Frameworks for Educational Technology: SAMR and the EdTech Quintet

Ruben R. Puentedura, Ph.D.

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

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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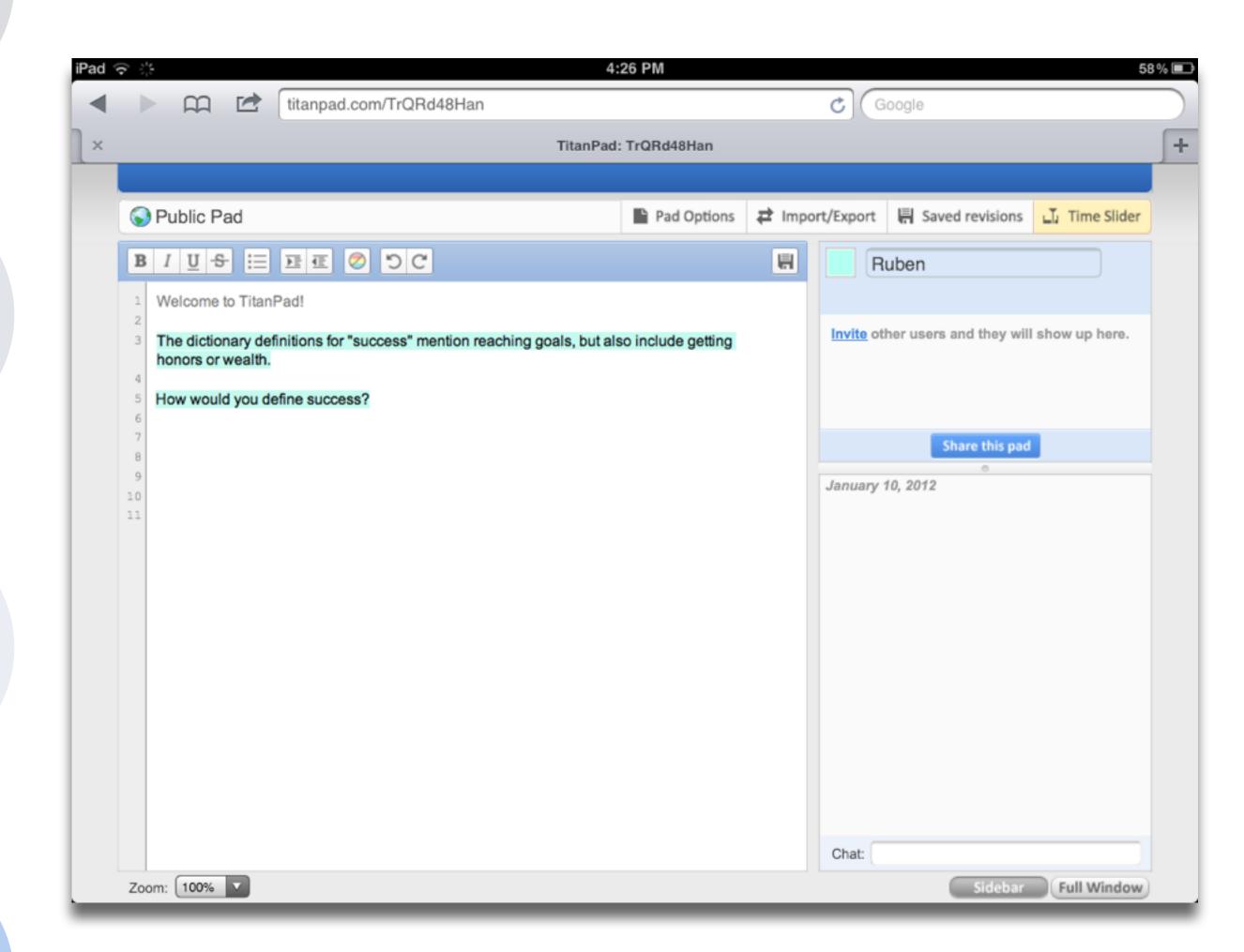
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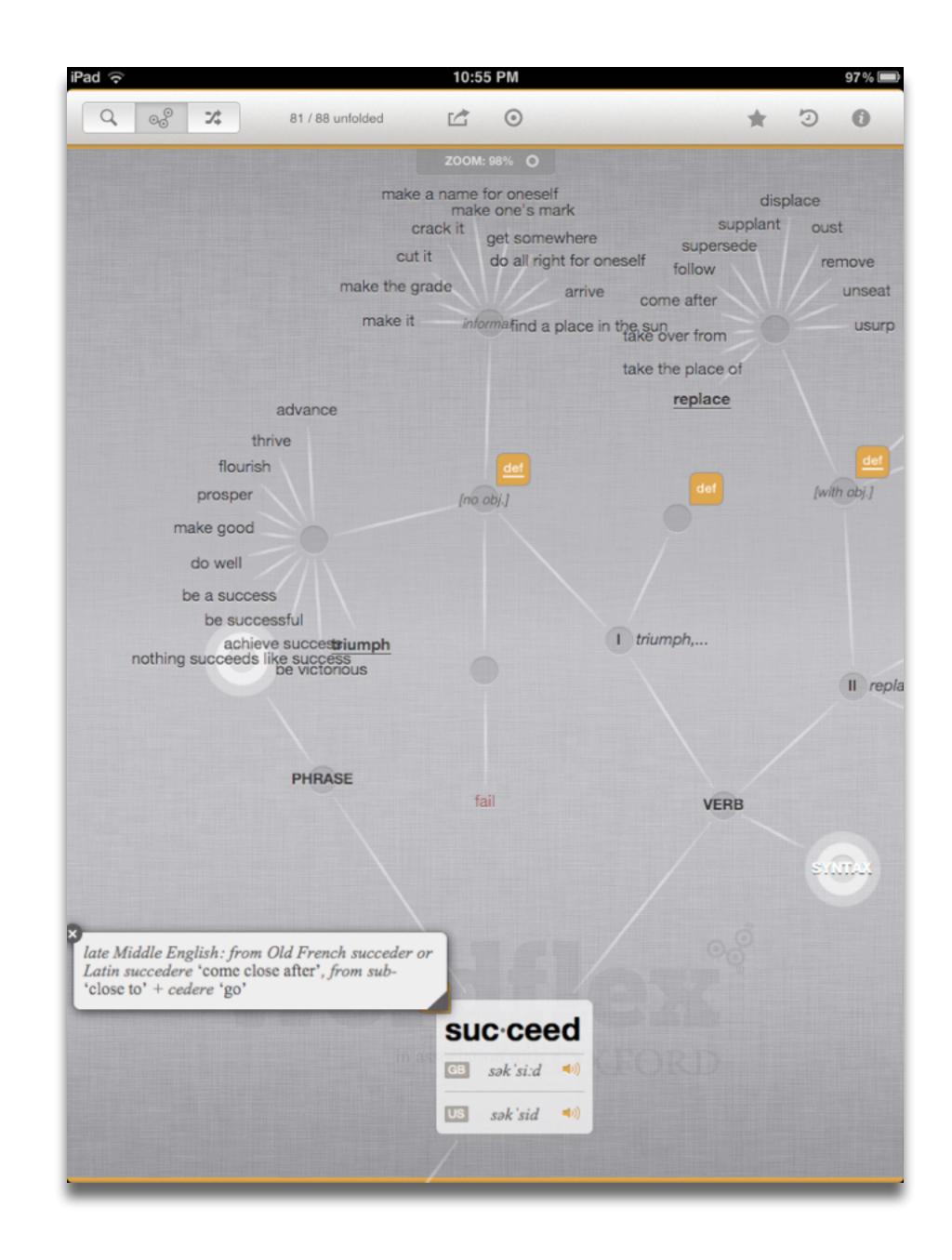
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ransformation

Redefinition

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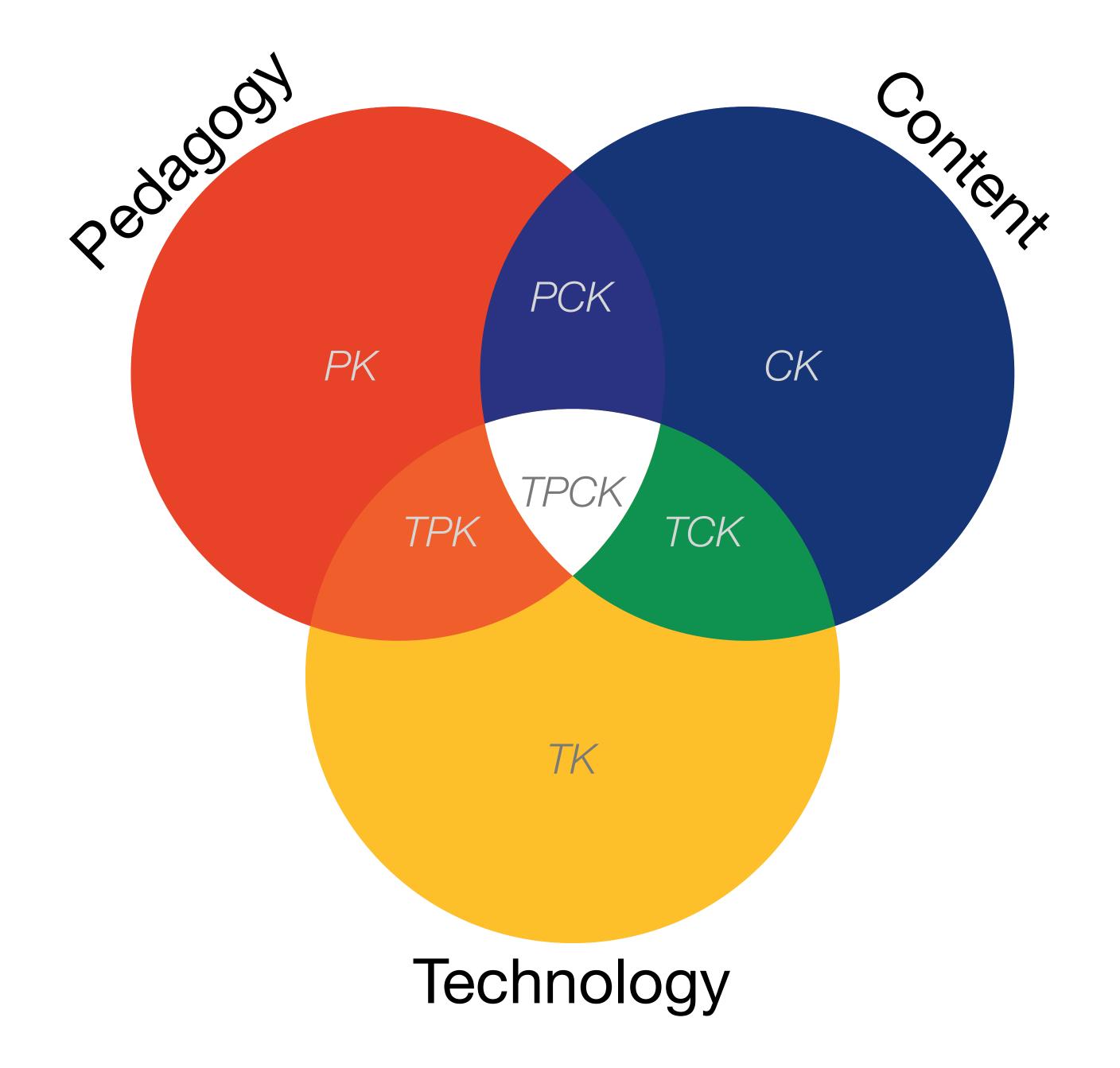
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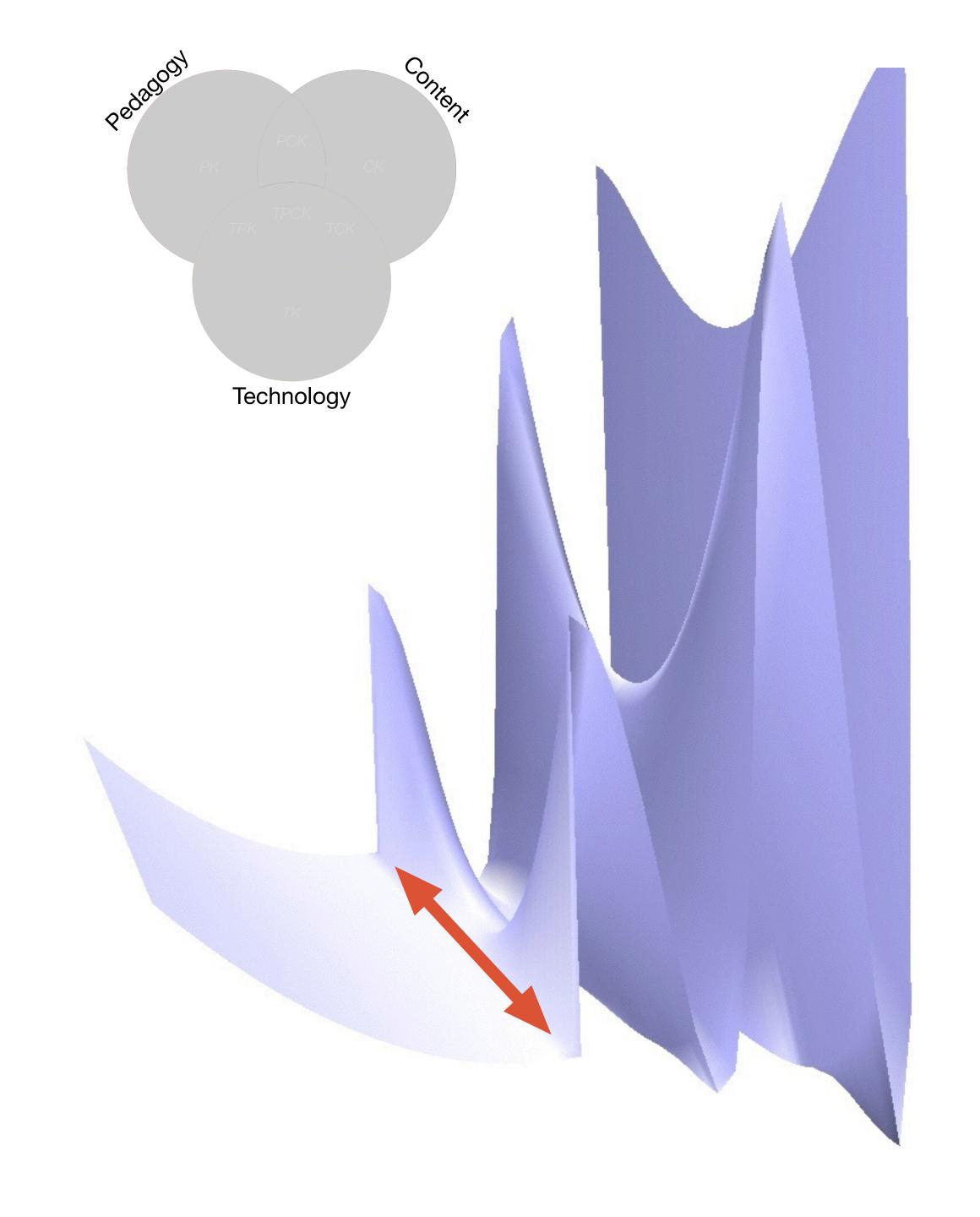
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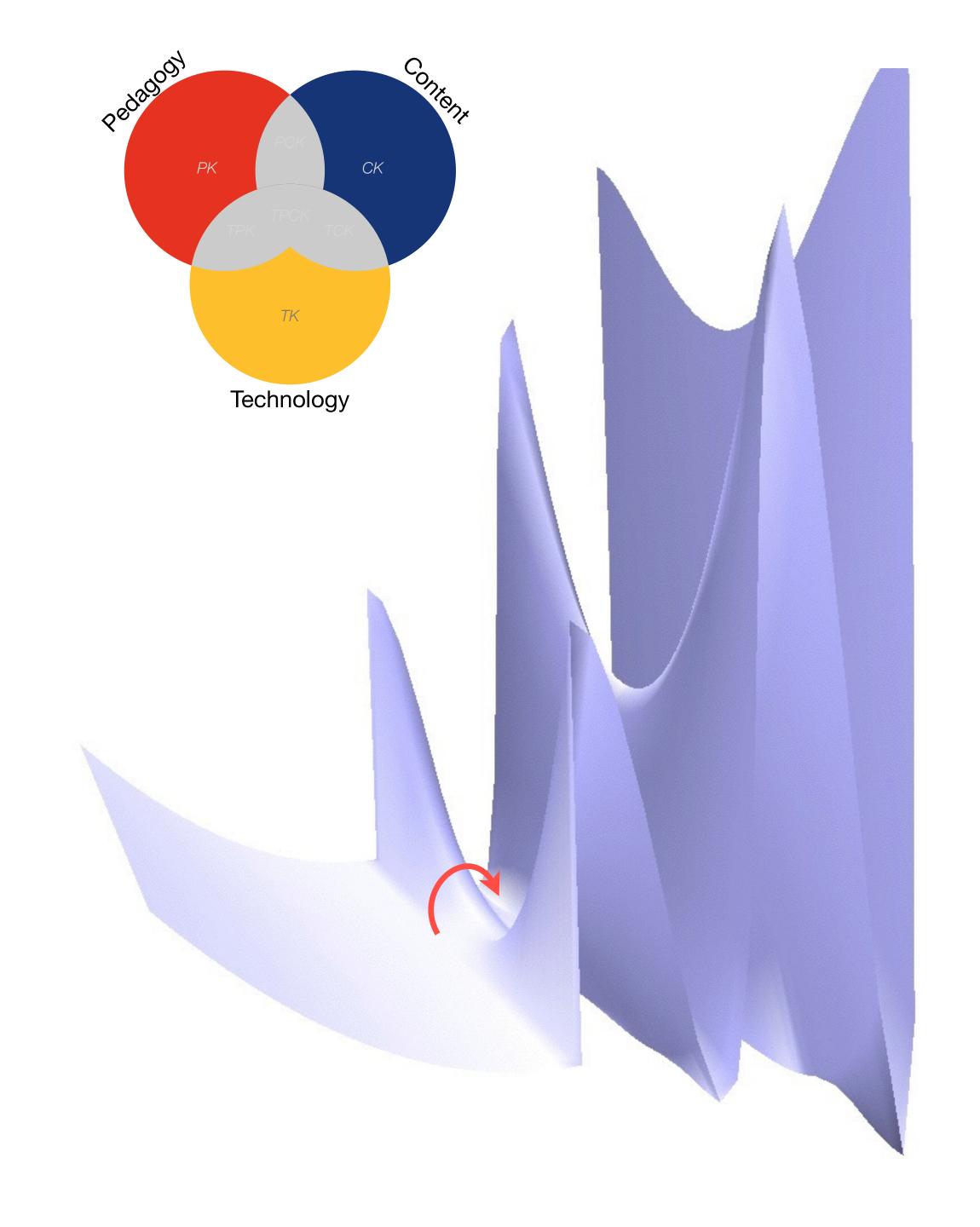
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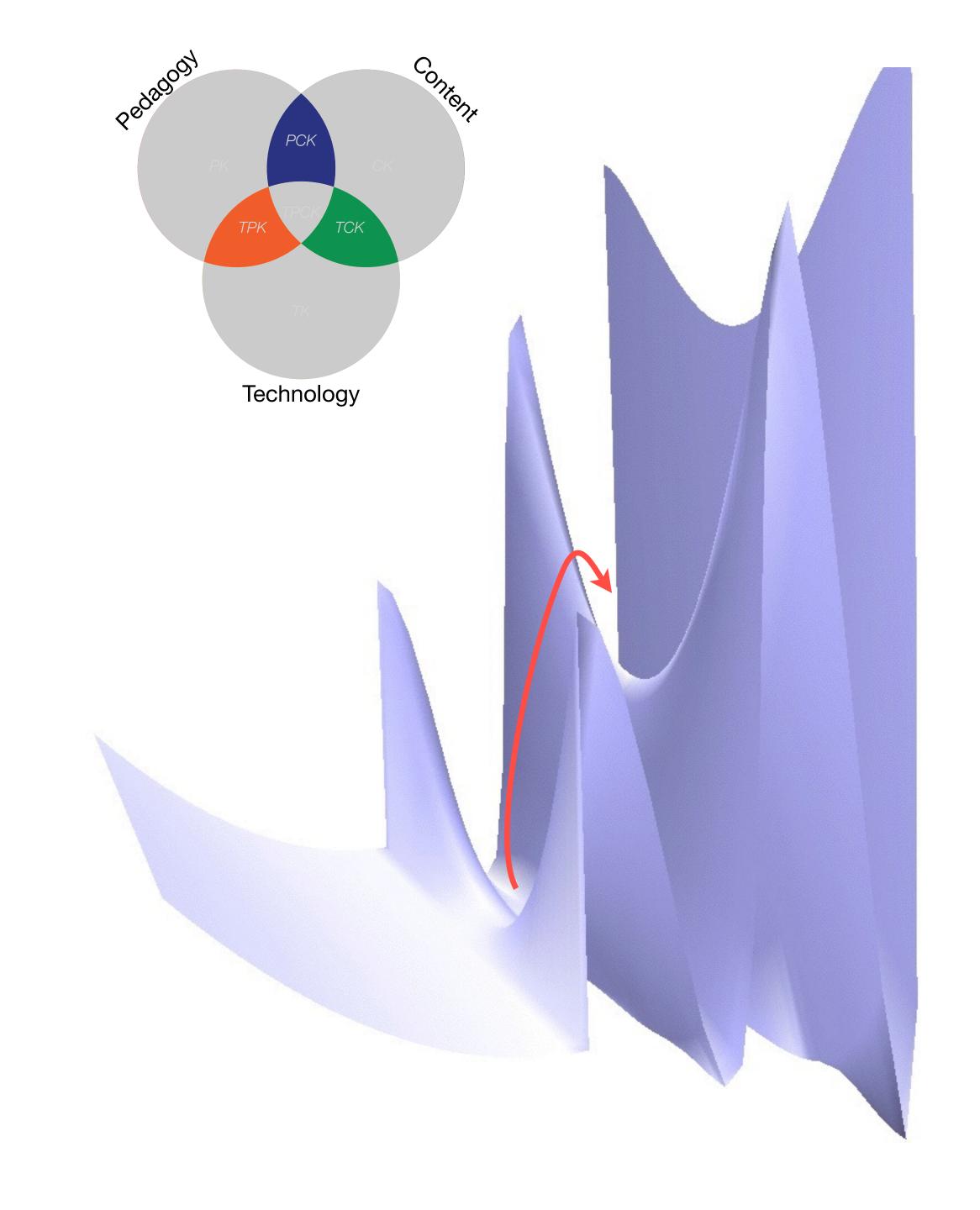
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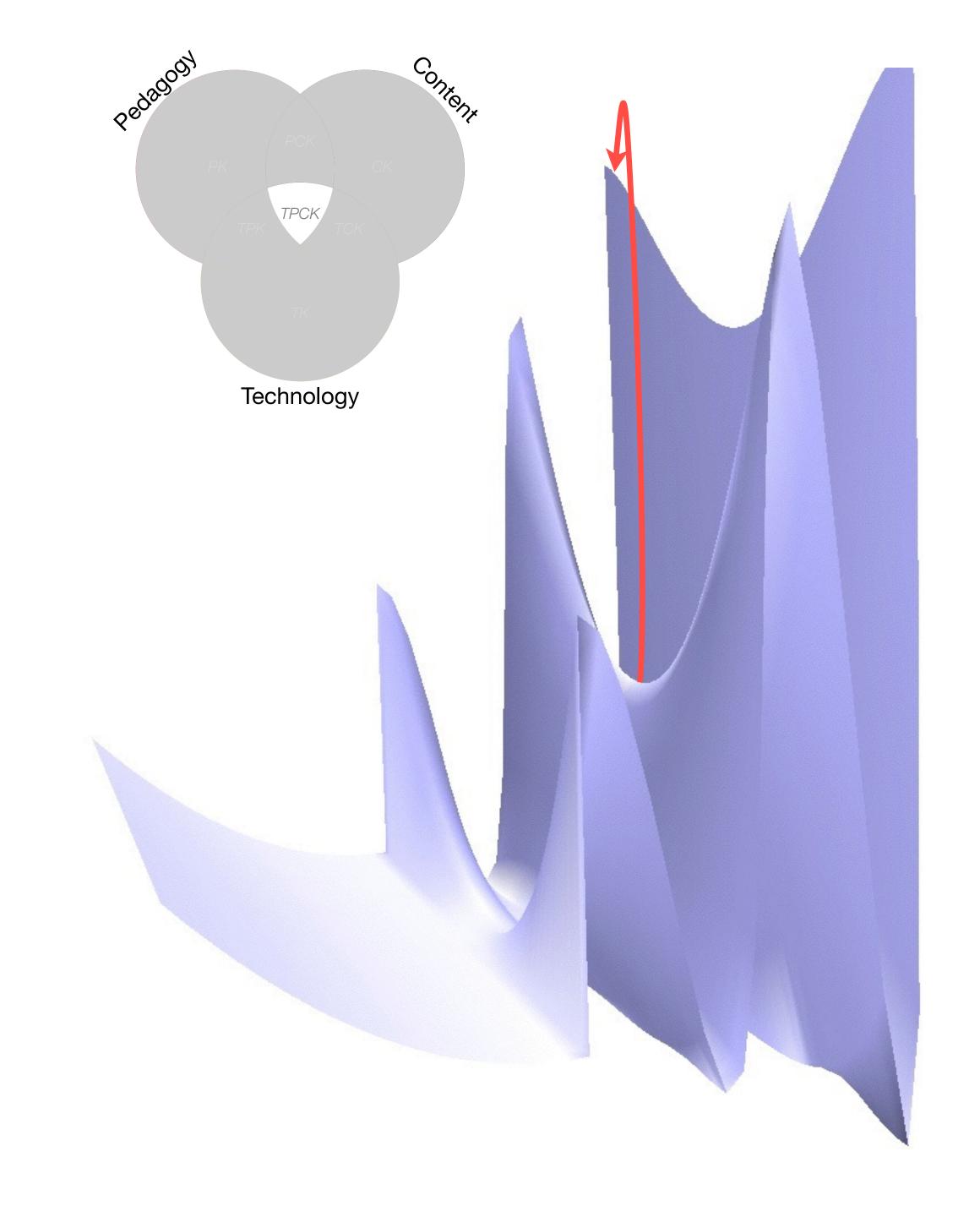
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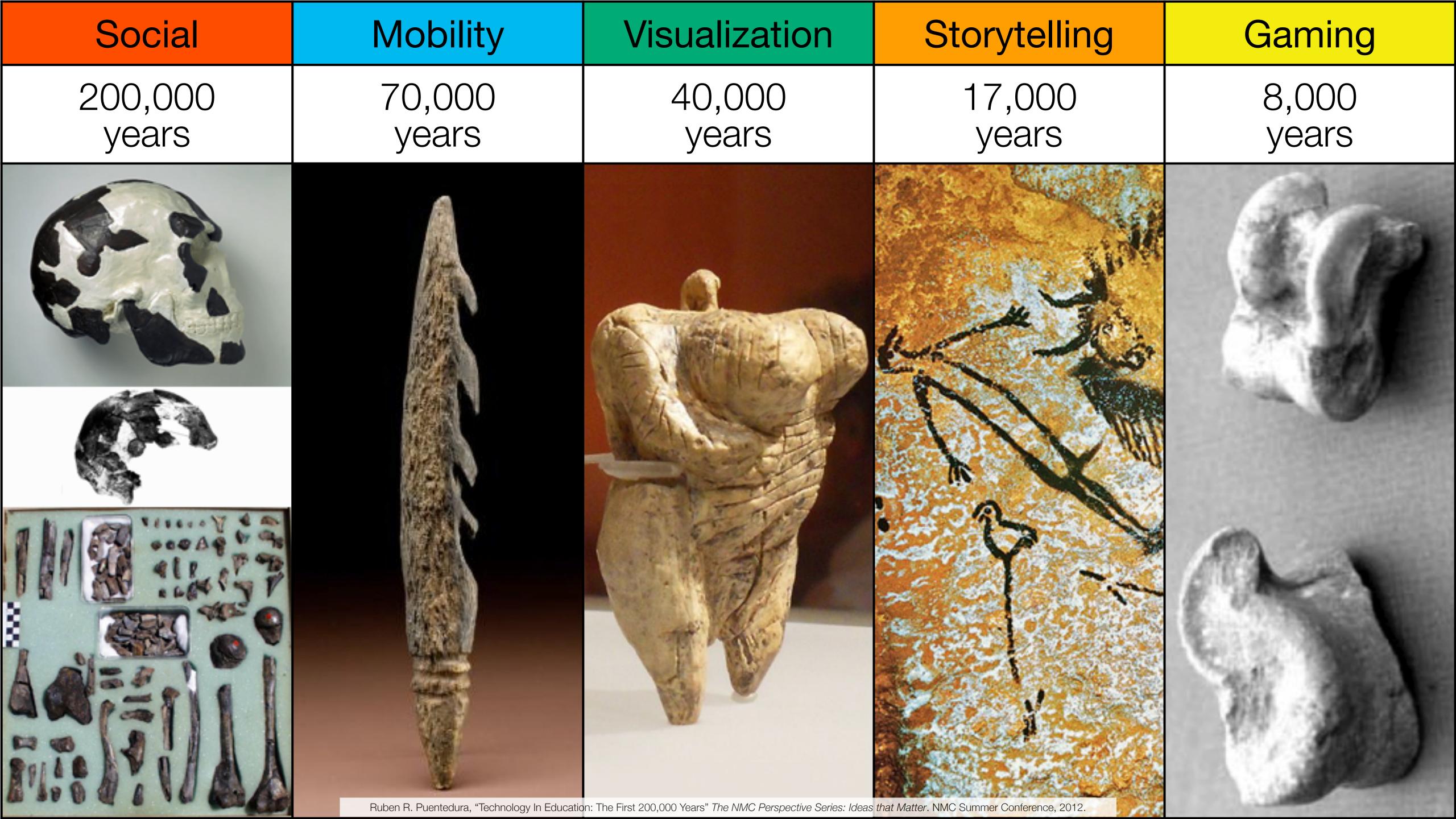
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Study	SAMR Level	Description	Effect Size
Ligas (2002)	S	CAI system used to support direct instruction approach for at-risk students.	0.029
Xin & Reith (2001)	A	Multimedia resources provided to contextualize learning of word meanings and concepts.	0.264
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 Effectiveness of Cognitive Tutor Algebra I at Scale, by John F. Pane, Beth Ann Griffin, Daniel F. McCaffrey, Rita Karam	S to A	S: Computerized algebra drills, some tied to realworld scenarios A: Tools for basic visualization; adaptive response to student progress	≈ 0.2 50th perc. → 58th perc.
Earth Science Using Laptops to Facilitate Middle School Science Learning: The Results of Hard Fun, 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

Bookmarks





RSS Feeds

Discussions





Microblogging

Blogging





Wikis

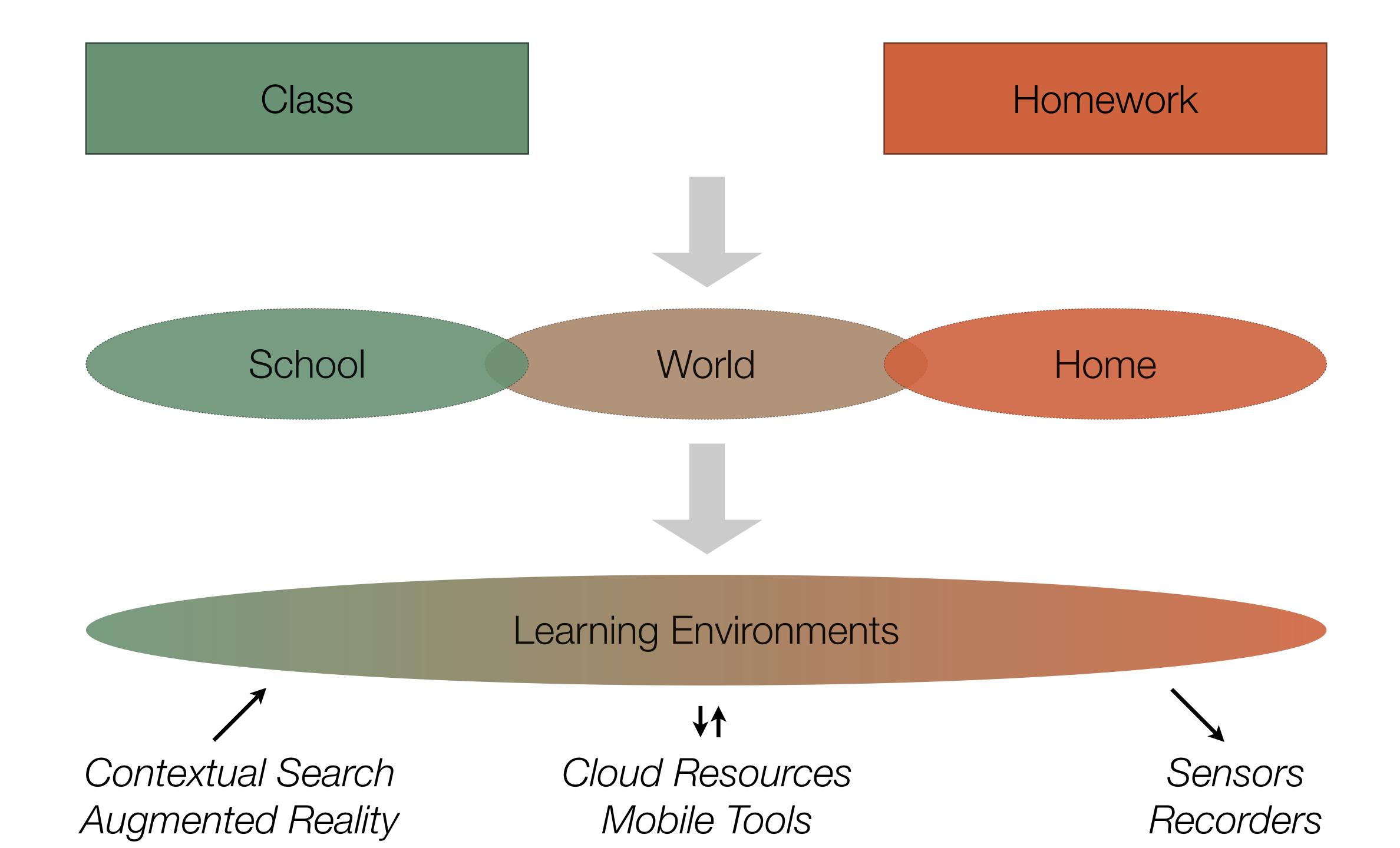
Telepresence





File Sharing

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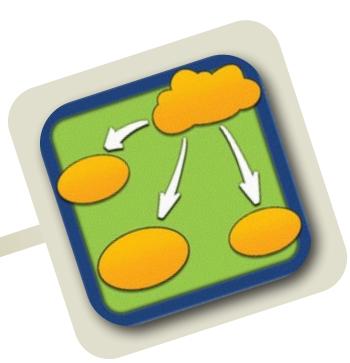
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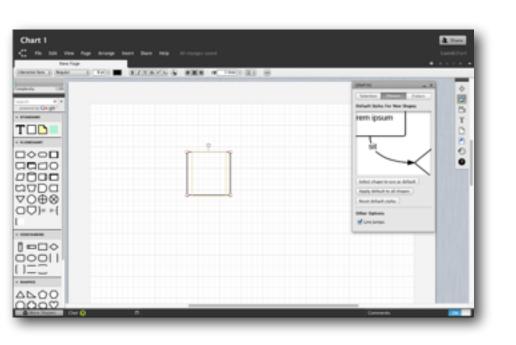








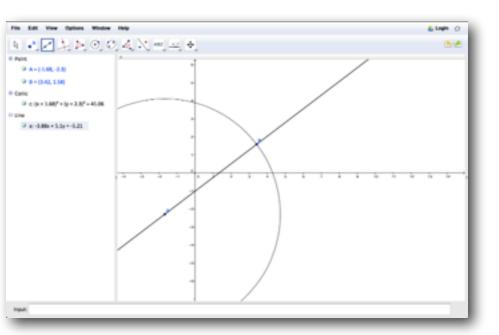




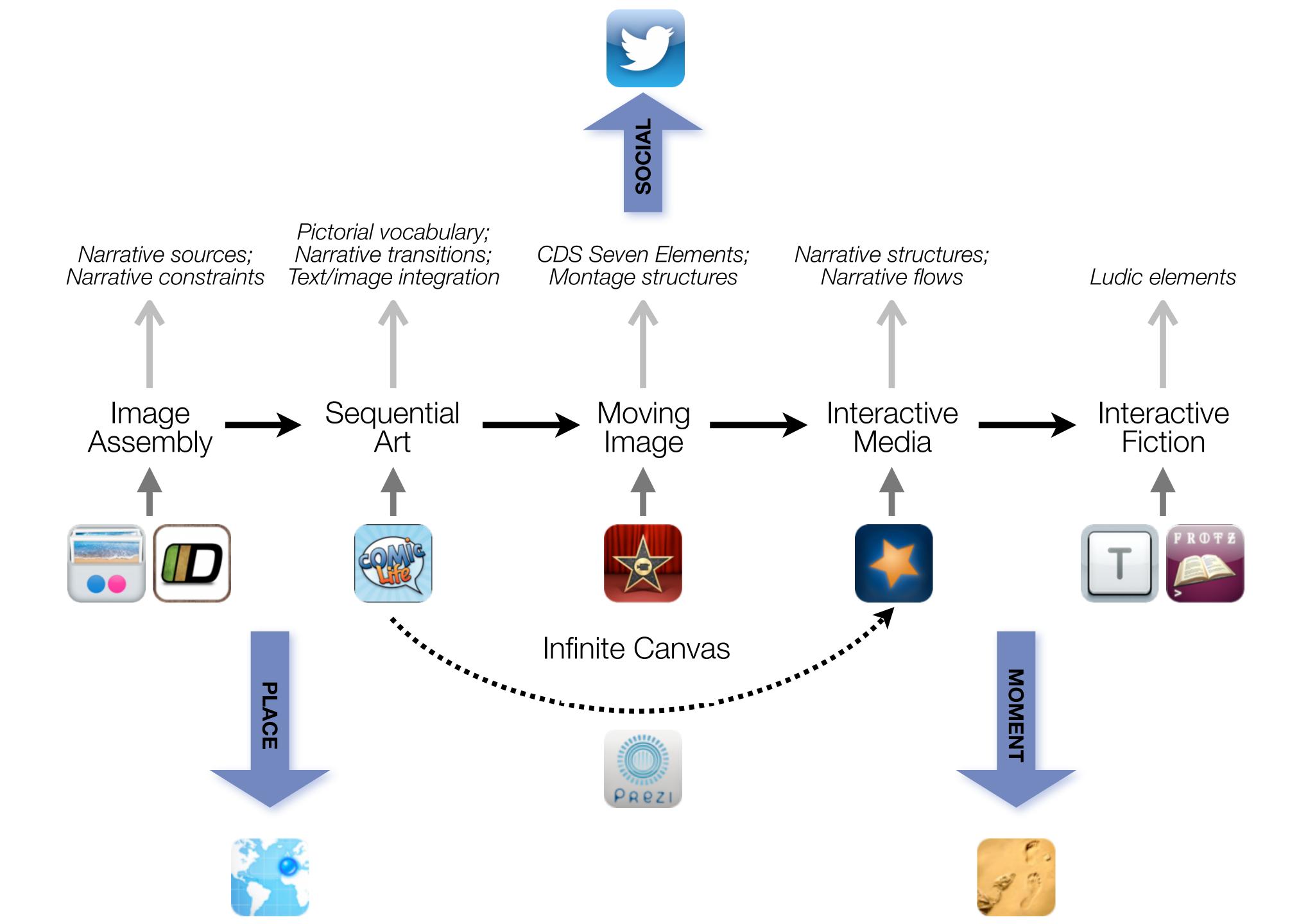








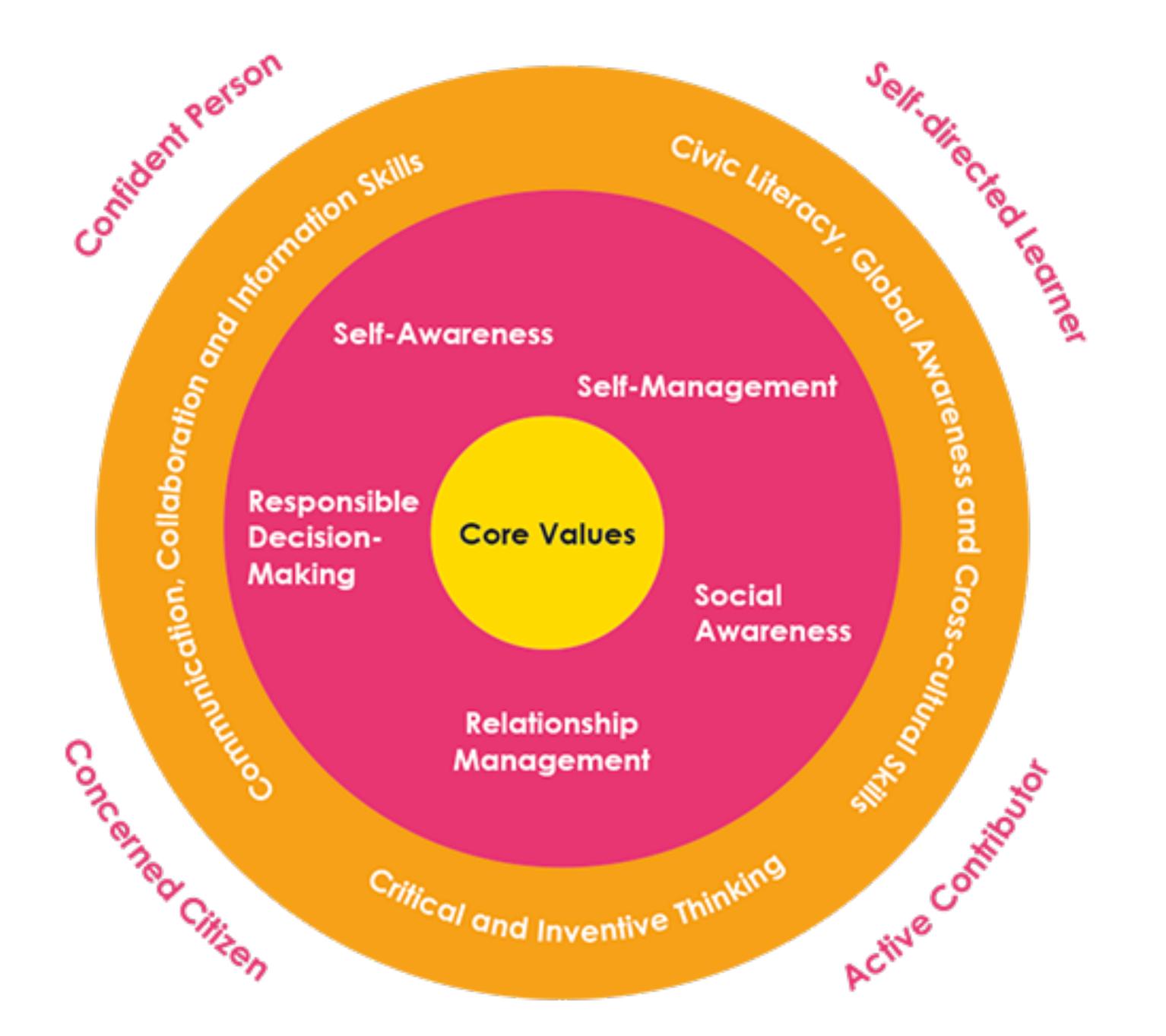
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Formal Definition of **Game** (Salen & Zimmerman)

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



Students will

- Articulate learning gaps
- Set learning goals and identify learning tasks to achieve the goals

F.Directed Learning

Management

and Monitoring

of Own Learning

Students will

- Apply learning in new contexts
- Learn beyond the curriculum

Teachers will

 Negotiate and develop a learning contract with the student for goals, strategies and evaluation criteria

A. Directed Learning Student-Teacher Learning Partnership

Experiences for Students, of

Conditions for Students' Self-management and Monitoring of their Learning

Teachers will

- Broaden and deepen students' learning
- Challenge students to reach a new level of thinking

Students will

- Explore alternatives and make sound decisions
- Formulate questions and generate own inquiries
- Plan and manage workload and time effectively and efficiently
- Reflect on their learning and use feedback to improve their schoolwork

Teachers will

- Scaffold self-directed learning processes to shift responsibility for learning from teacher to students, i.e. facilitate:
 - Self-management of learning through analysis, inquiry, expression of differing and conflicting views and decision making in an emotionally safe environment
 - Self-monitor and reflect on their own thinking and learning processes

searching, browsing, accessing, collecting

Discovering

categorizing, providing commentary, analyzing

find differences, similarities and create meaning from them

Annotating

Comparing

linking, referencing

Referring

Scholarly Primitives

selecting according to a criterion, showing relationships of items selected to the original set

Sampling

Illustrating

showing an example, highlighting features within an example

Representing

changing depiction mode, publishing

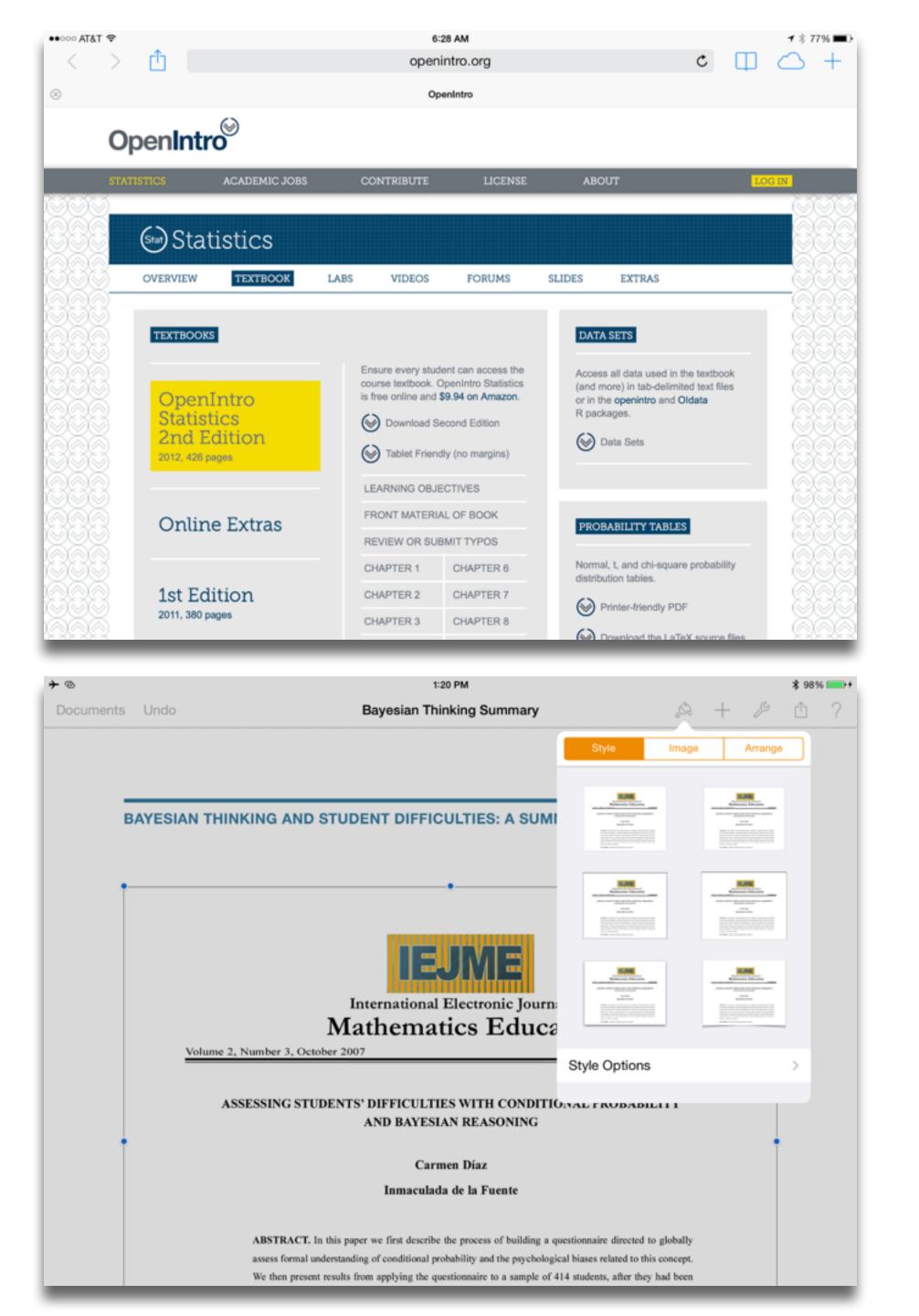
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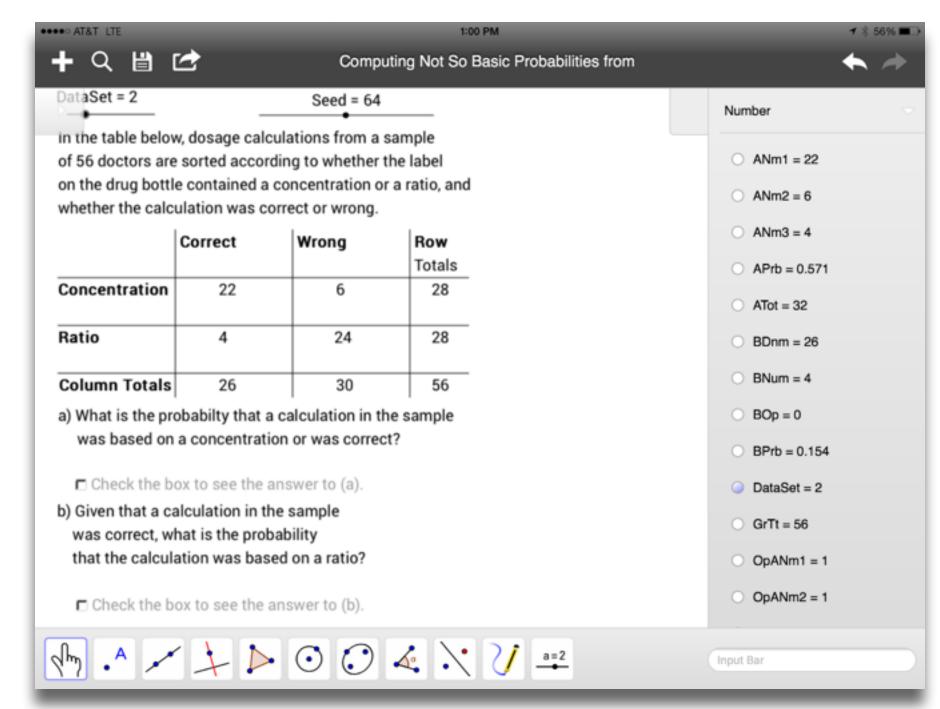
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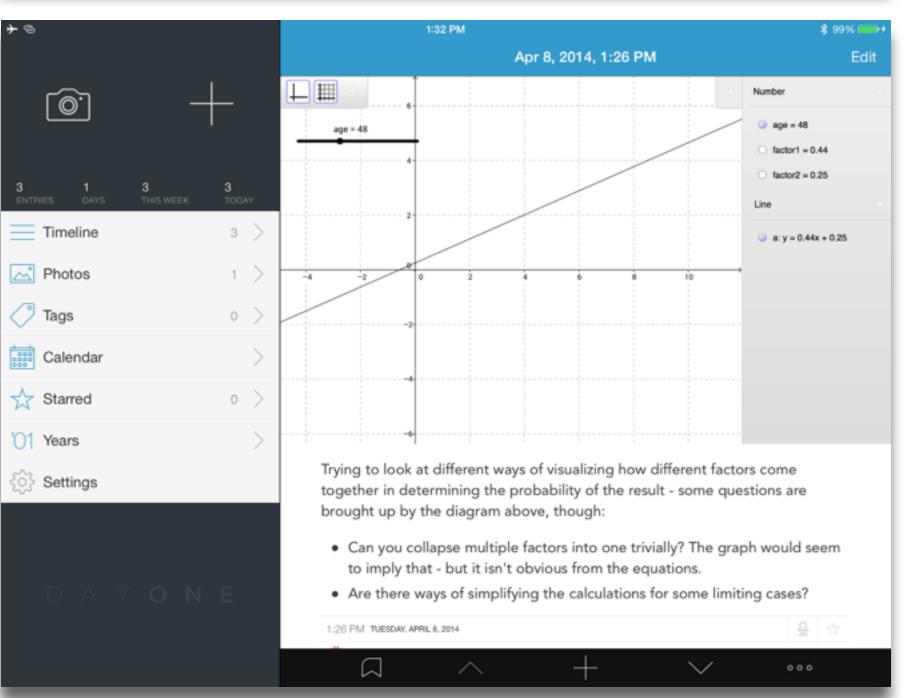
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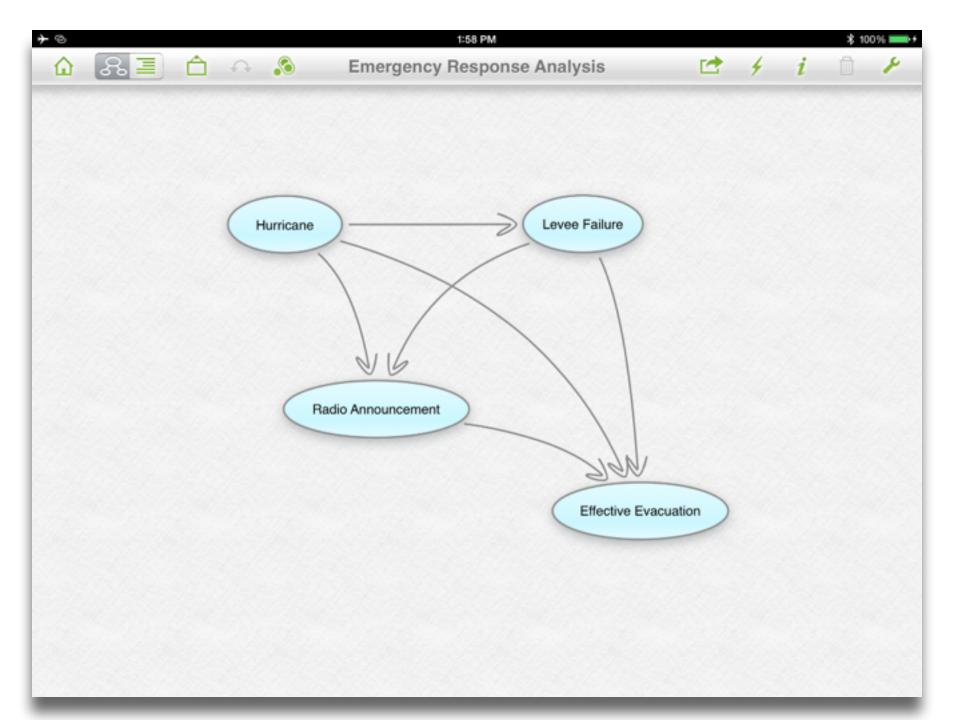
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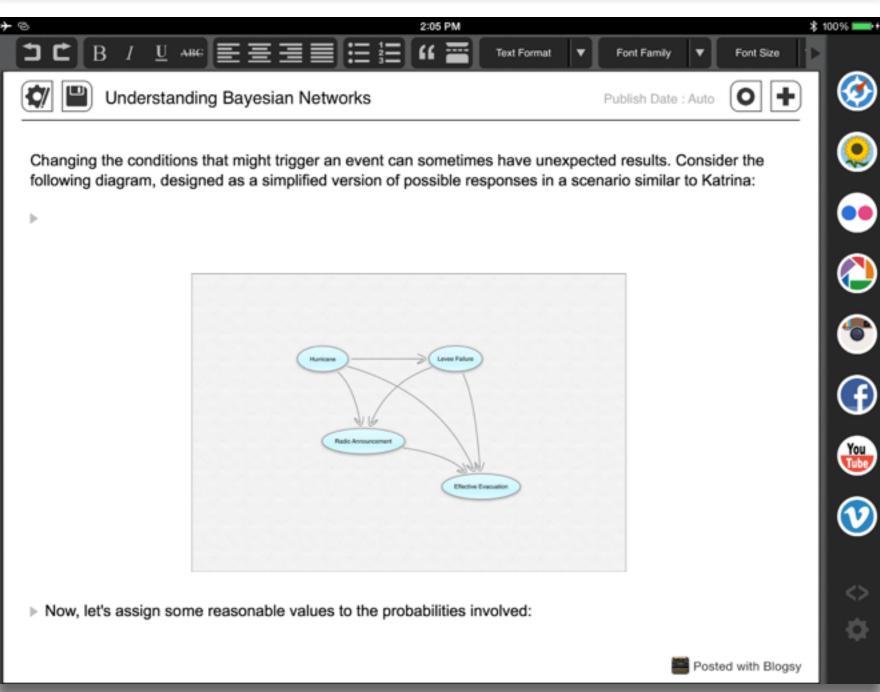
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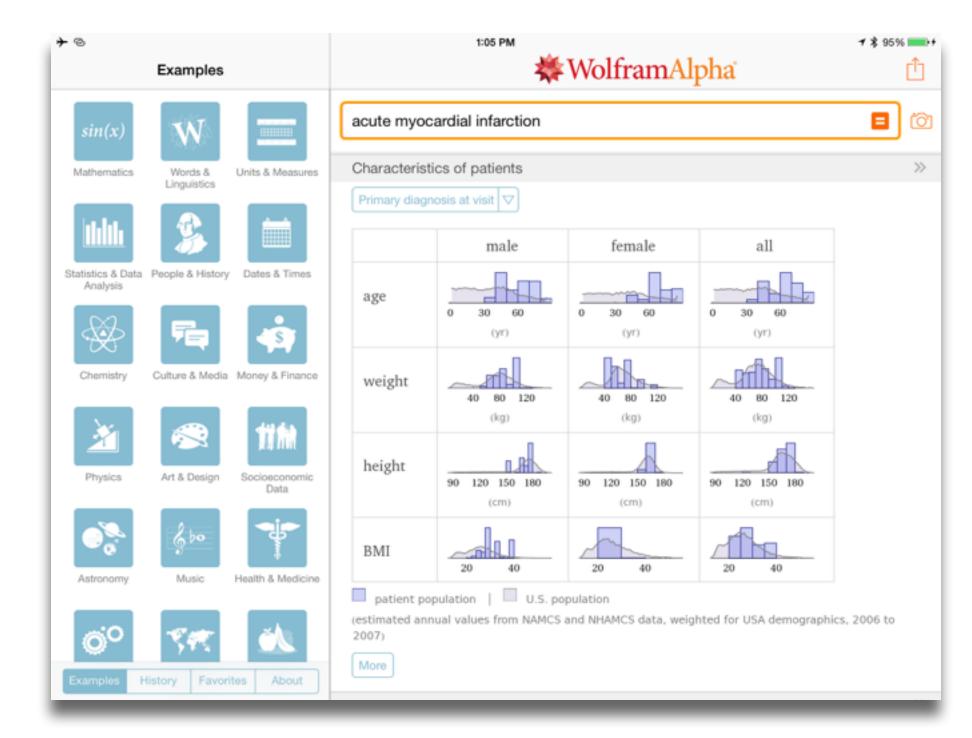
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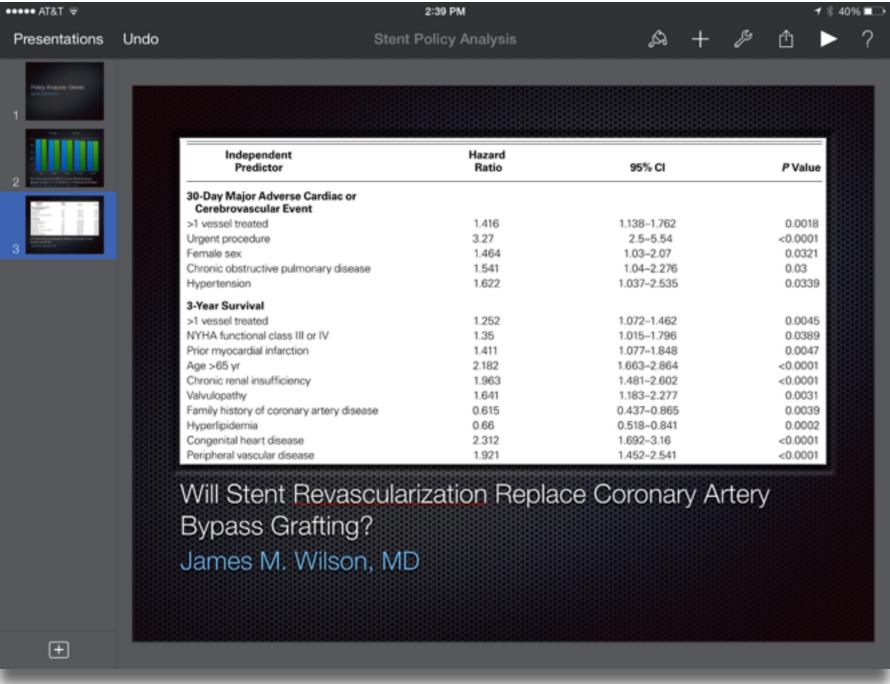
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Students will

- Negotiate and set common goals
- Interactively contribute own ideas clearly and consider other points of view objectively and maturely
- Ask questions to clarify and offer constructive feedback
- Reach consensus and take on different roles and tasks responsibly within the group to achieve group goals
- Reflect on group and individual learning processes



Students will

- Work towards completing individual's assigned tasks as well as help group members achieve group goals
- Rely on each other for success

Teachers will

 Create multiple and appropriate platforms and networks to generate and promote collaboration among students

Assessment of Individual and Group Learning

Structures for Structures for Structure Group Students

Collaboration

Collaboration

Collaborative Learning

Teachers will

- Use various assessment methods to assess both individuals and group learning and performance
- Provide feedback on individual learning and group learning and performance

Teachers will

- Develop students' communication skills and interpersonal skills
- Provide conflict management strategies on resolving diverse or conflicting views

Location Position in space

Condition

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

Links

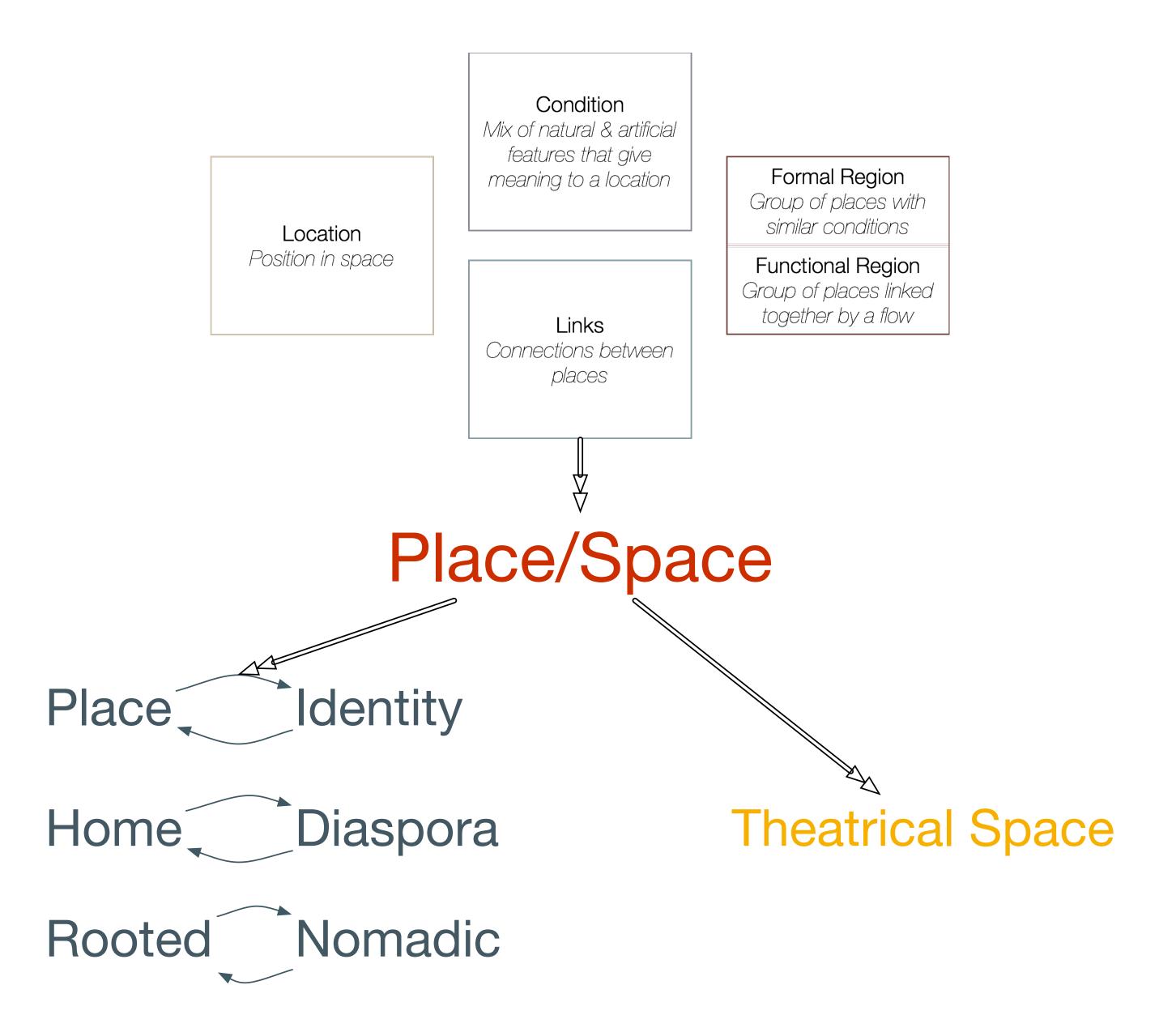
Connections between places

Formal Region

Group of places with similar conditions

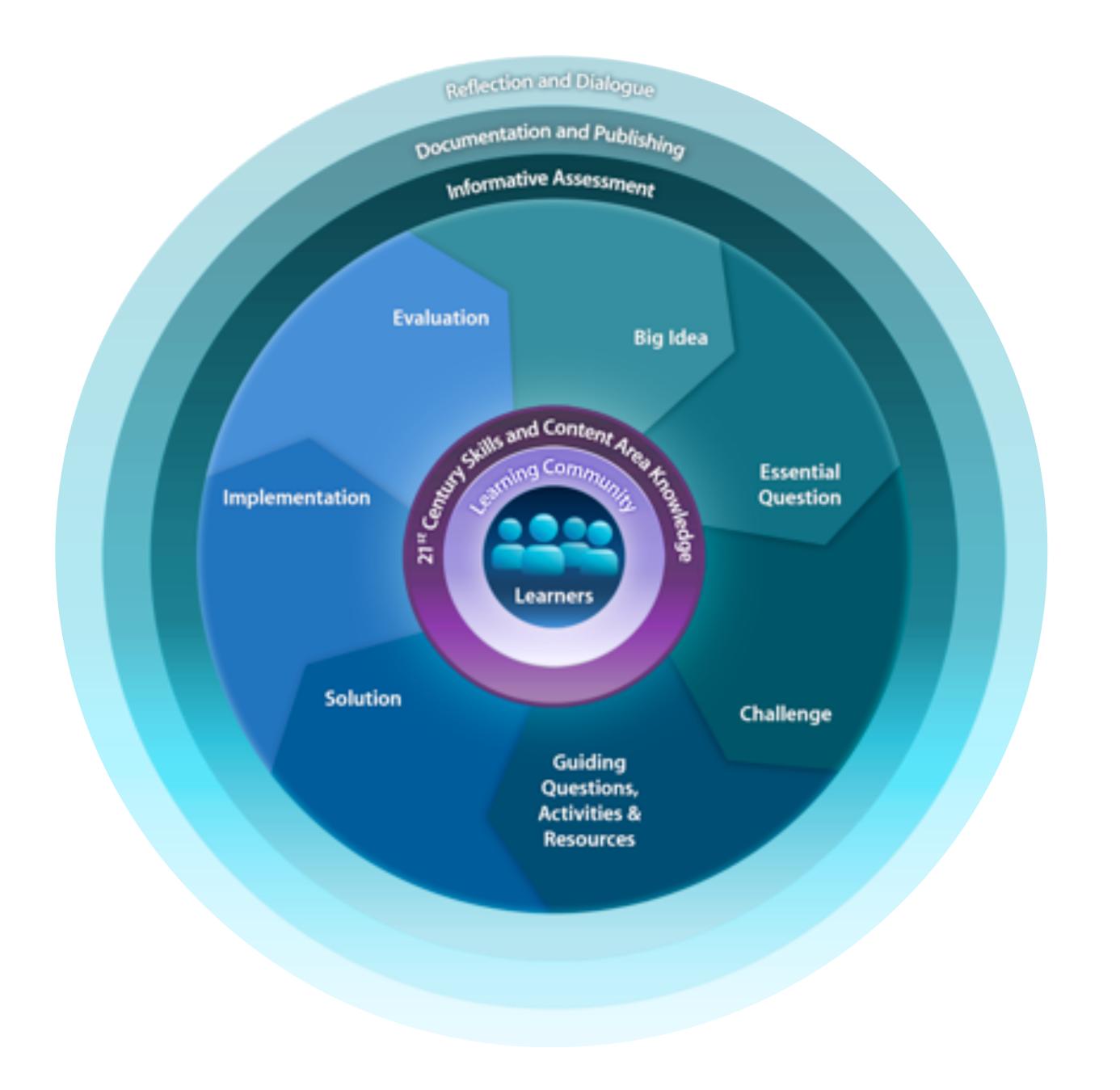
Functional Region

Group of places linked together by a flow









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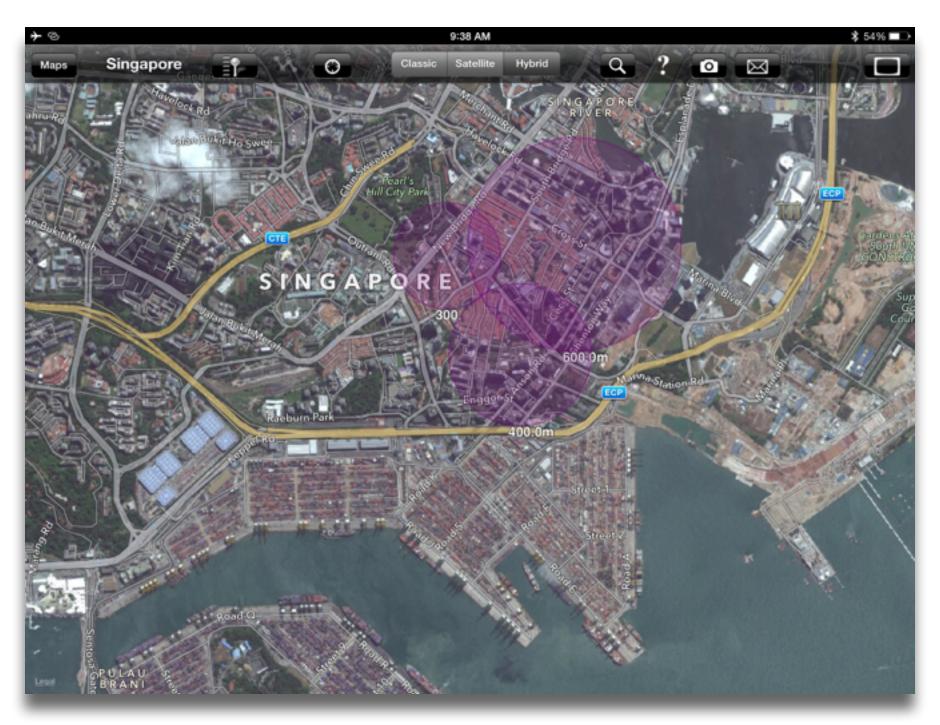
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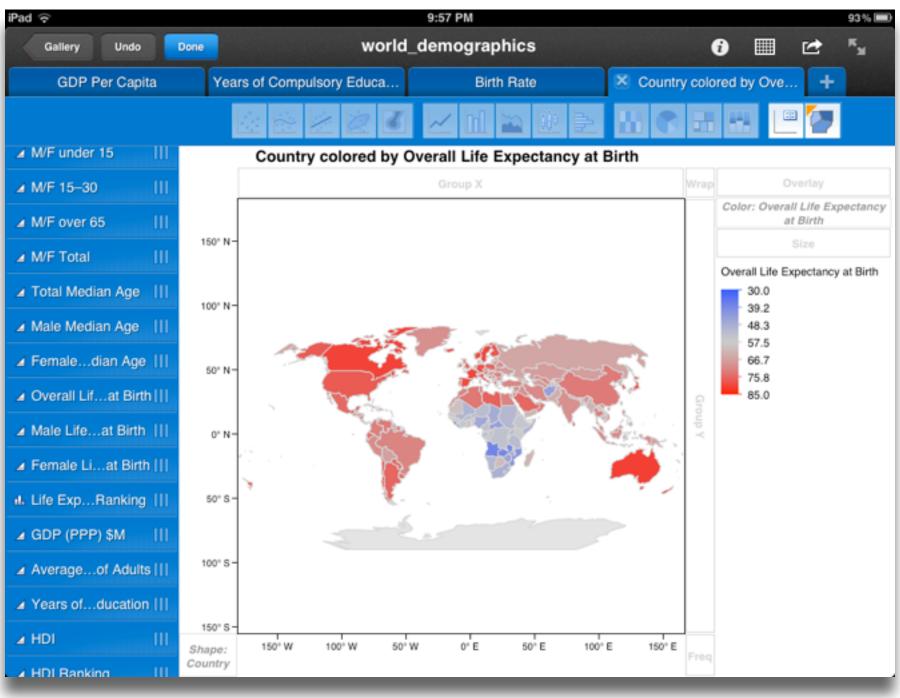
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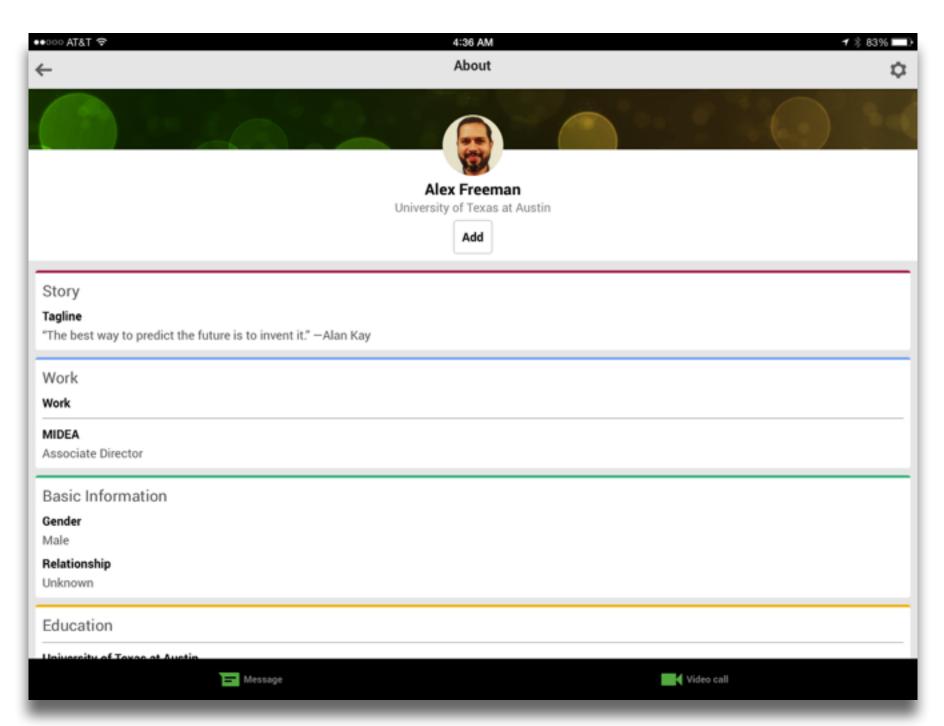
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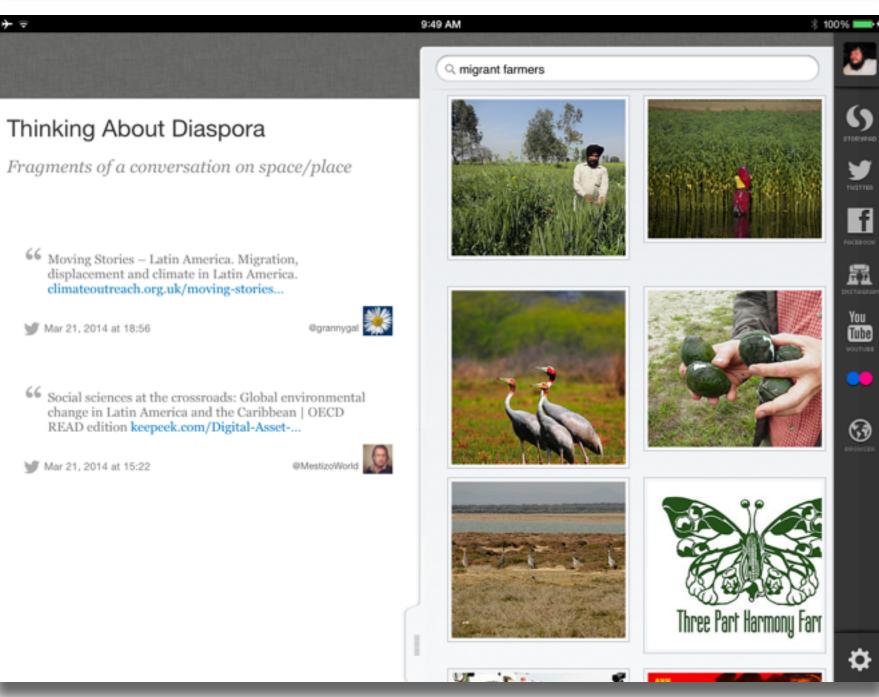
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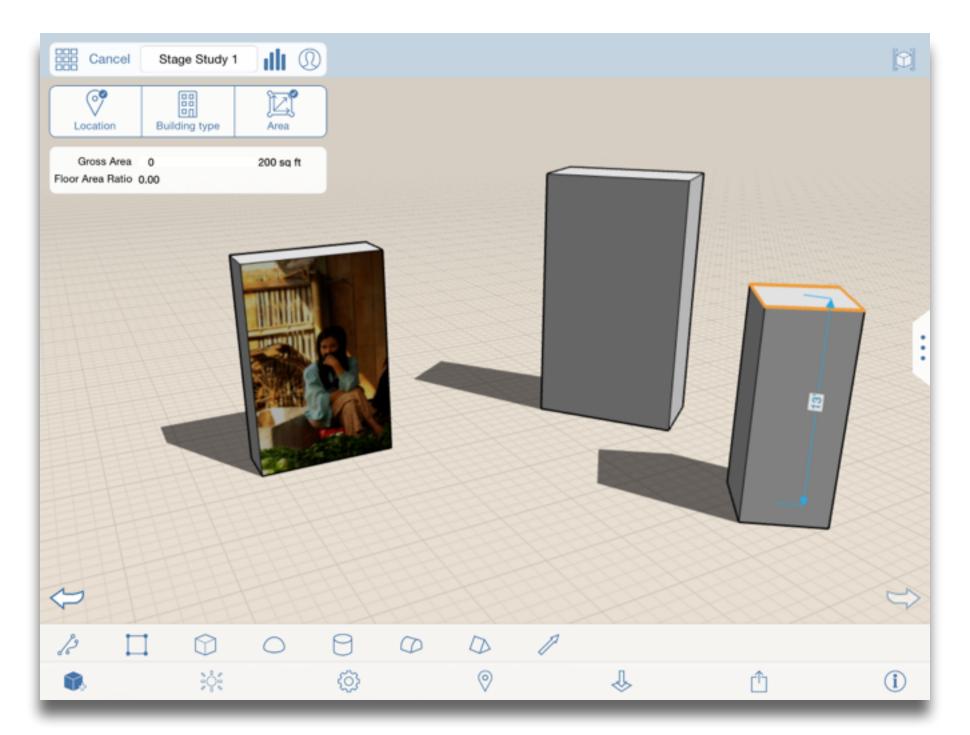
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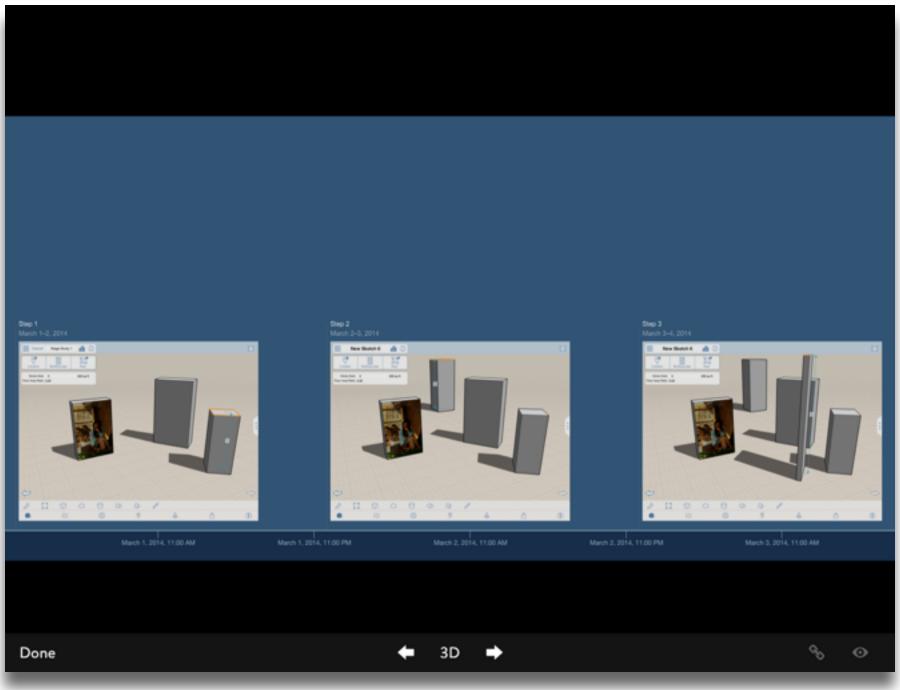
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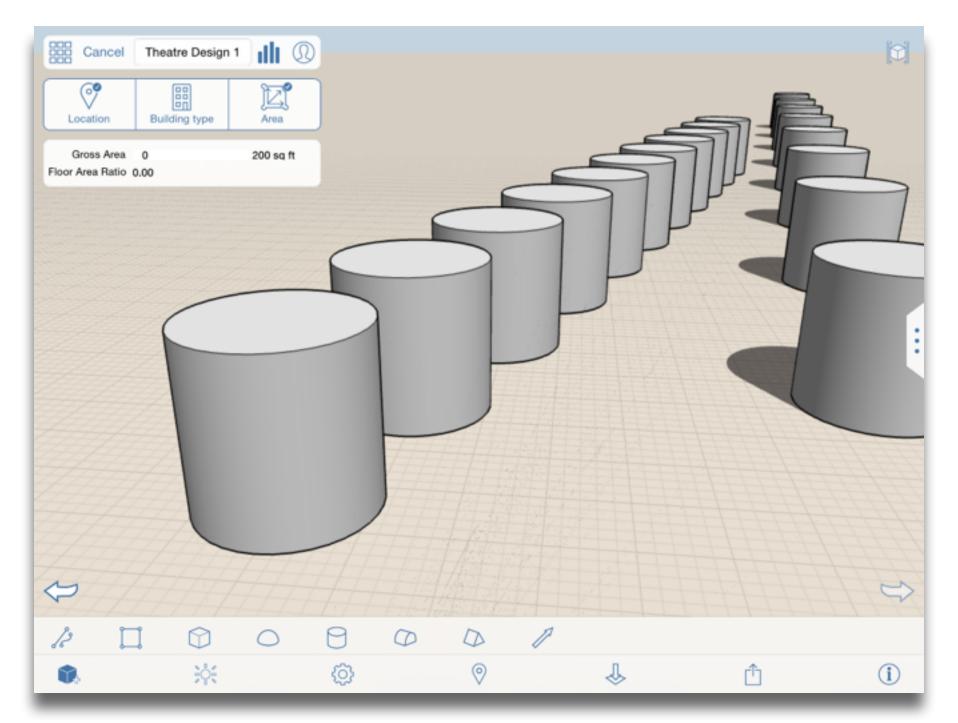
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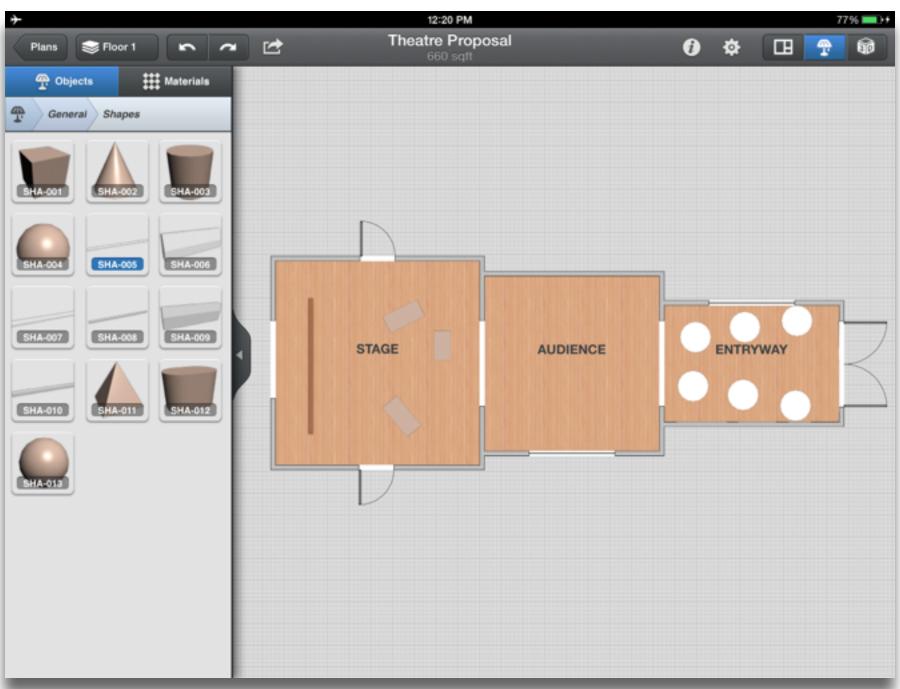
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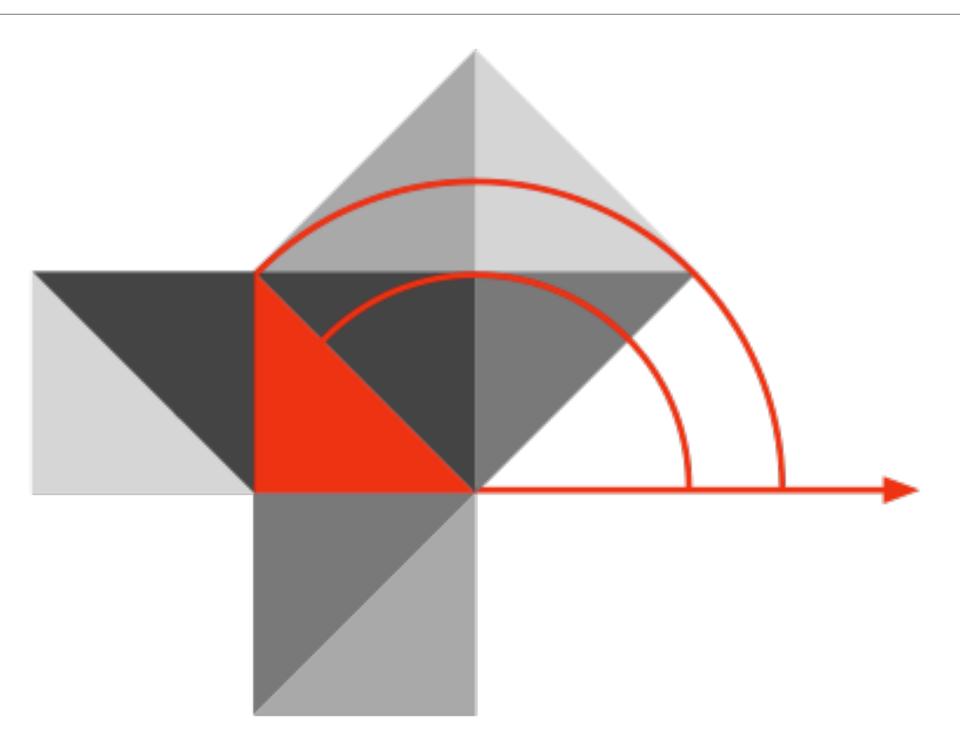
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Hippasus



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