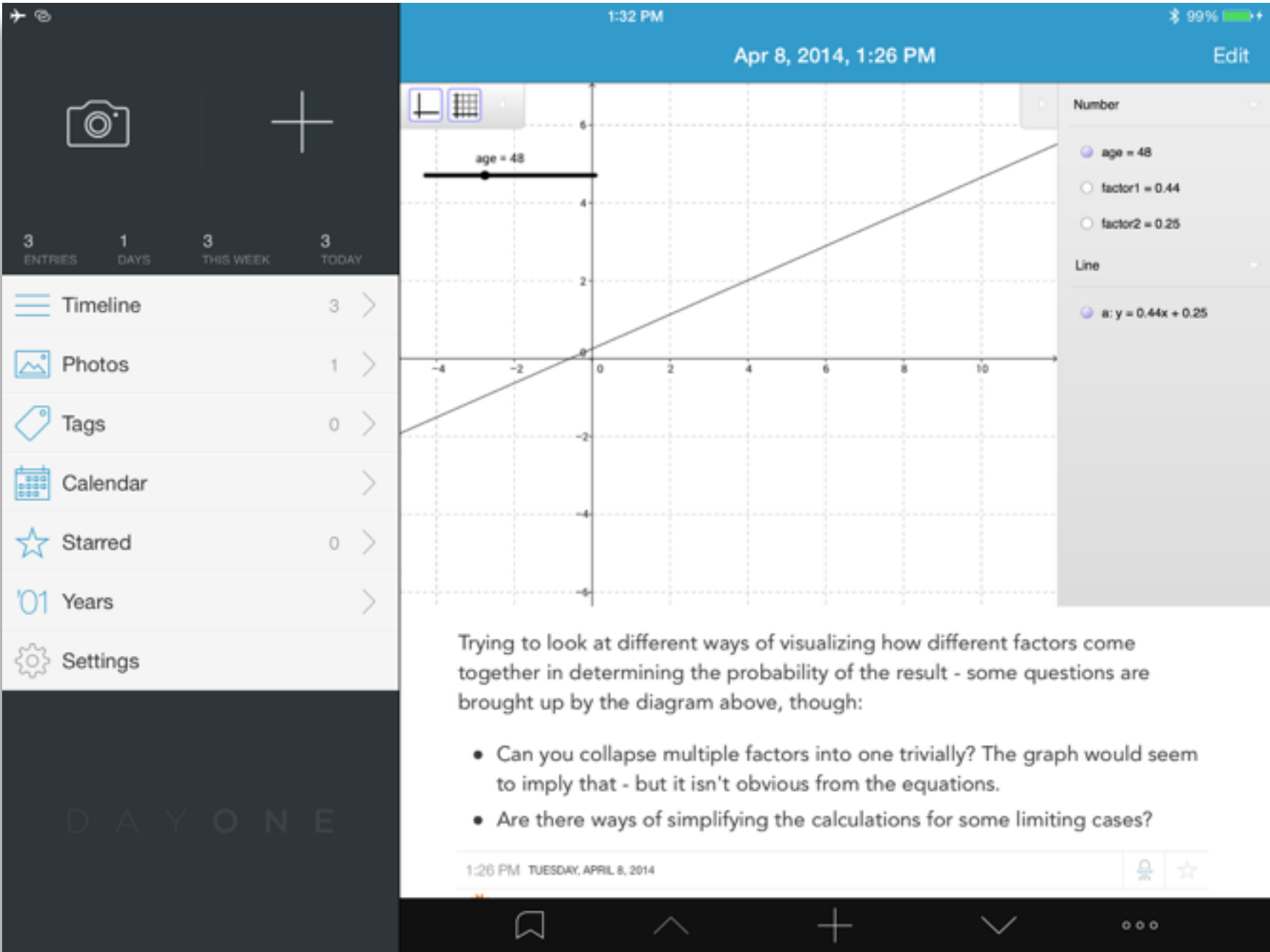
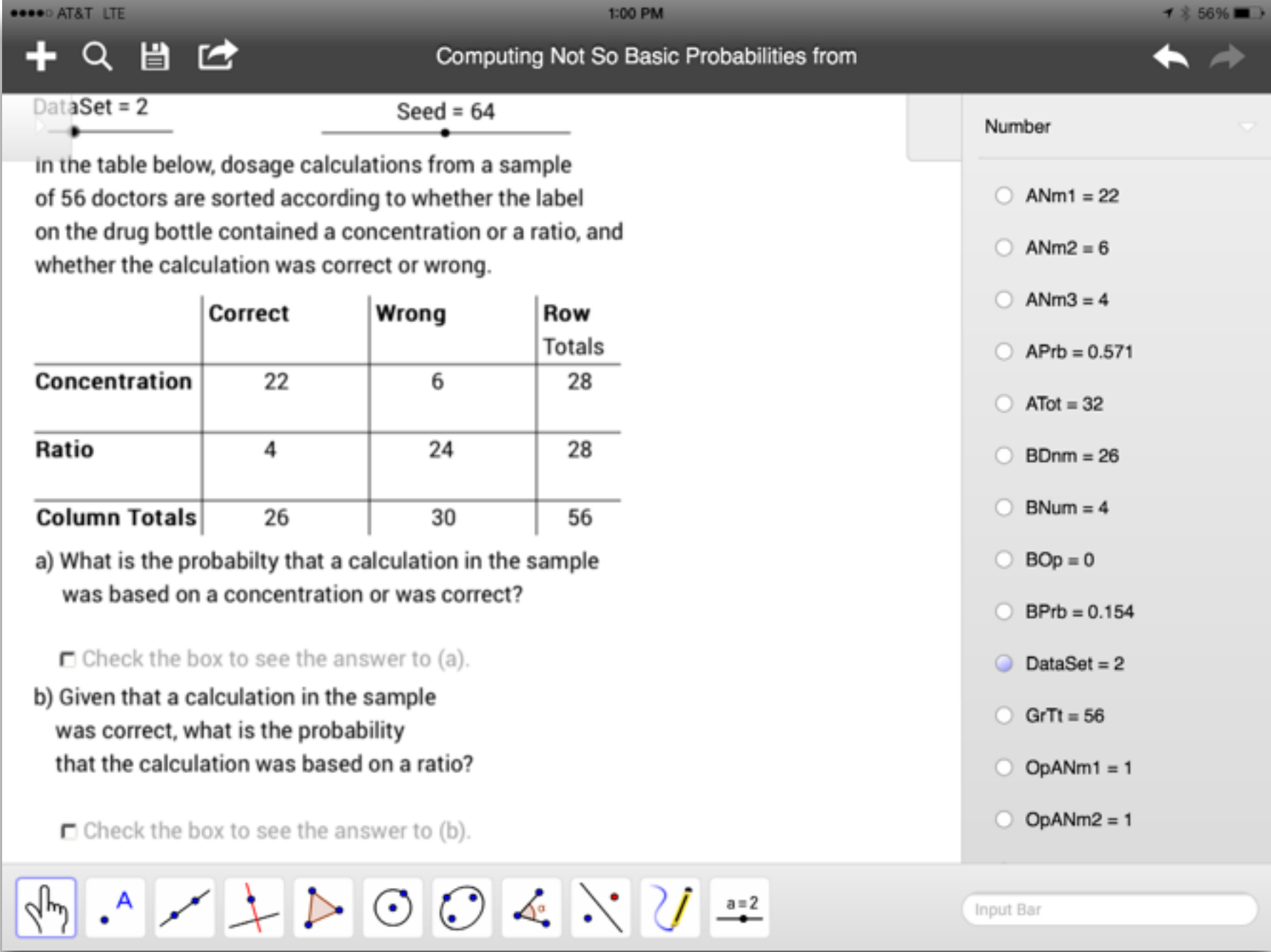
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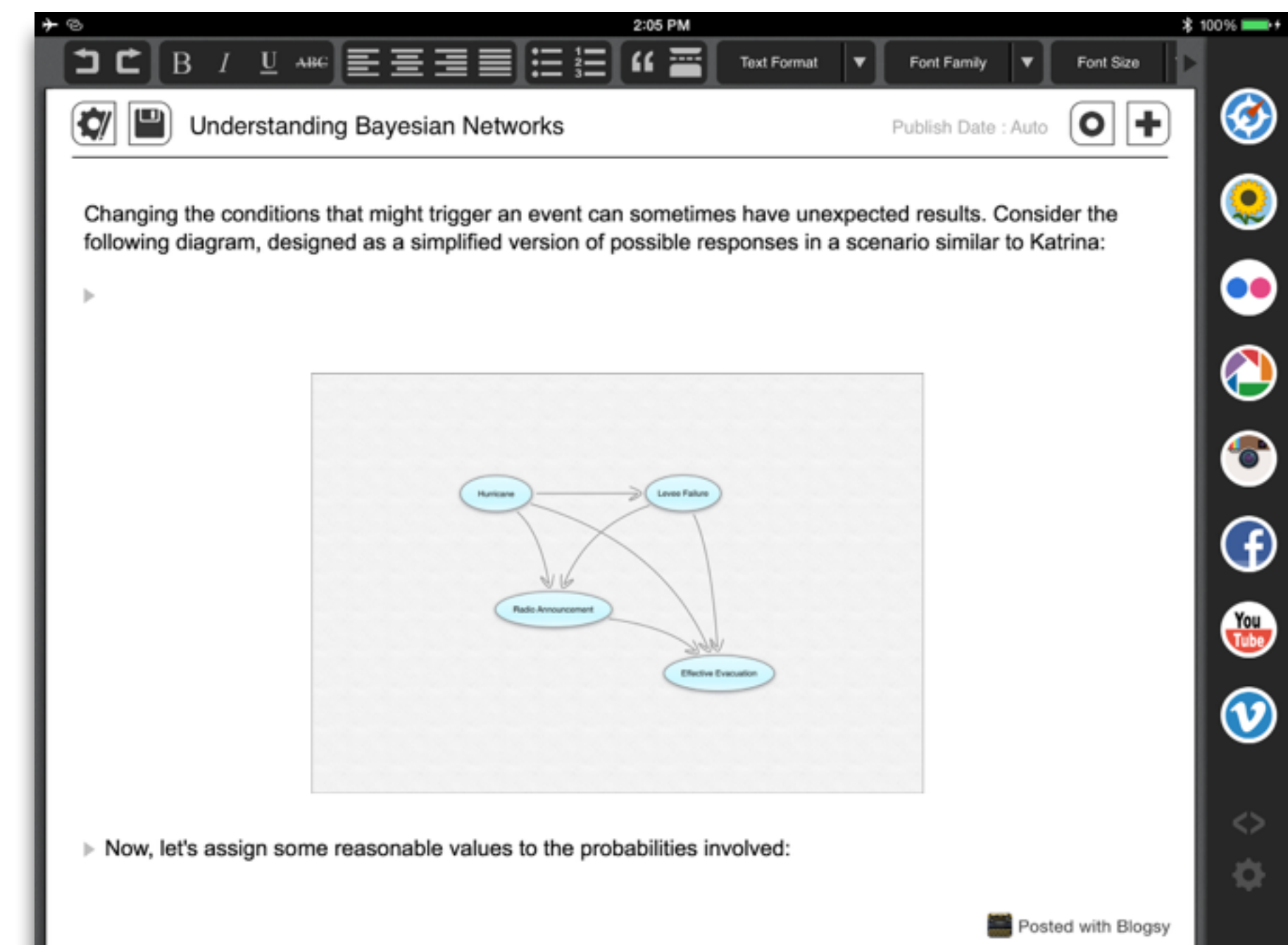
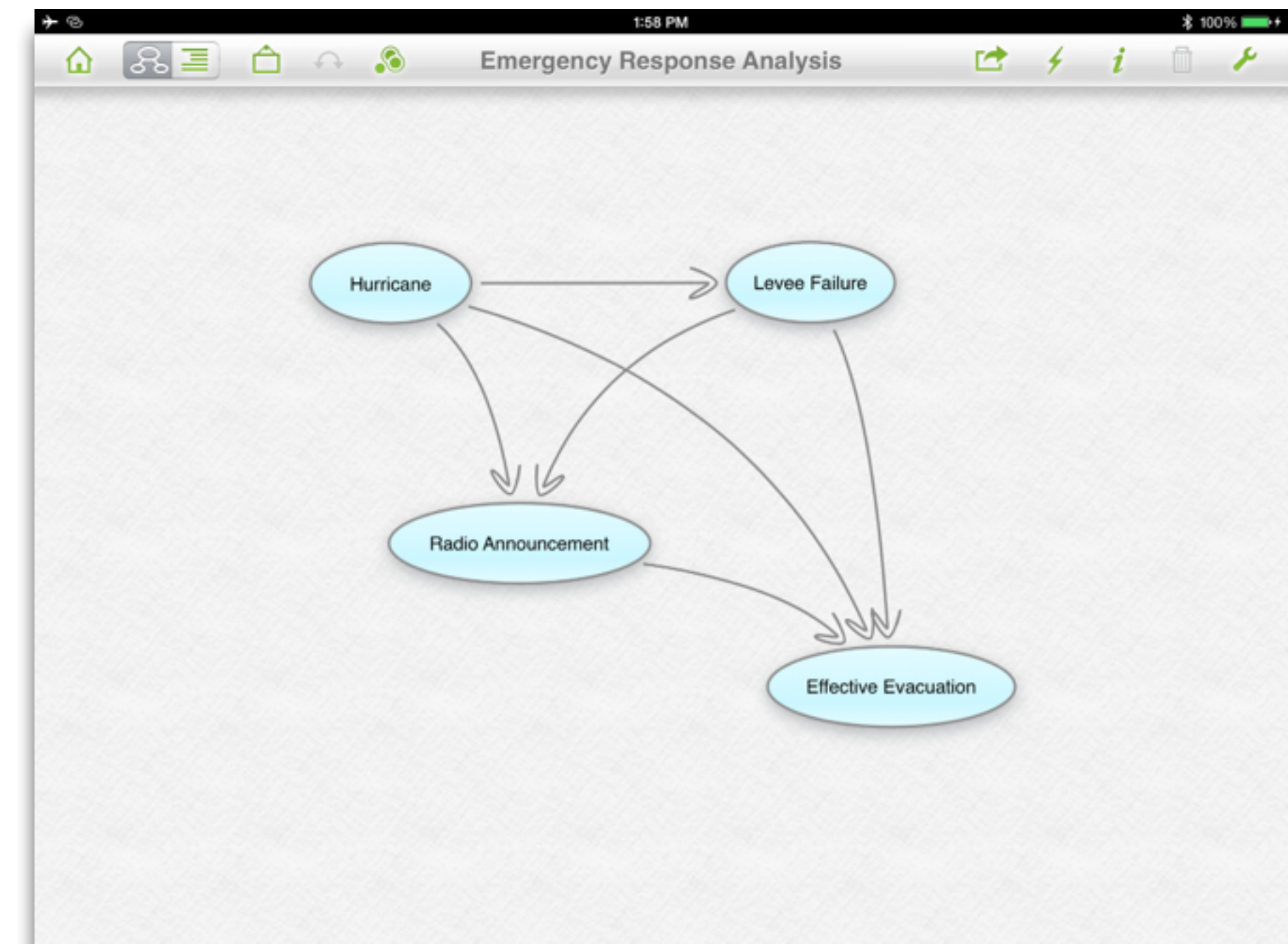
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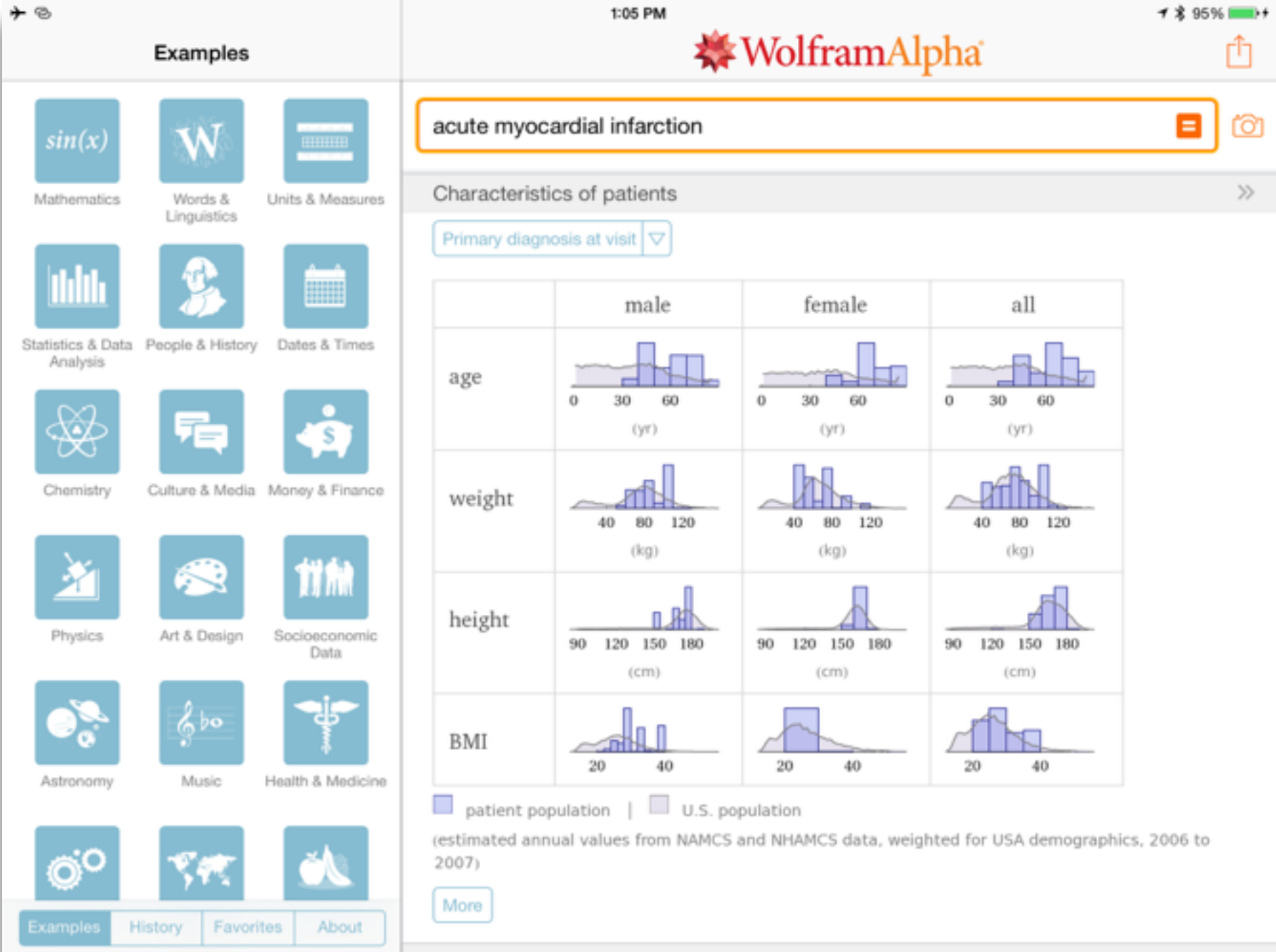
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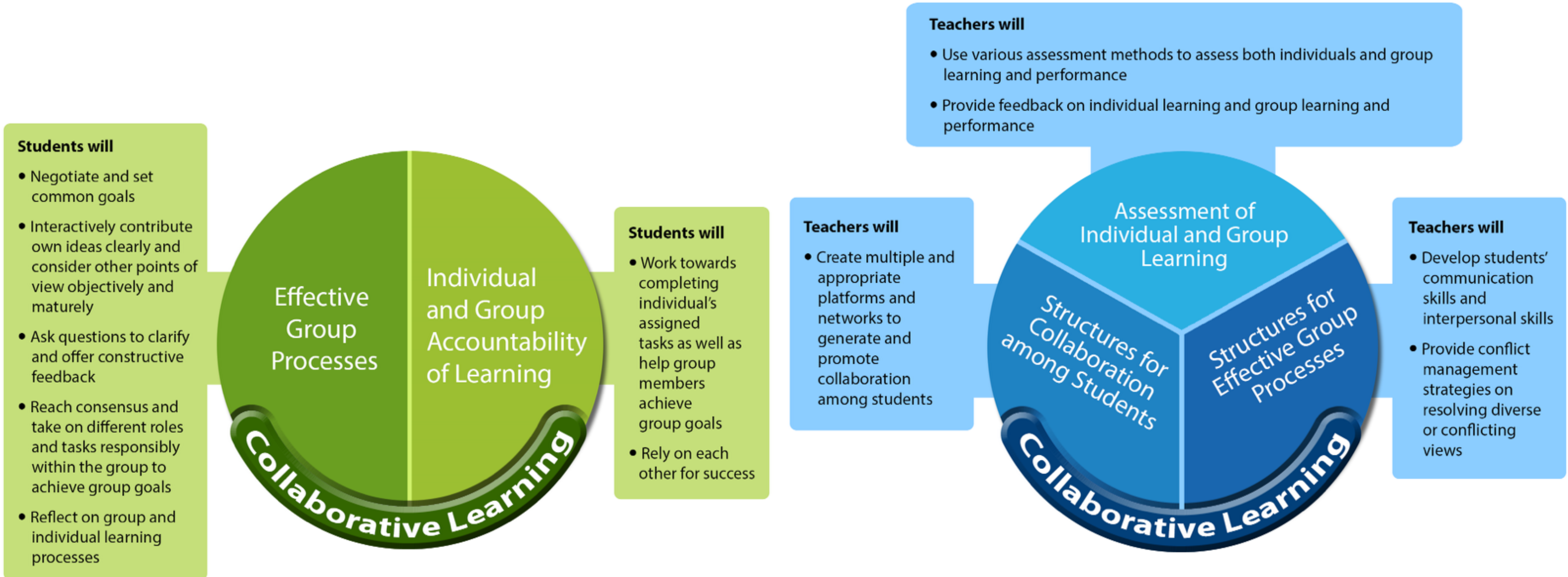
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The screenshot shows a presentation slide titled "Stent Policy Analysis". The slide contains a table of independent predictors for 30-day major adverse cardiac or cerebrovascular event and 3-year survival. The table lists predictors such as >1 vessel treated, urgent procedure, female sex, chronic obstructive pulmonary disease, hypertension, NYHA functional class III or IV, prior myocardial infarction, age >65 yr, chronic renal insufficiency, valvulopathy, family history of coronary artery disease, hyperlipidemia, congenital heart disease, and peripheral vascular disease. The table also includes hazard ratios, 95% confidence intervals, and p-values for each predictor.

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

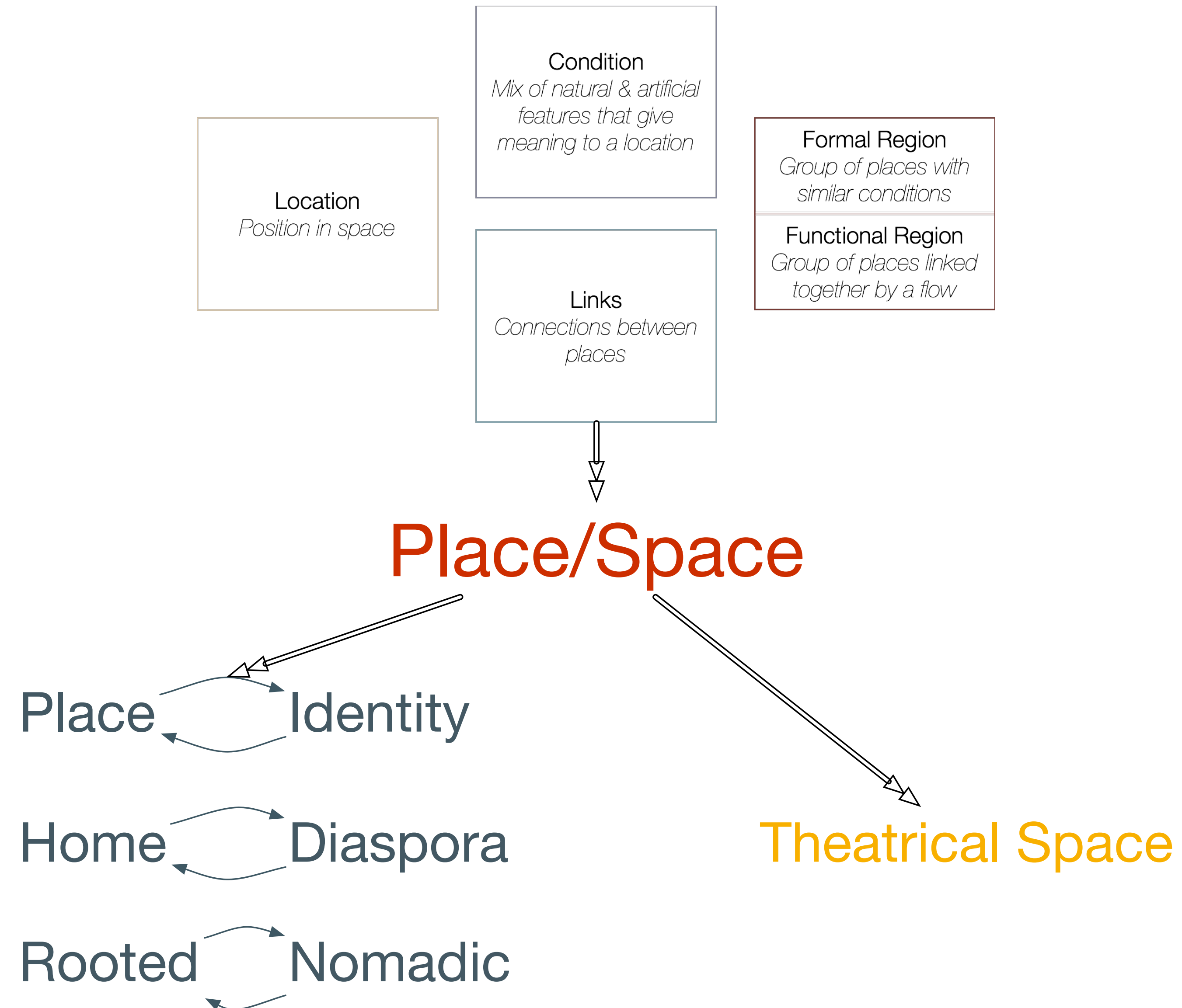
*Connections between
places*

Formal Region

*Group of places with
similar conditions*

Functional Region

*Group of places linked
together by a flow*

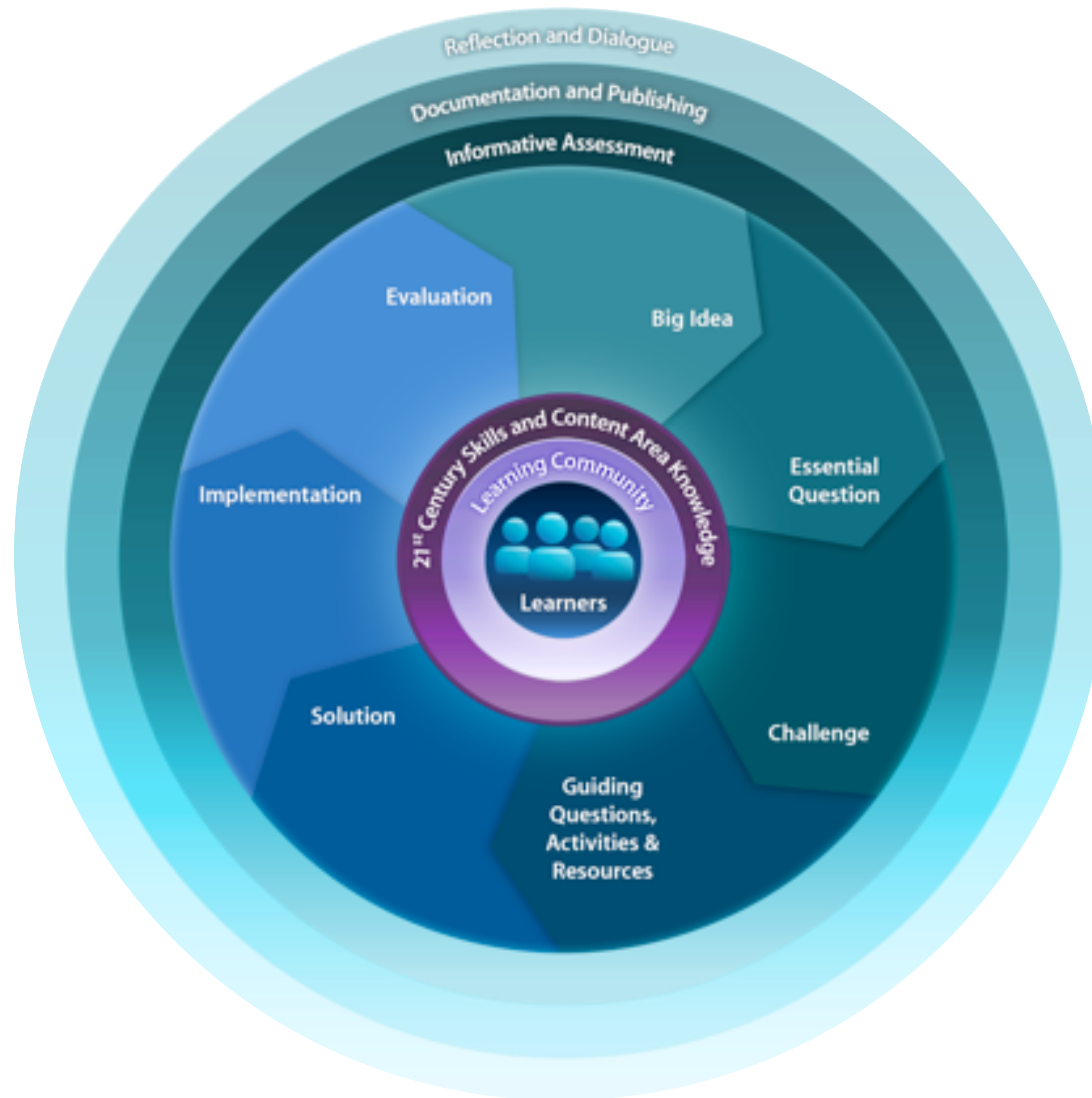




Shigeru Ban - Log House, Kobe – Photo by Forgemind ArchiMedia



Shigeru Ban - The Nomadic Museum – Photo by weird tramp



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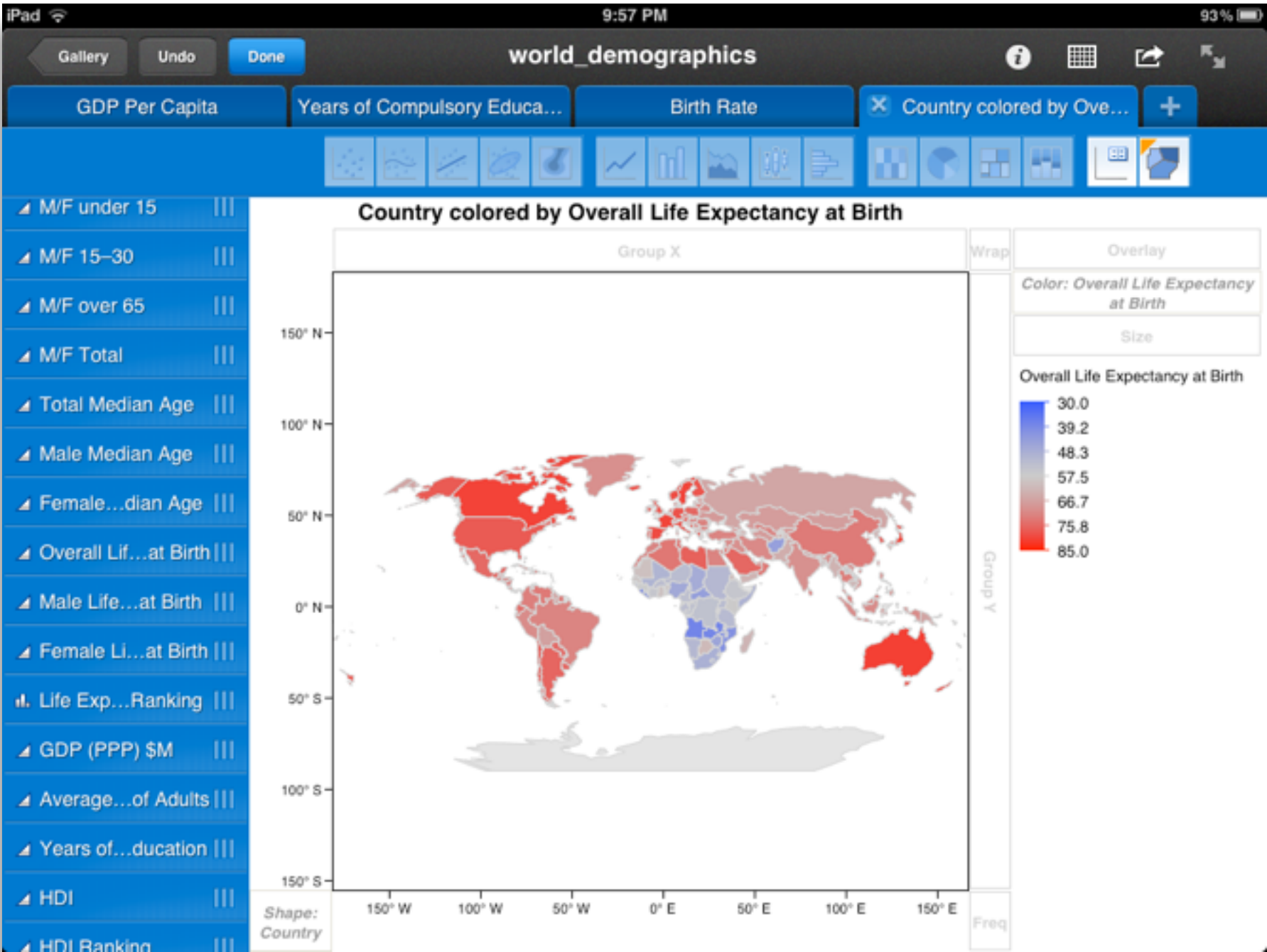
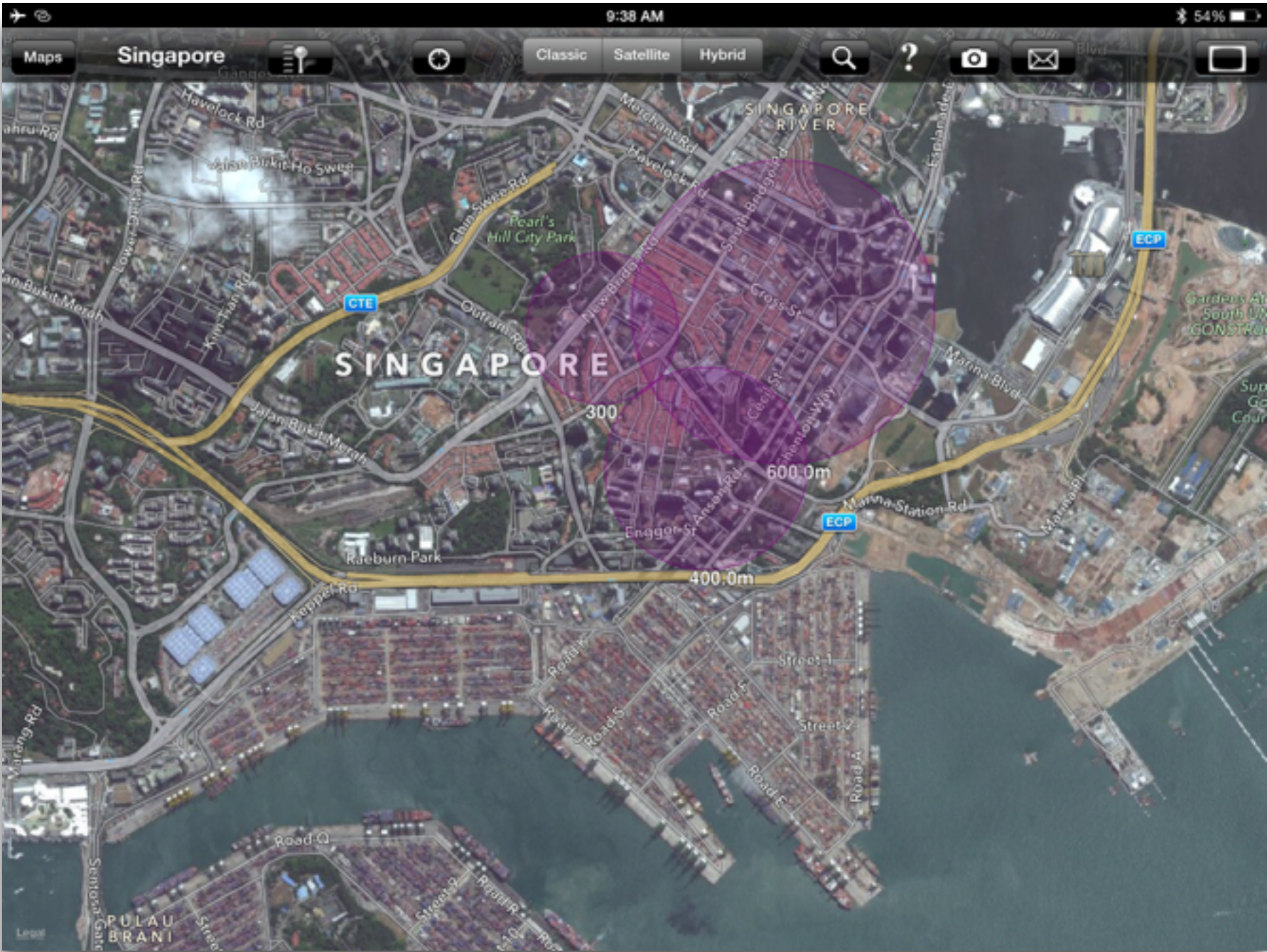
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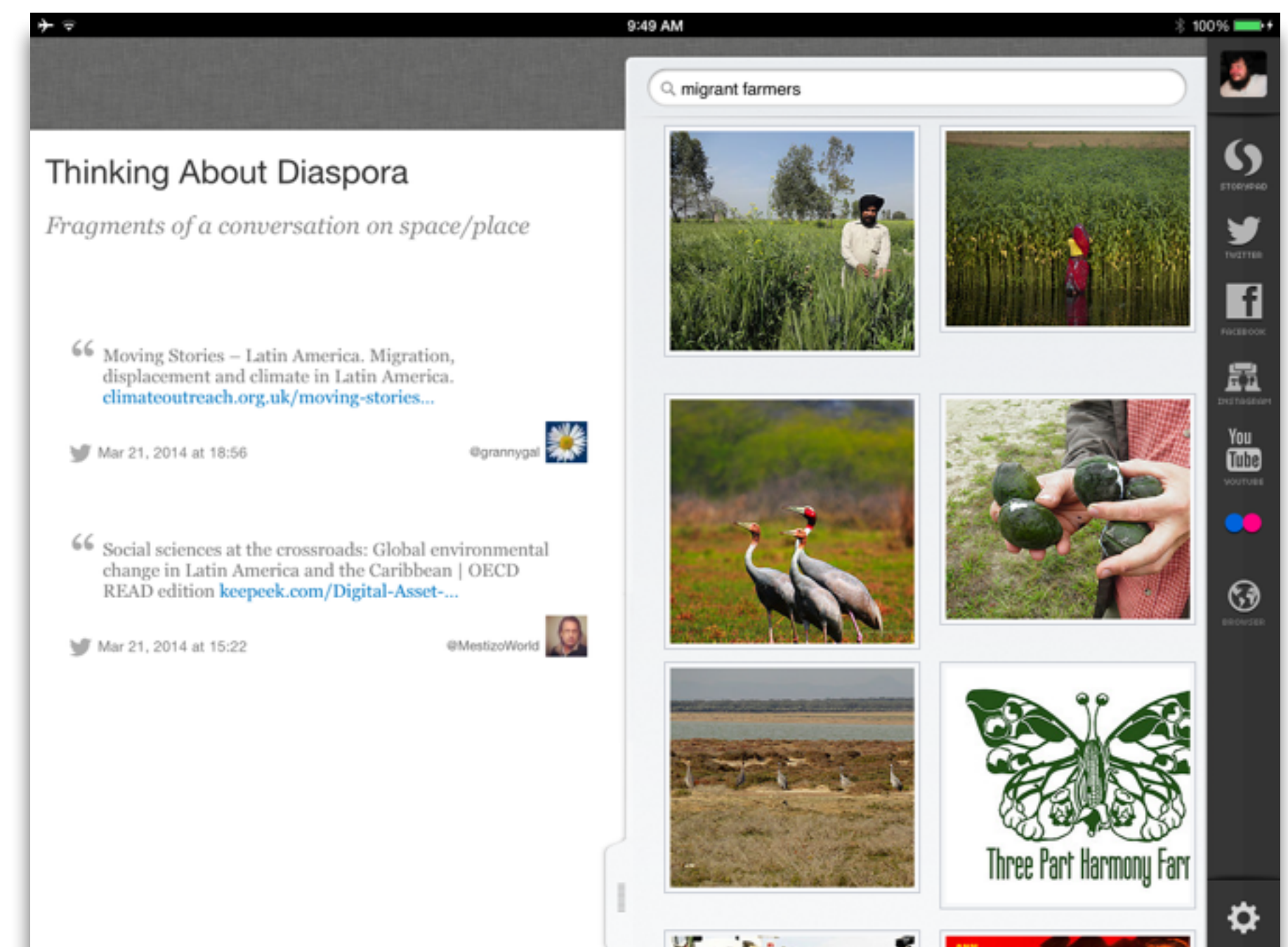
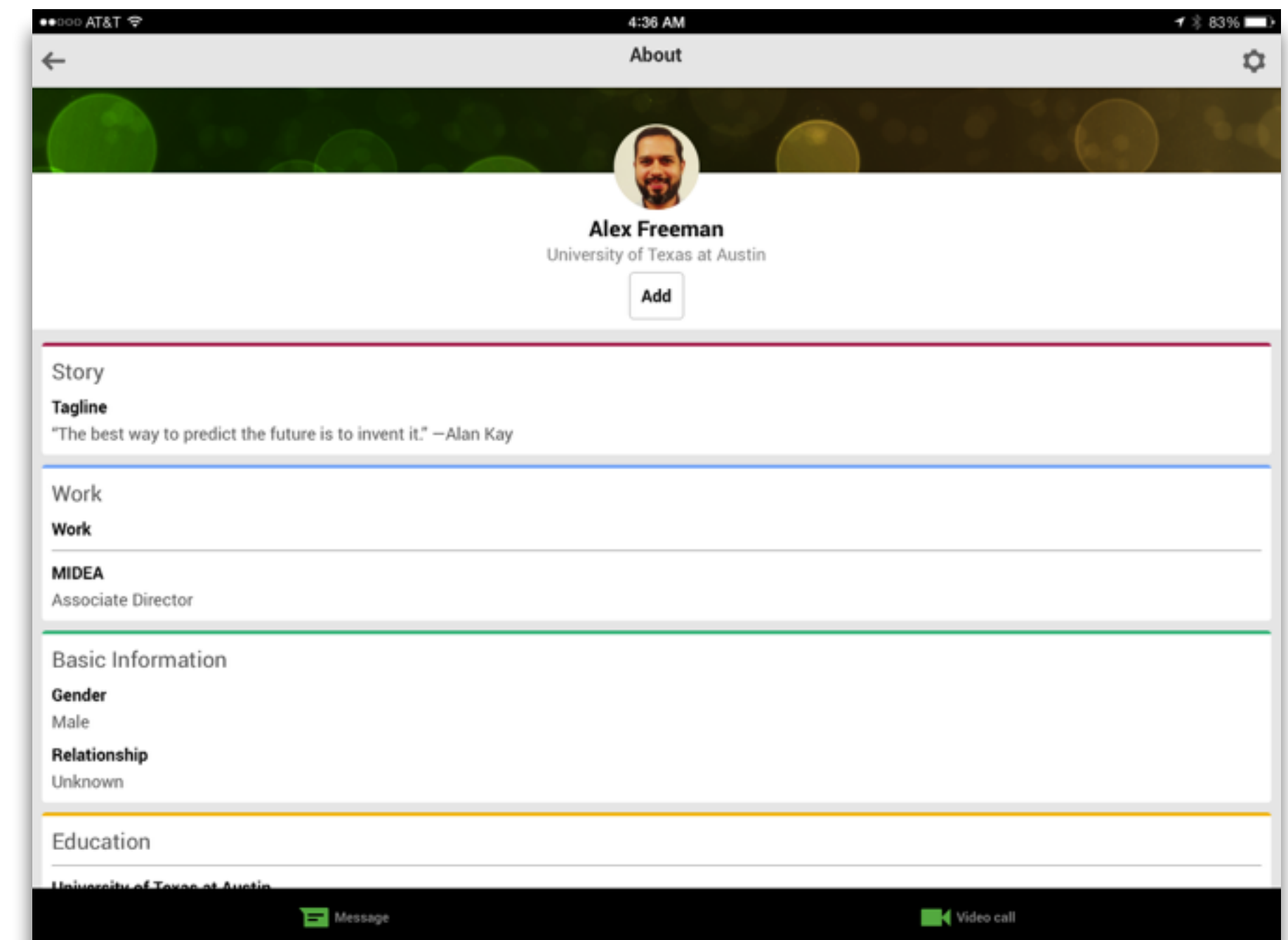
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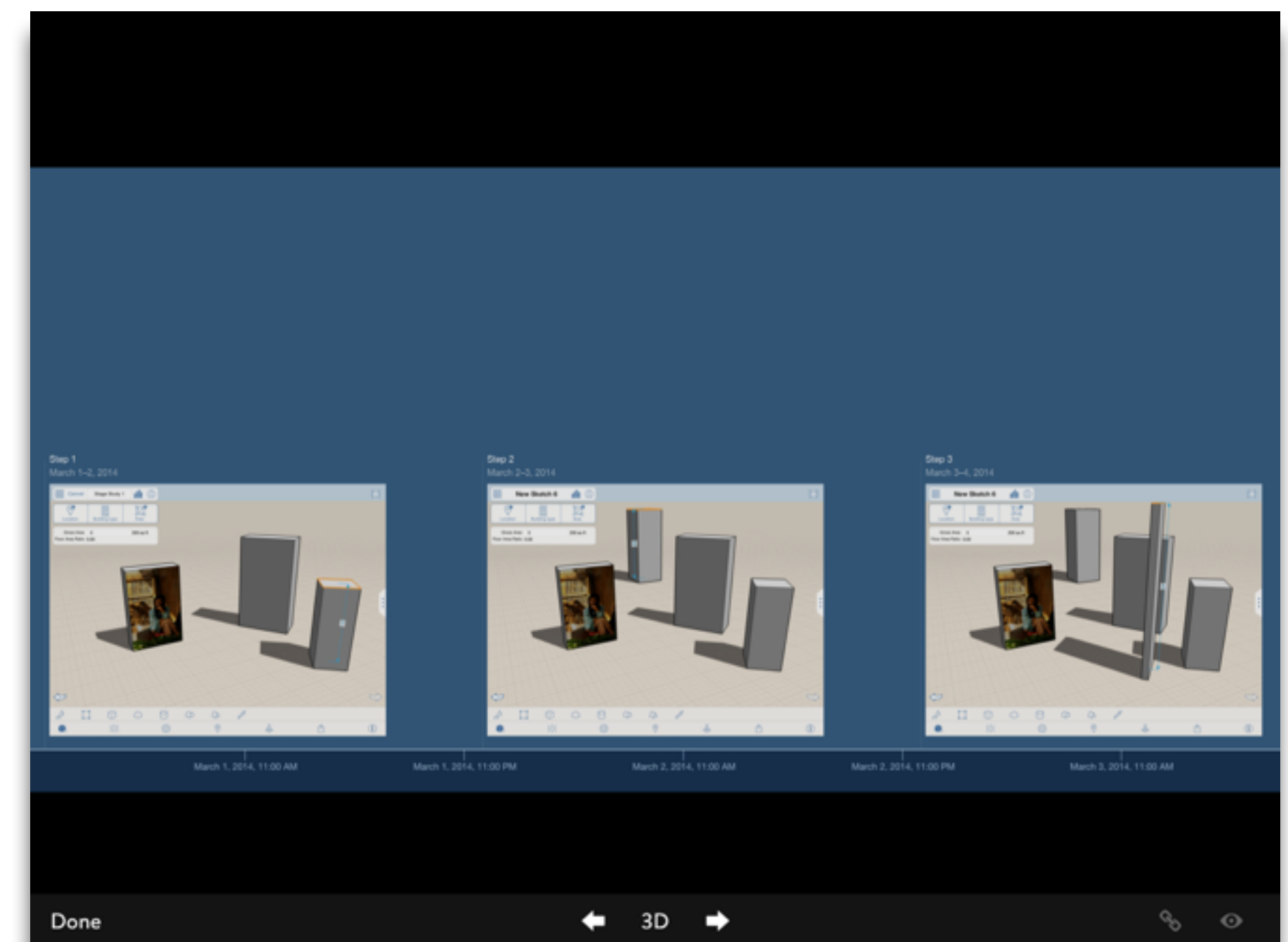
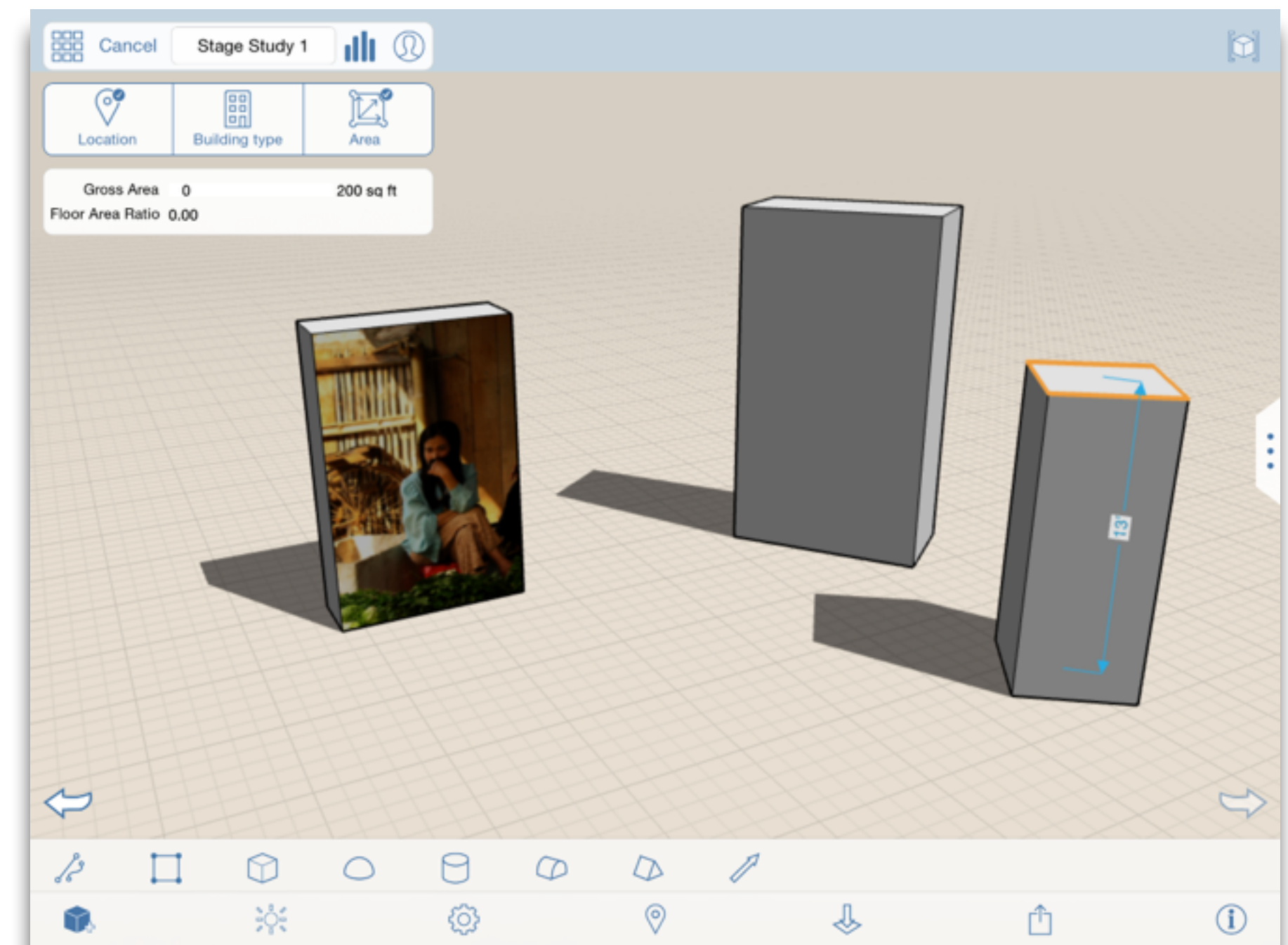
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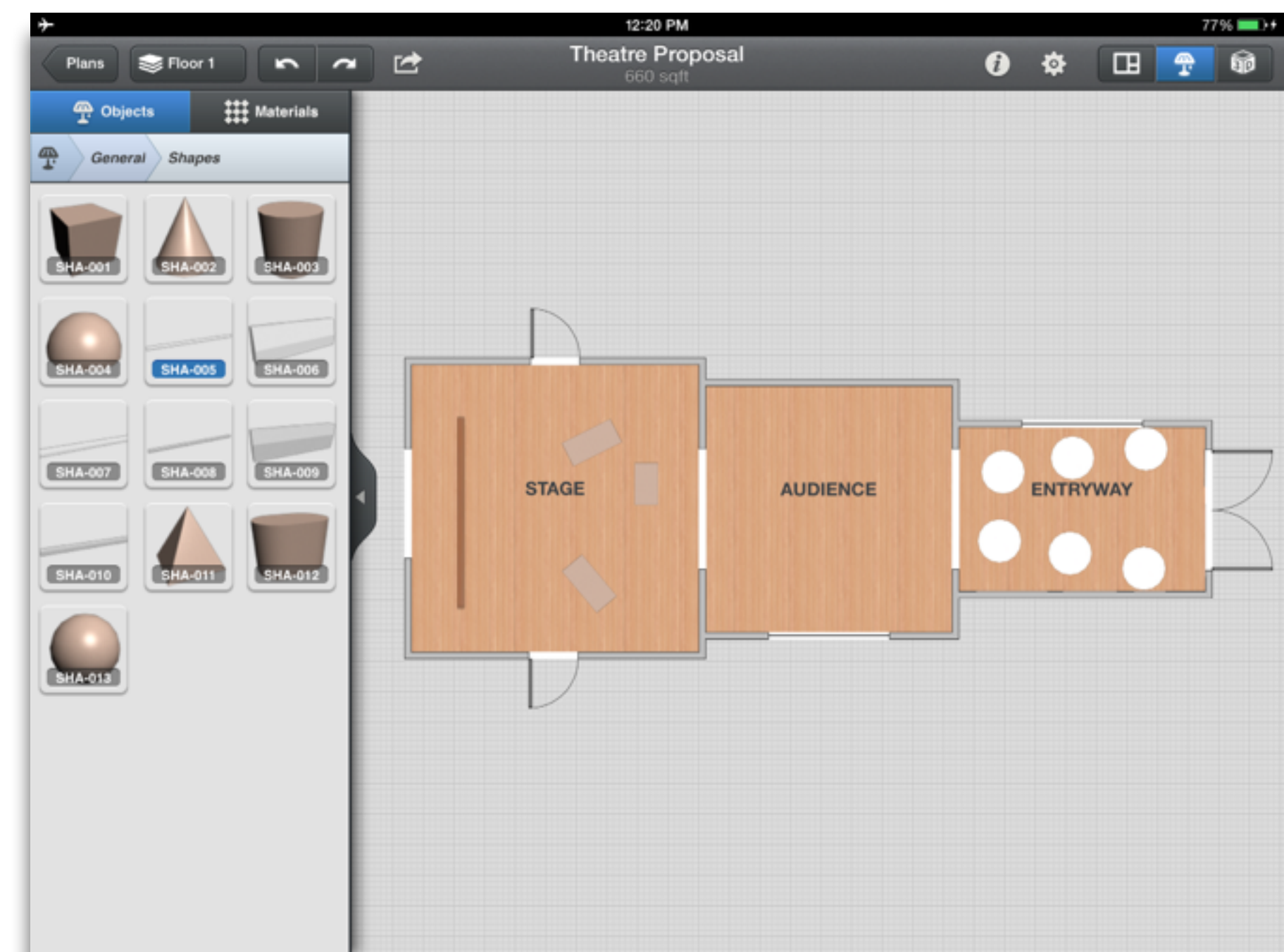
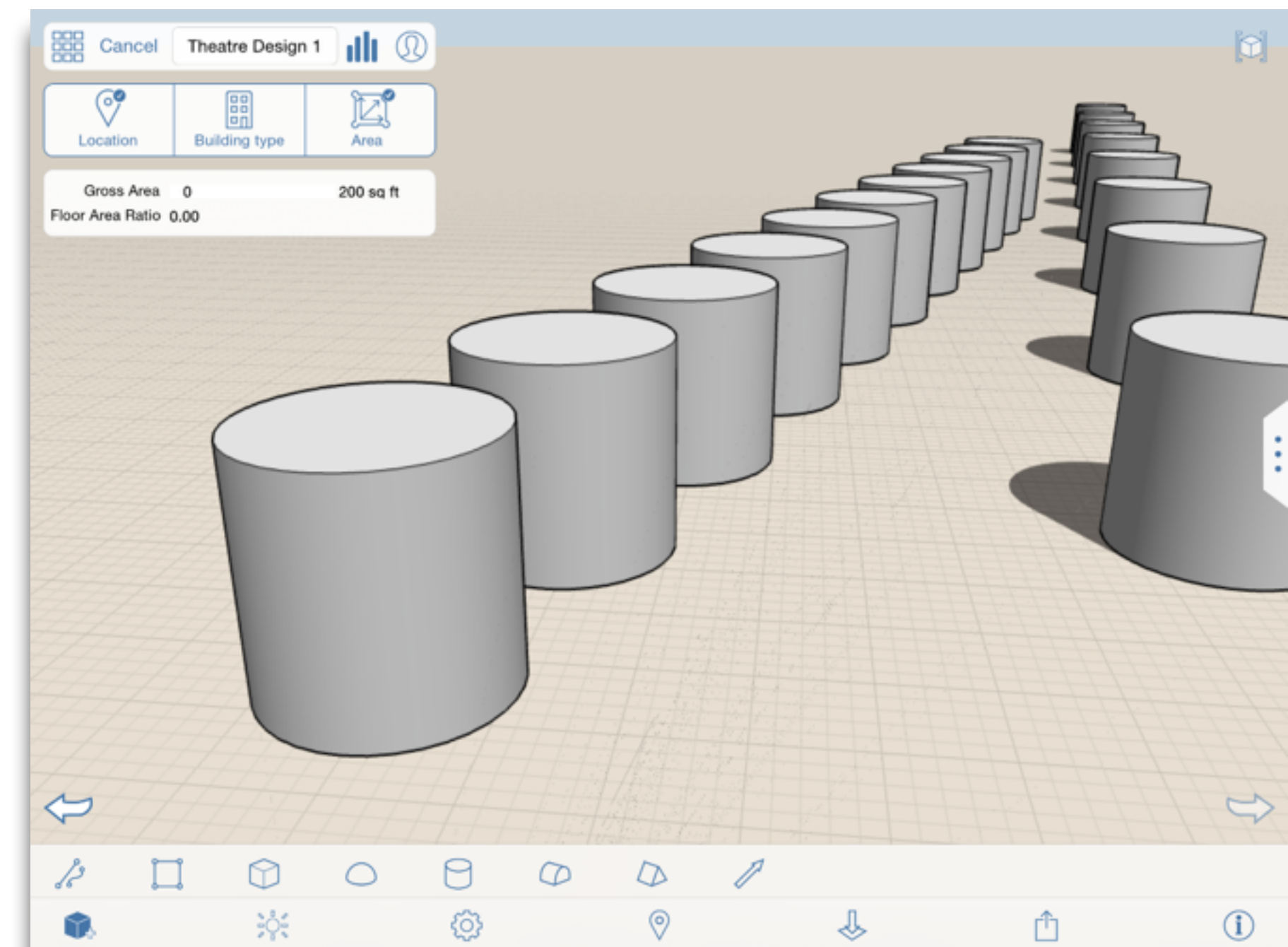
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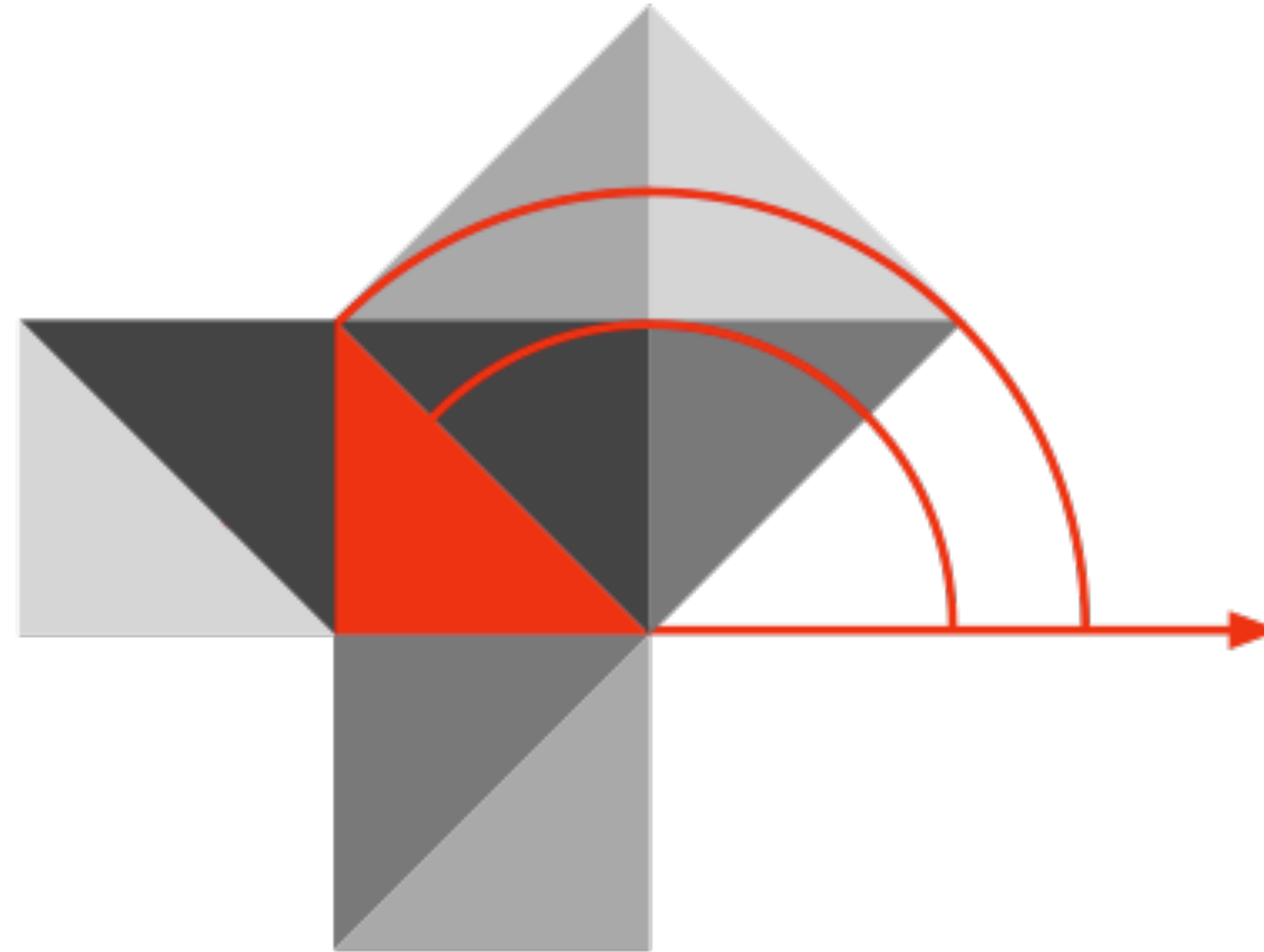
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Hippasus



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