

# SAMR, Learning, and Assessment

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Ruben R. Puentedura, Ph.D.

# Part 1: PCK and SAMR

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*Transformation*

## **Redefinition**

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

## **Modification**

*Tech allows for significant task redesign*

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## **Augmentation**




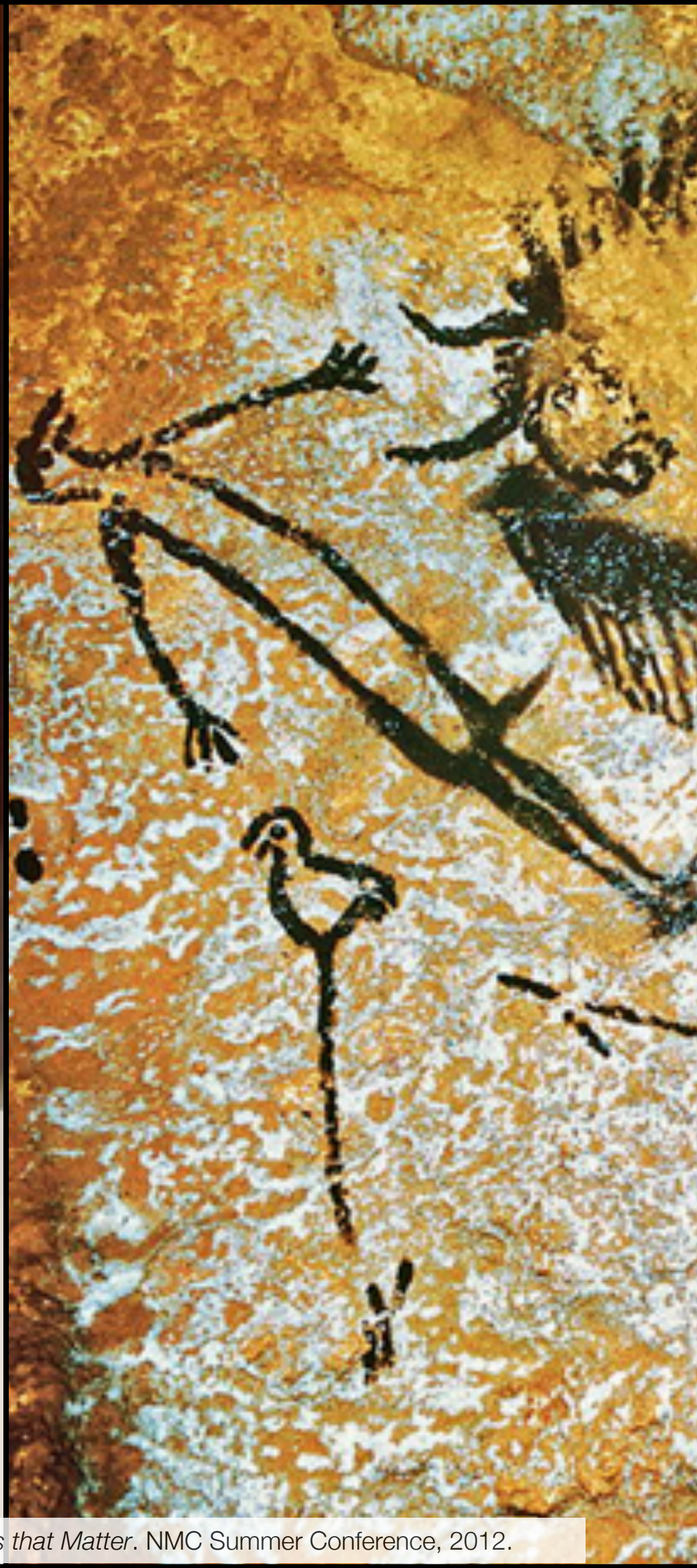

*Tech acts as a direct tool substitute, with  
functional improvement*

## **Substitution**

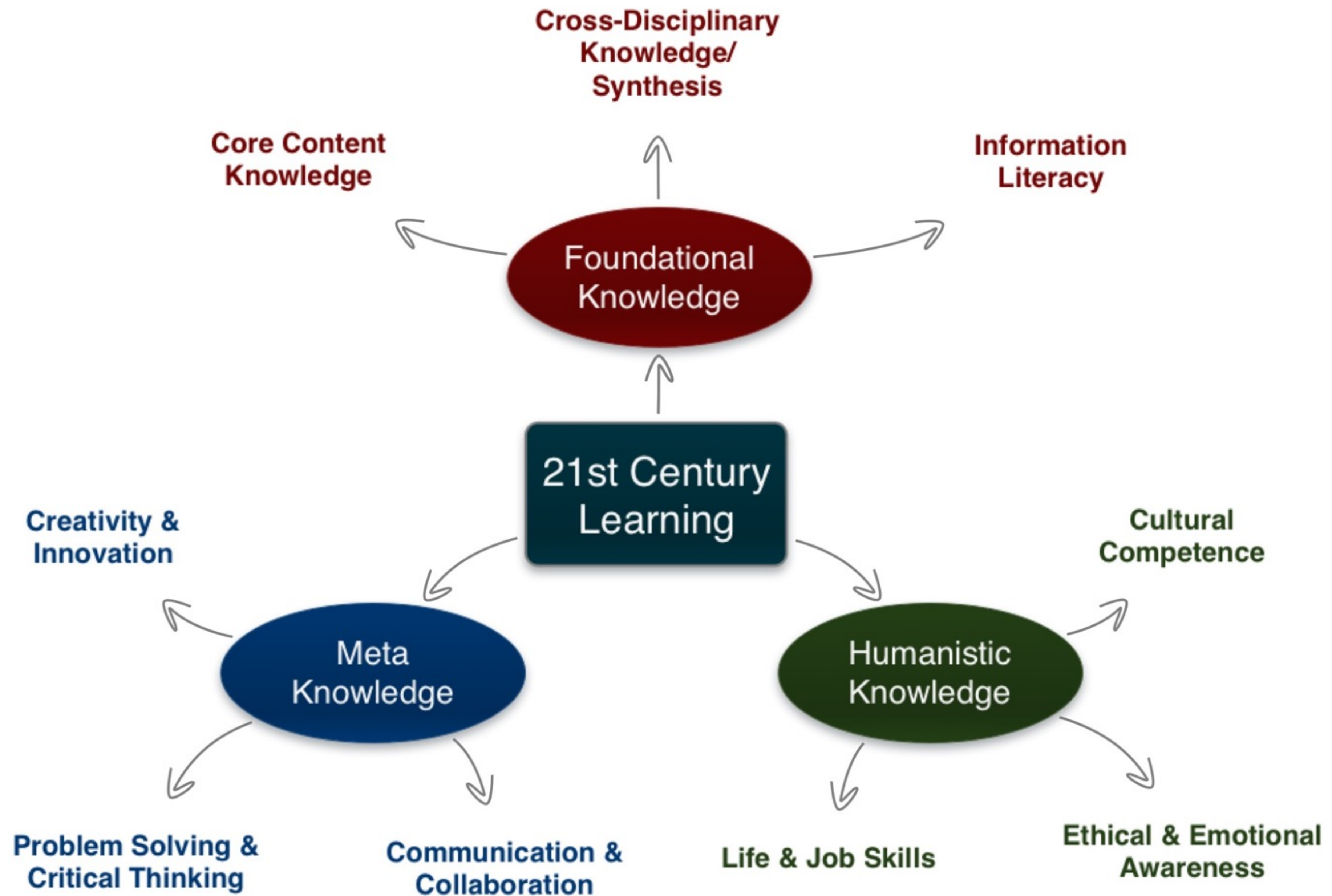
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*Enhancement*

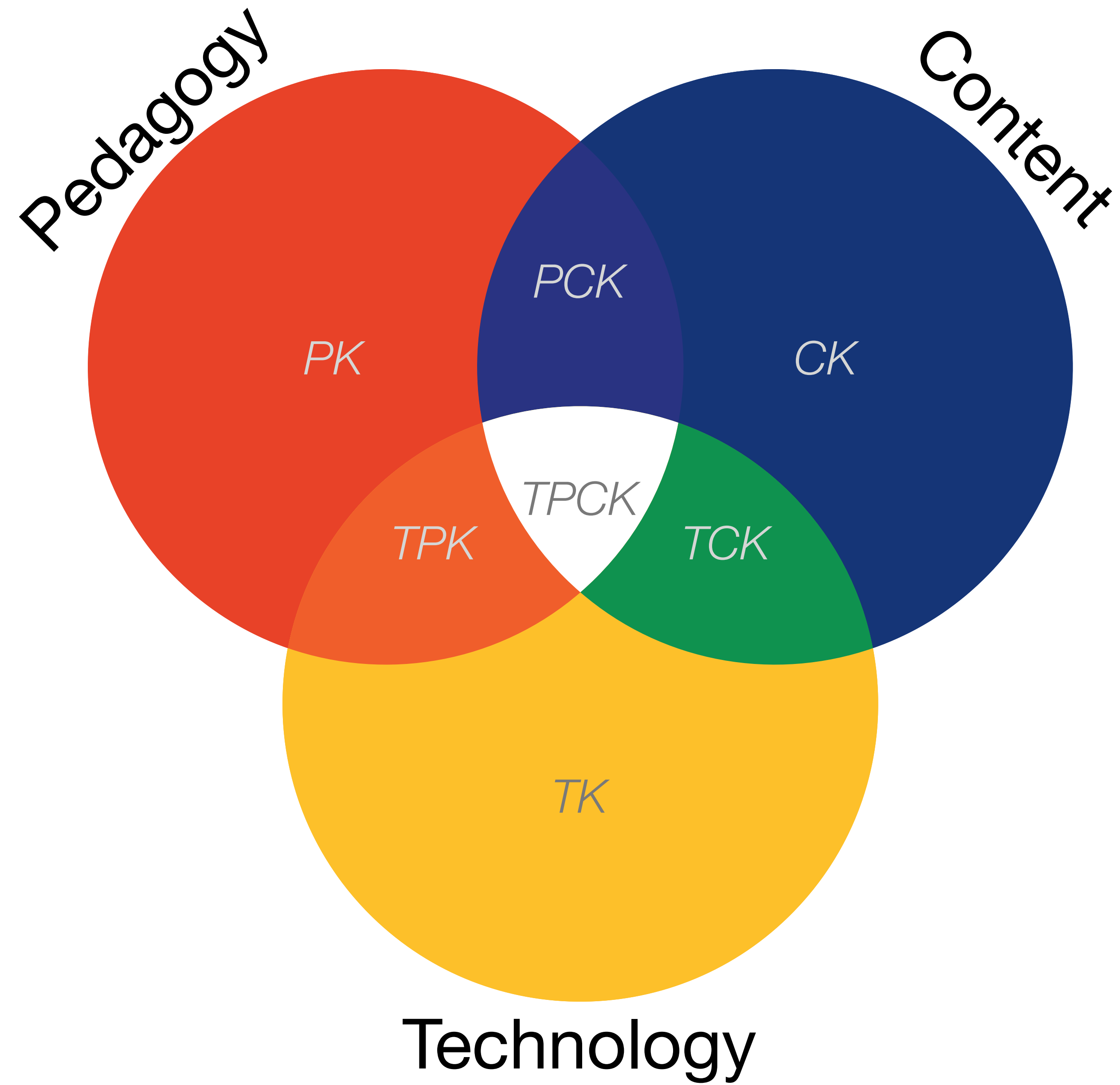


Social	Mobility	Visualization	Storytelling	Gaming
200,000 years	70,000 years	40,000 years	17,000 years	8,000 years
				

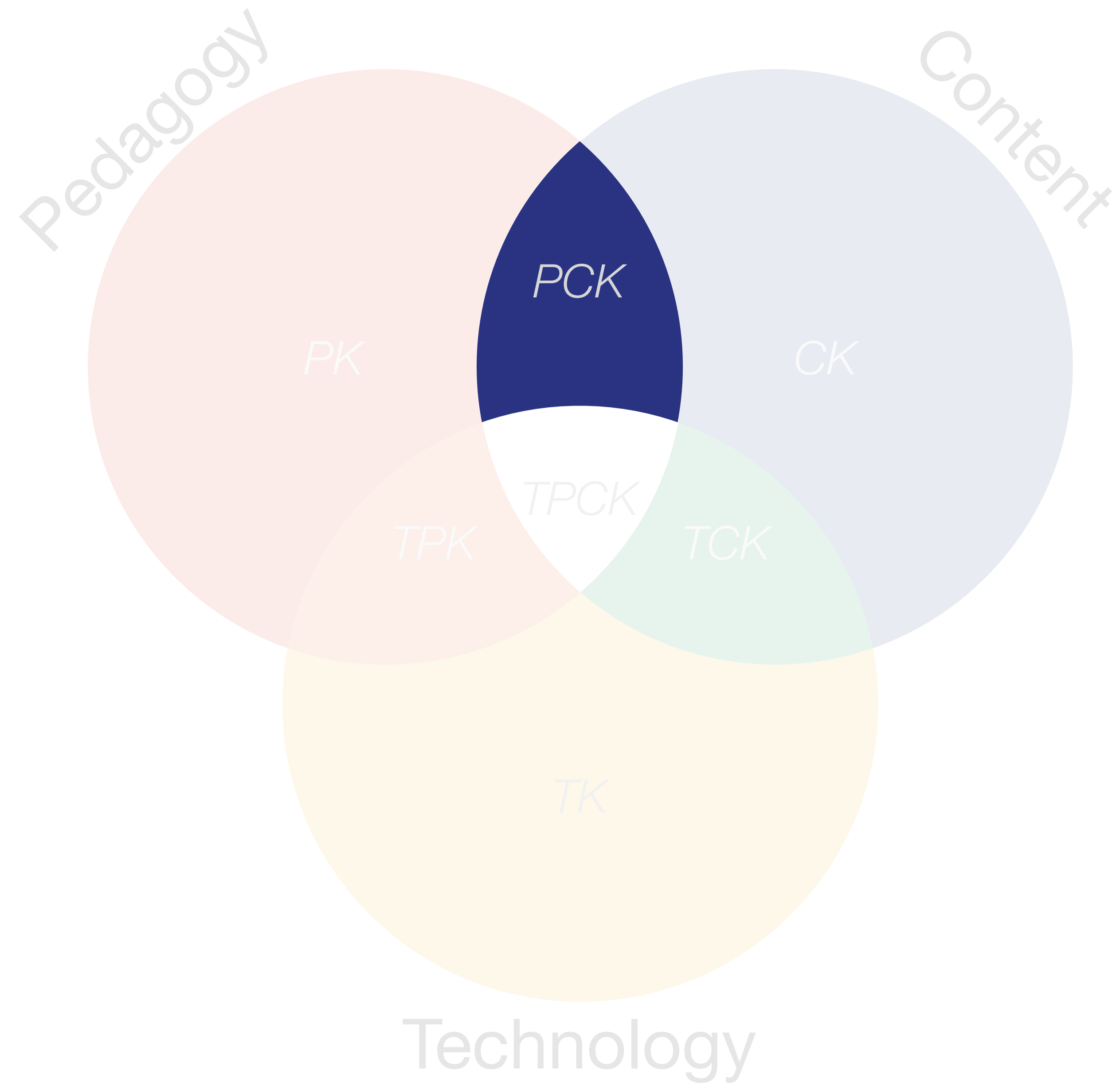








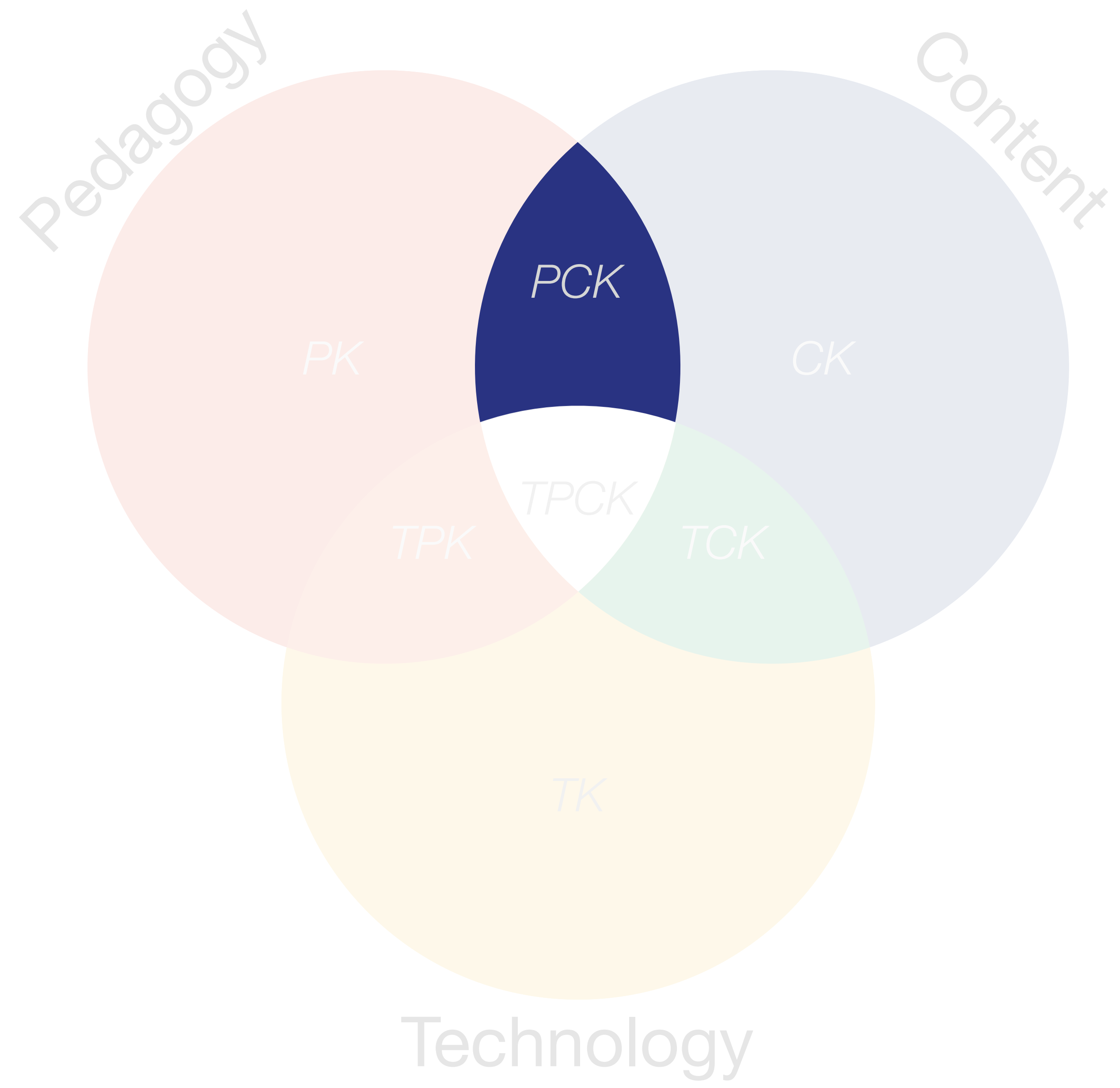




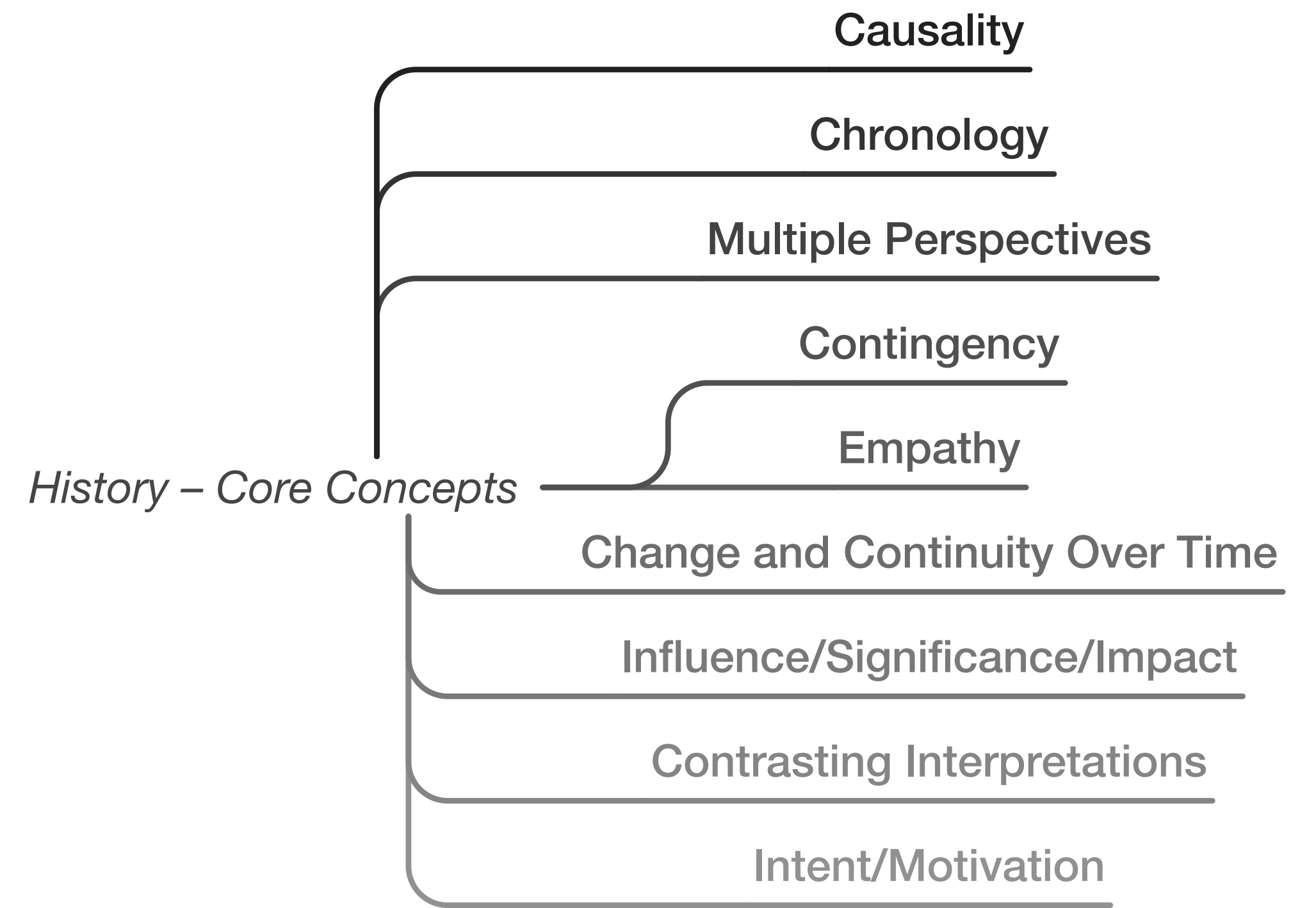
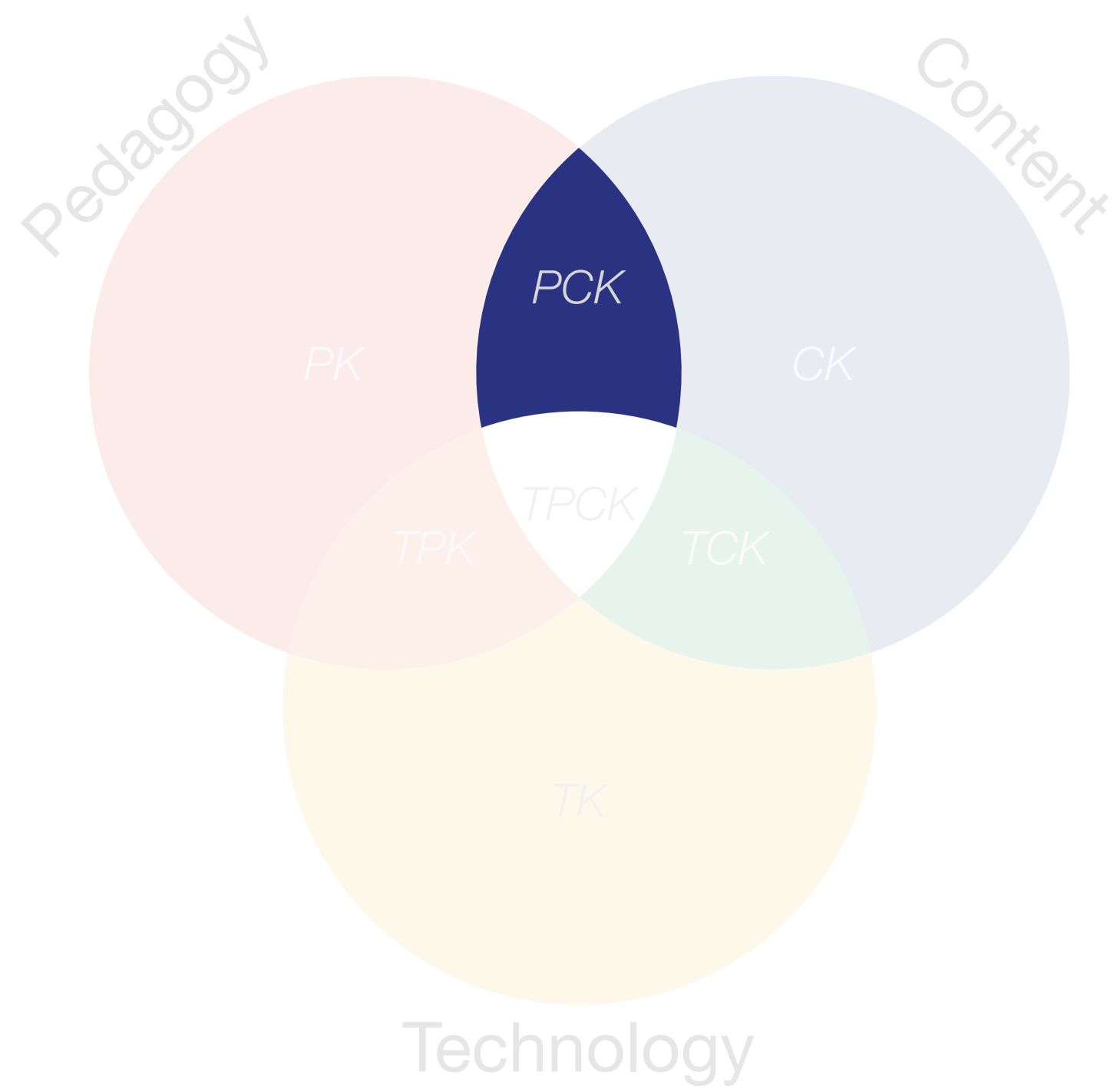


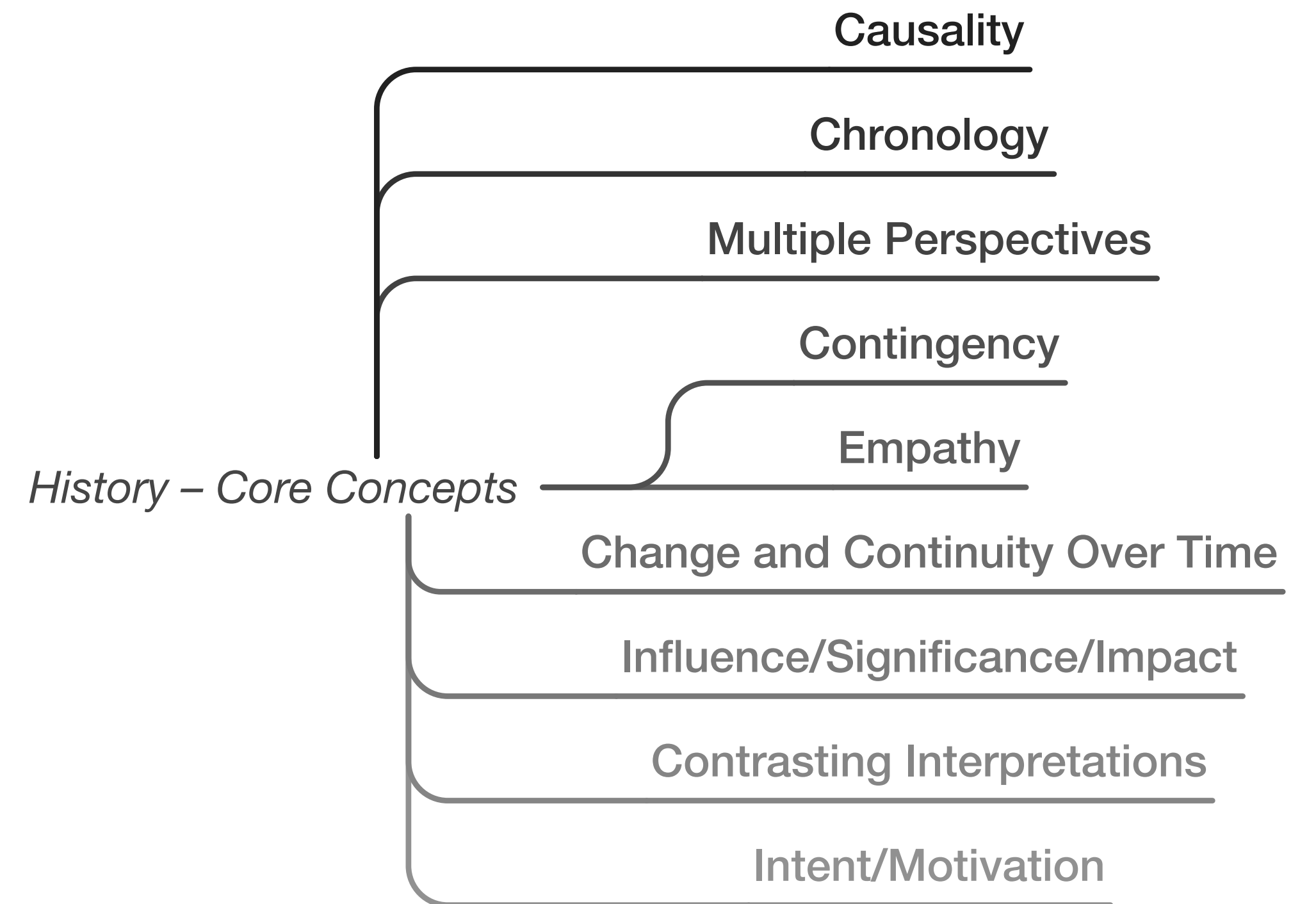
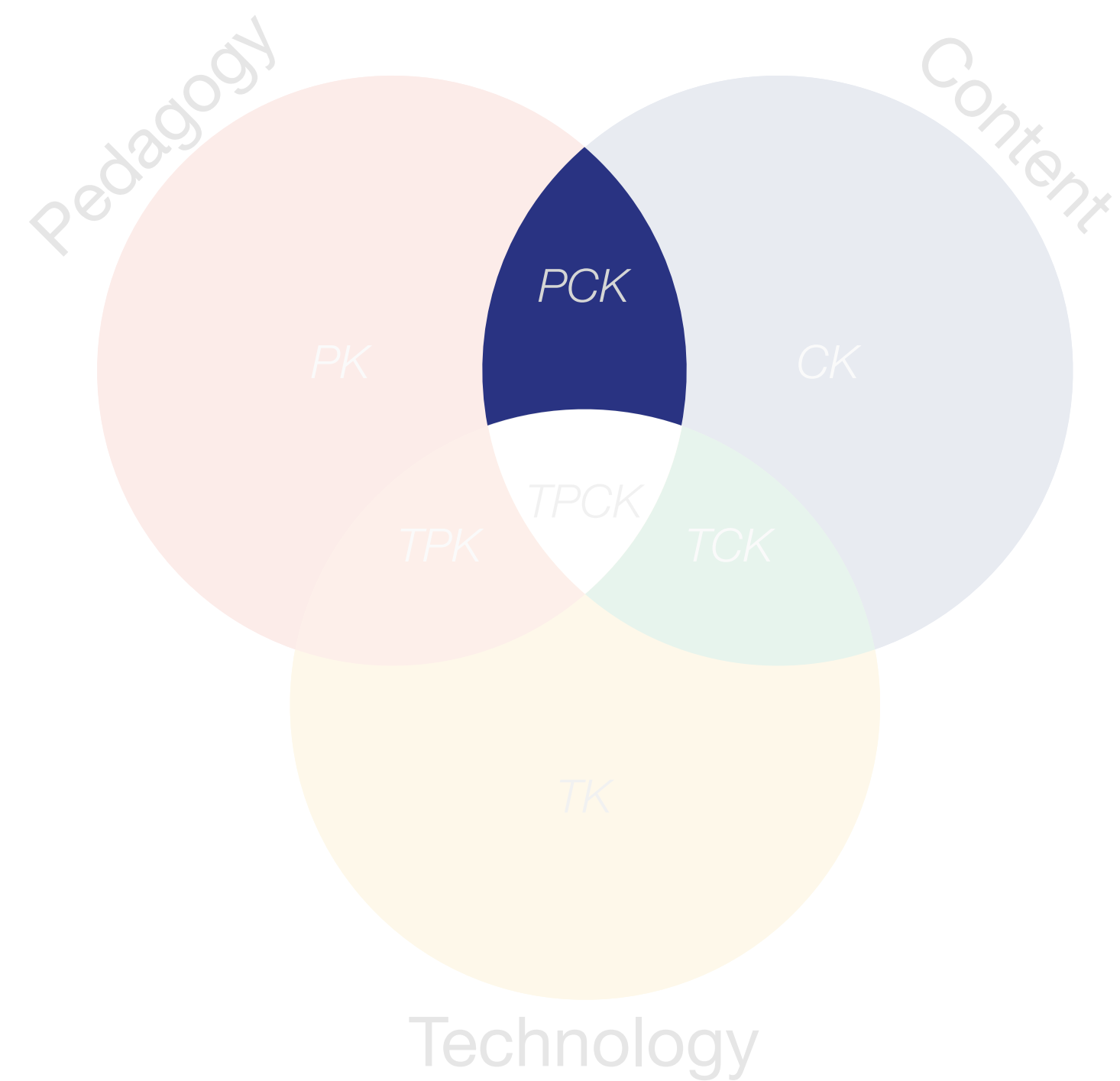
# History & Geography

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Does the question represent an important issue to historical and contemporary times?

Is the question debatable?

Does the question represent a reasonable amount of content?

Will the question hold the interest of students?

Is the question appropriate given the materials available?

Is the question challenging for the students you are teaching?

What organizing historical concepts will be emphasized?

History - Guiding Criteria



## 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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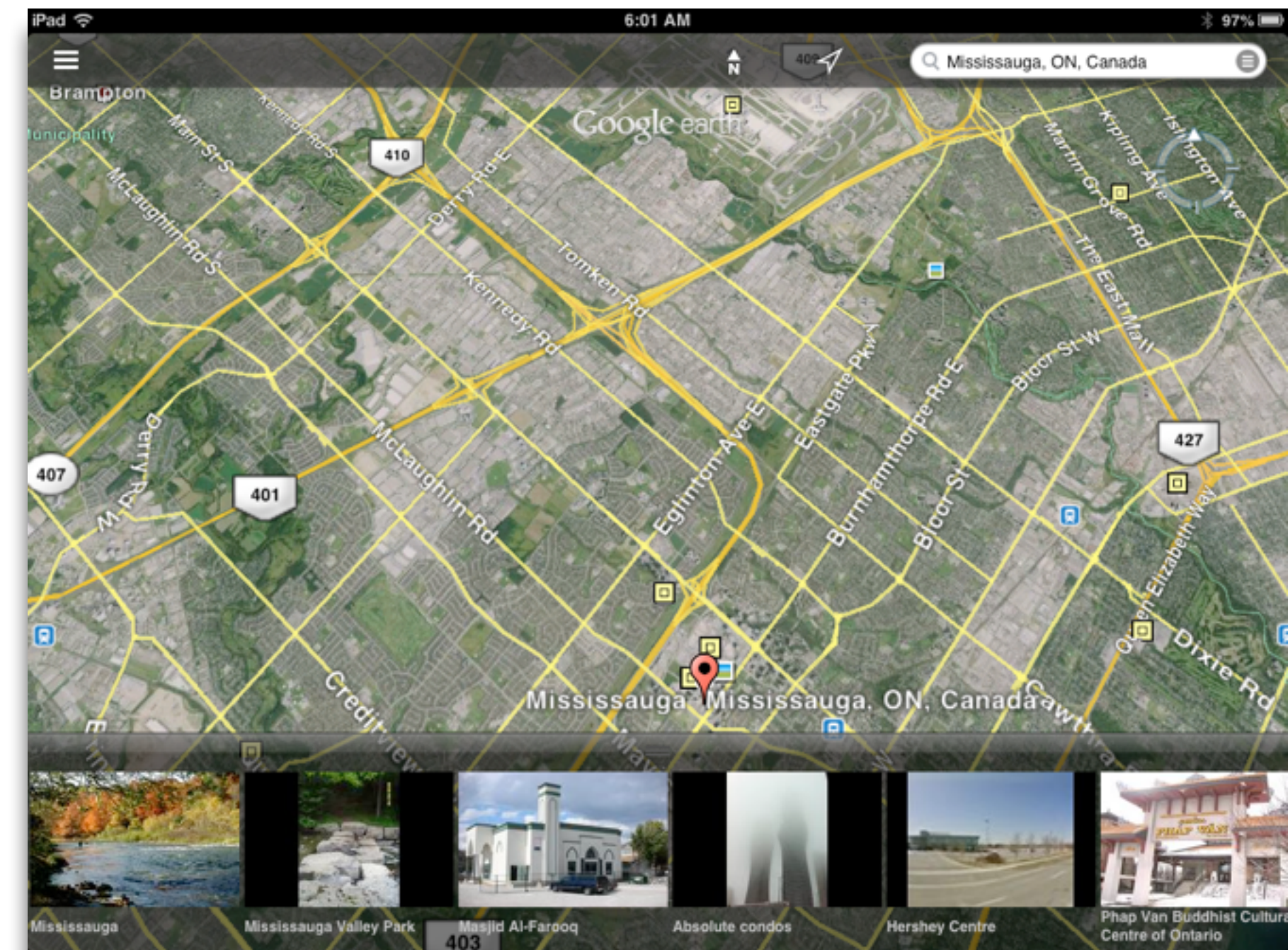
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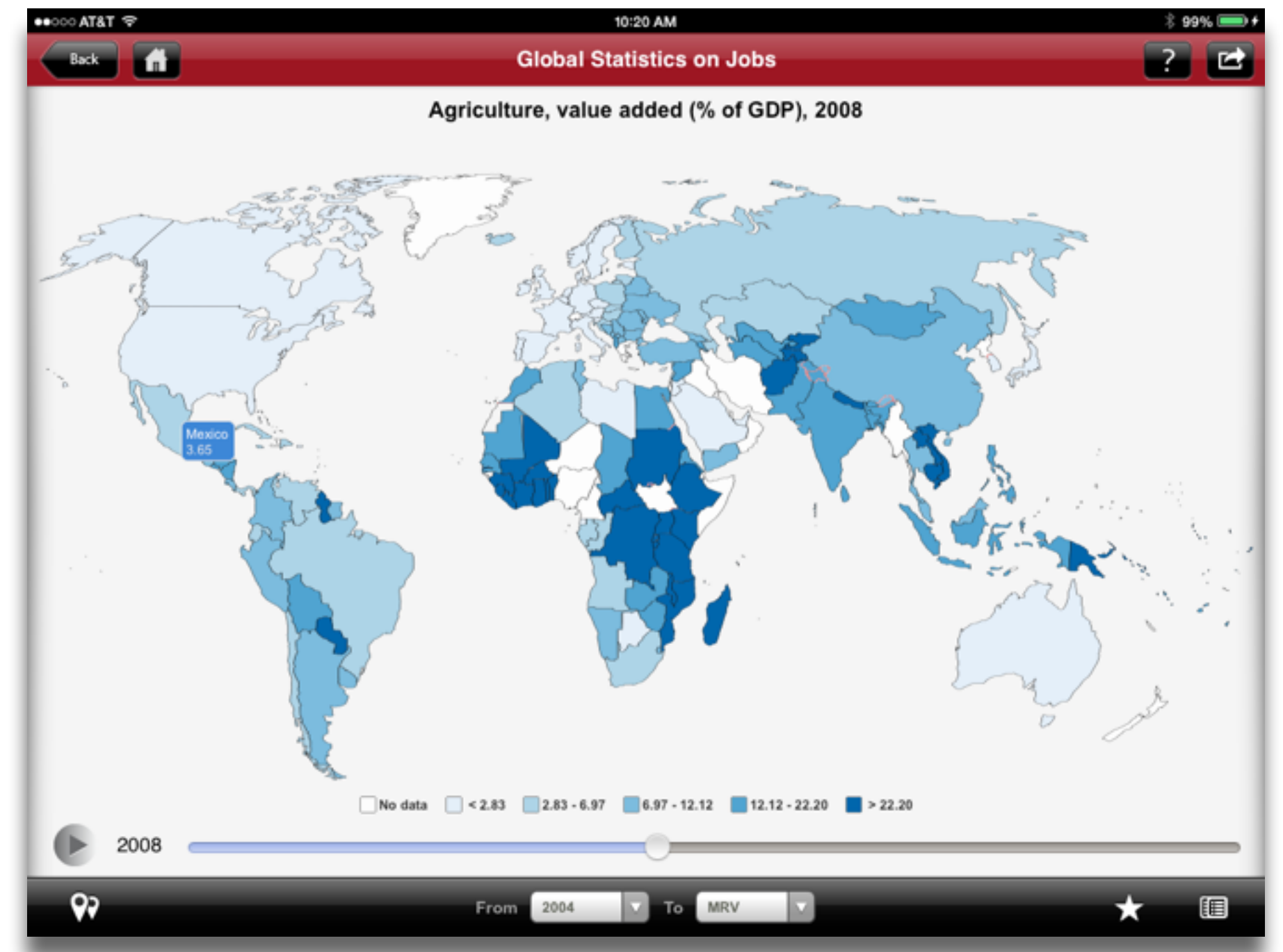
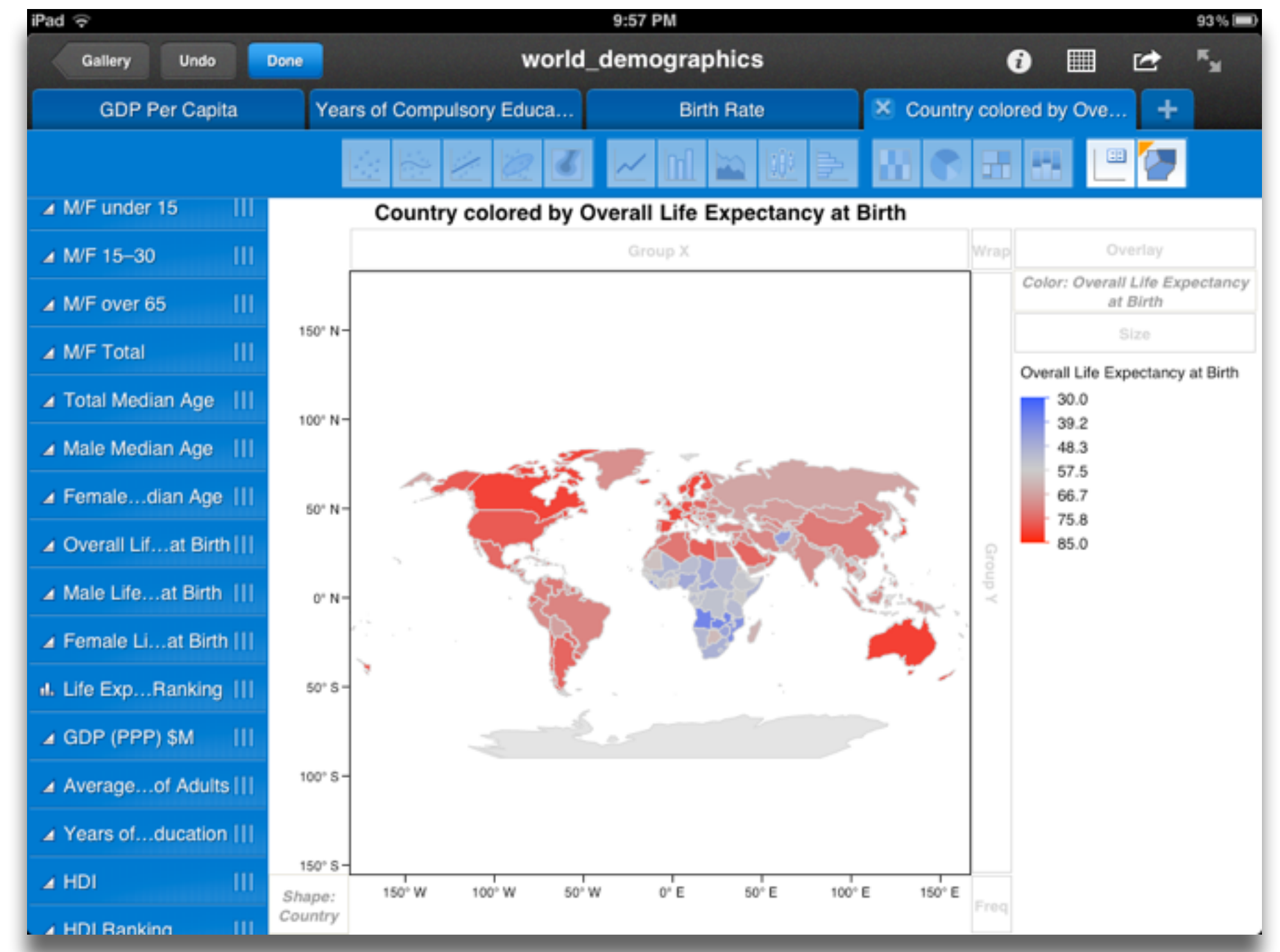
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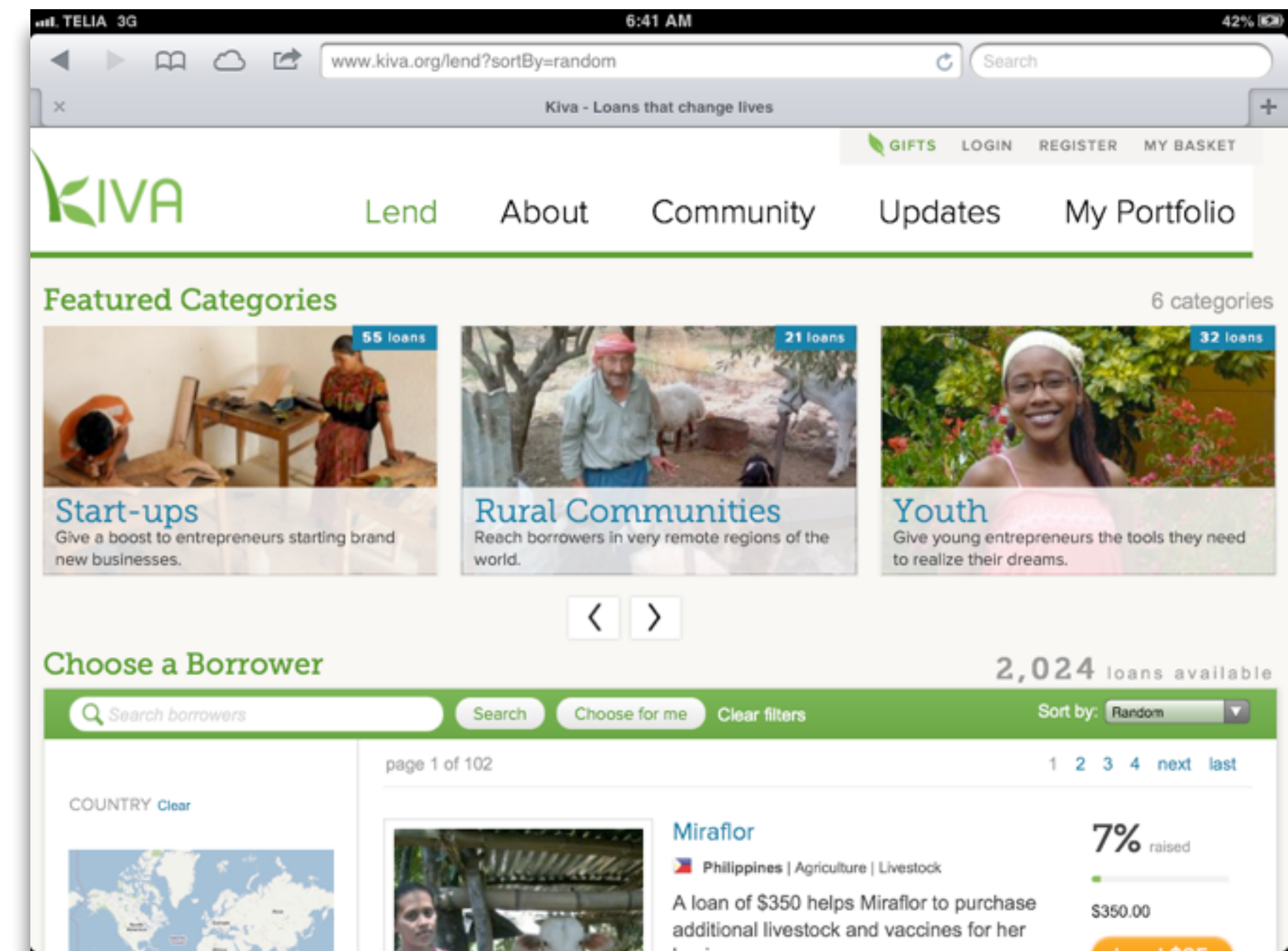
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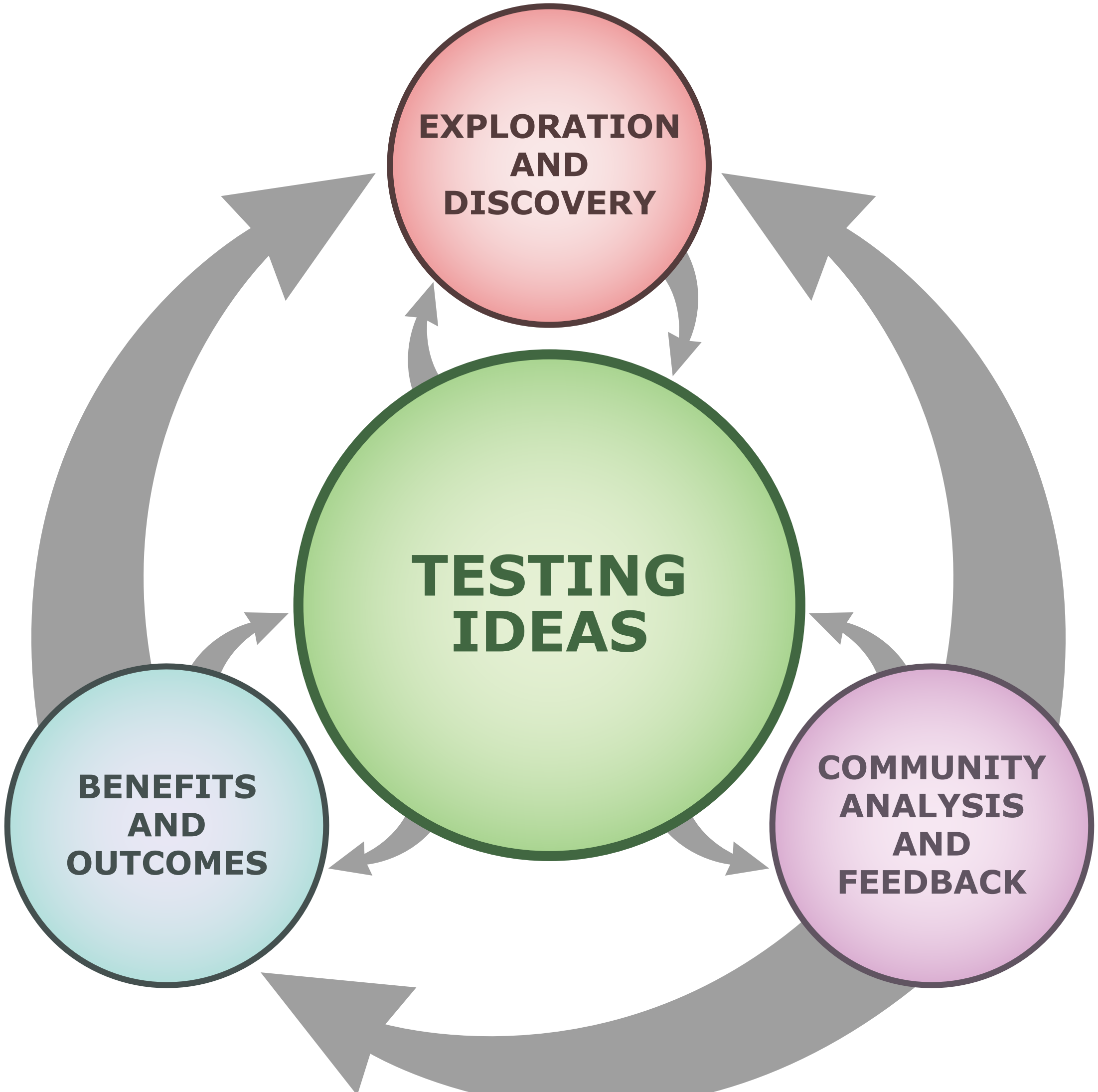


# Science & Mathematics

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# Understanding Science: How Science Works

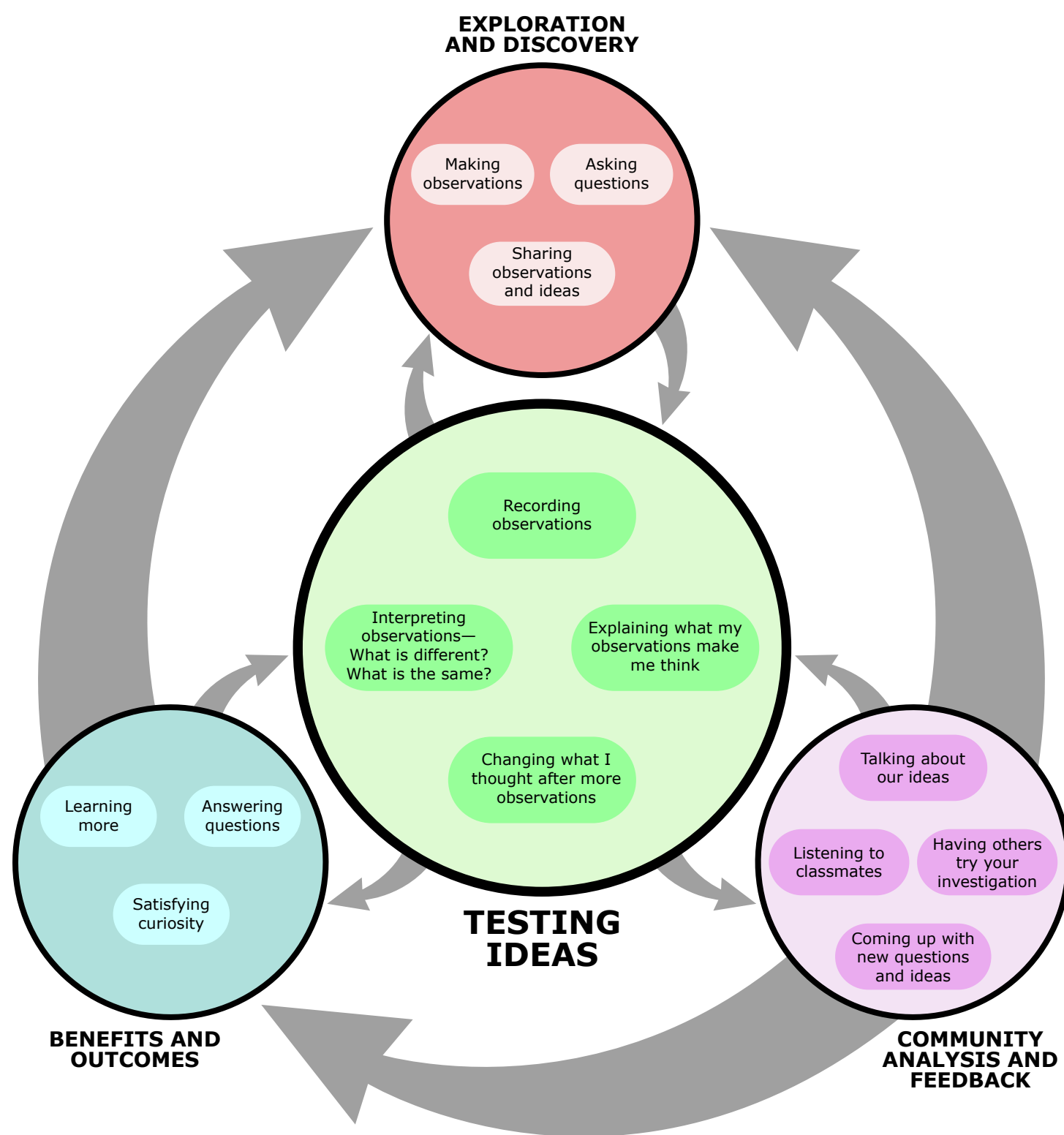
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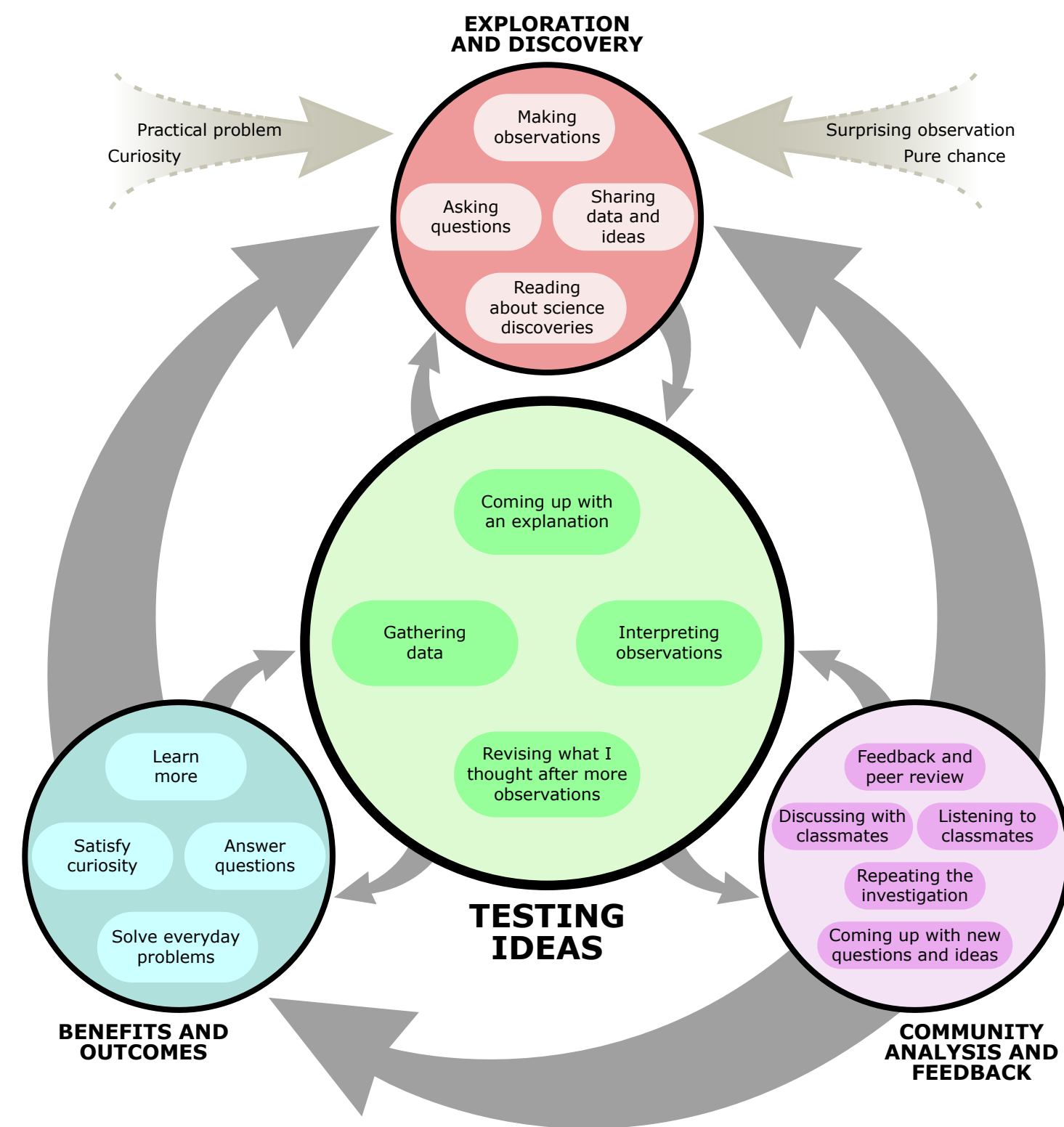
"Understanding Science." Understanding Science. N.p., n.d. Web. 5 Jan. 2014. <<http://undsci.berkeley.edu>>



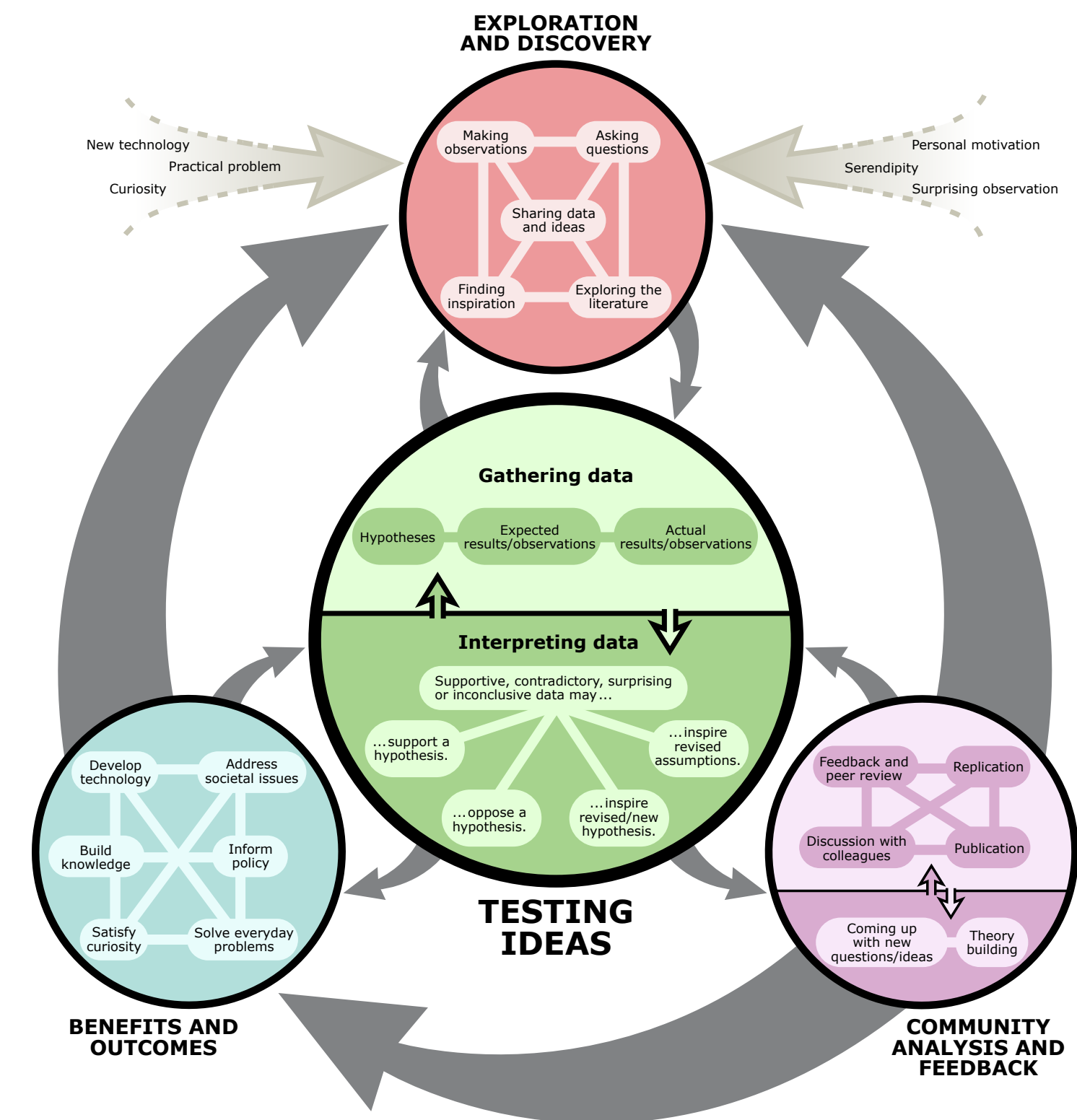
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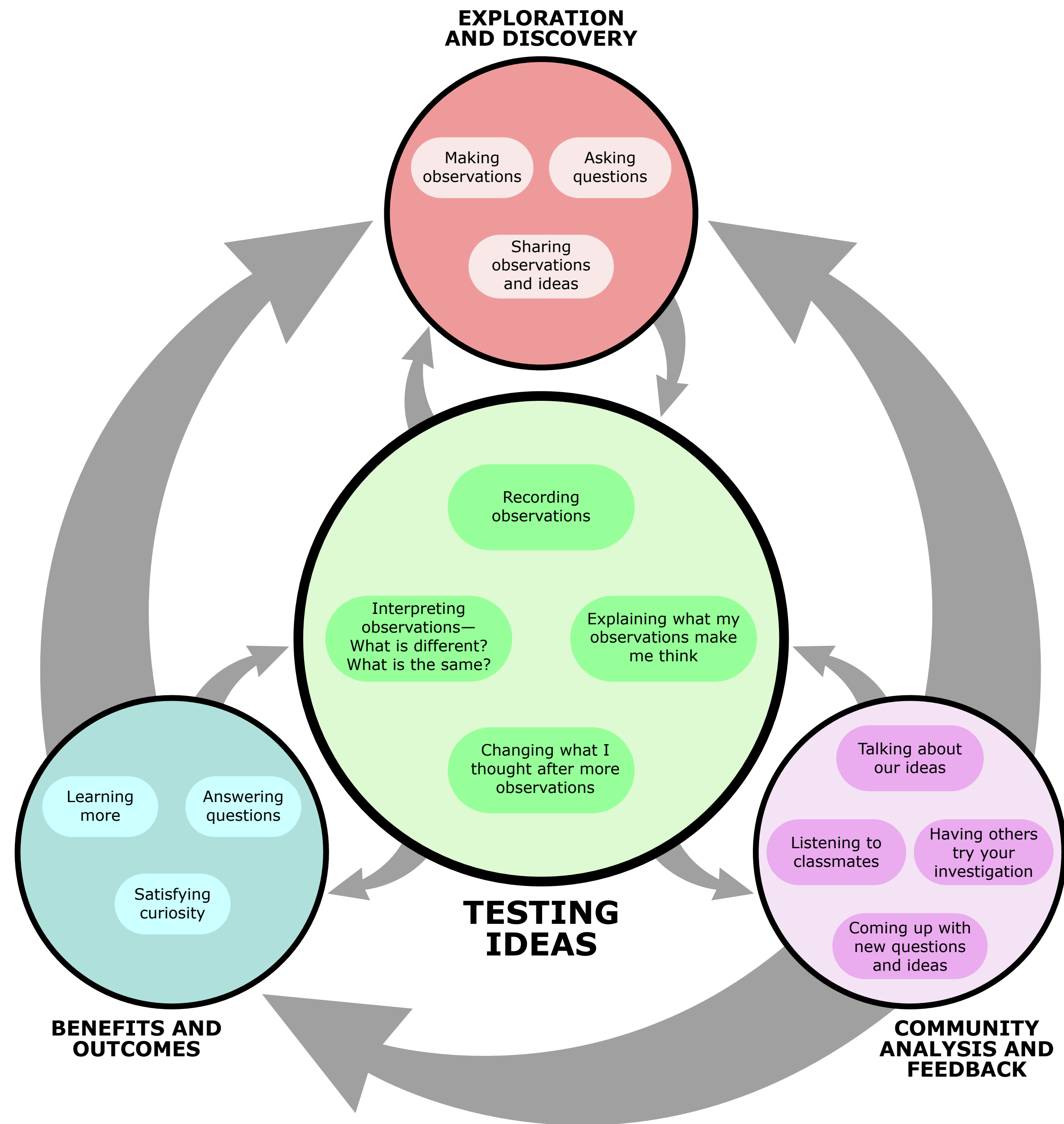
K-2



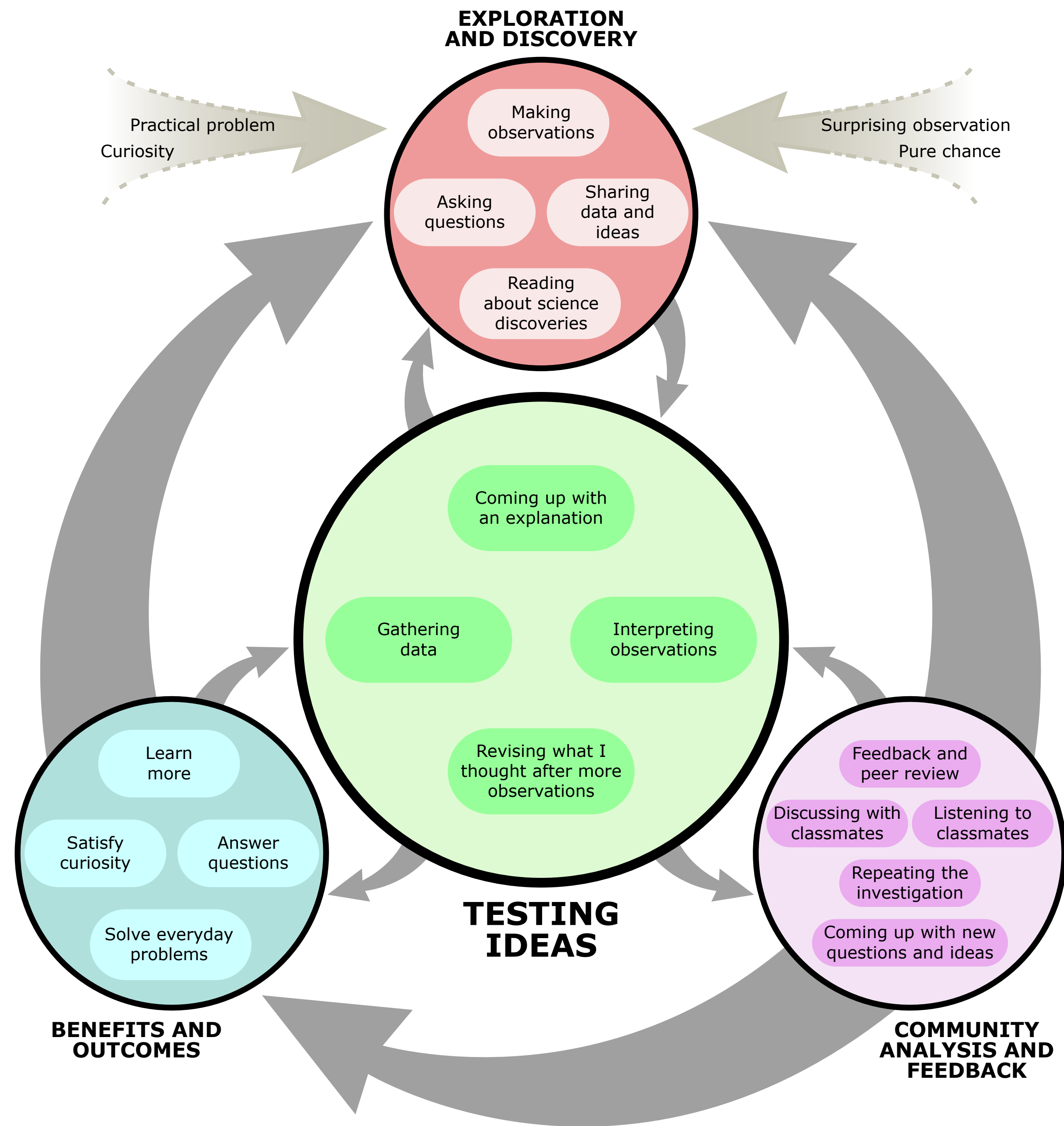
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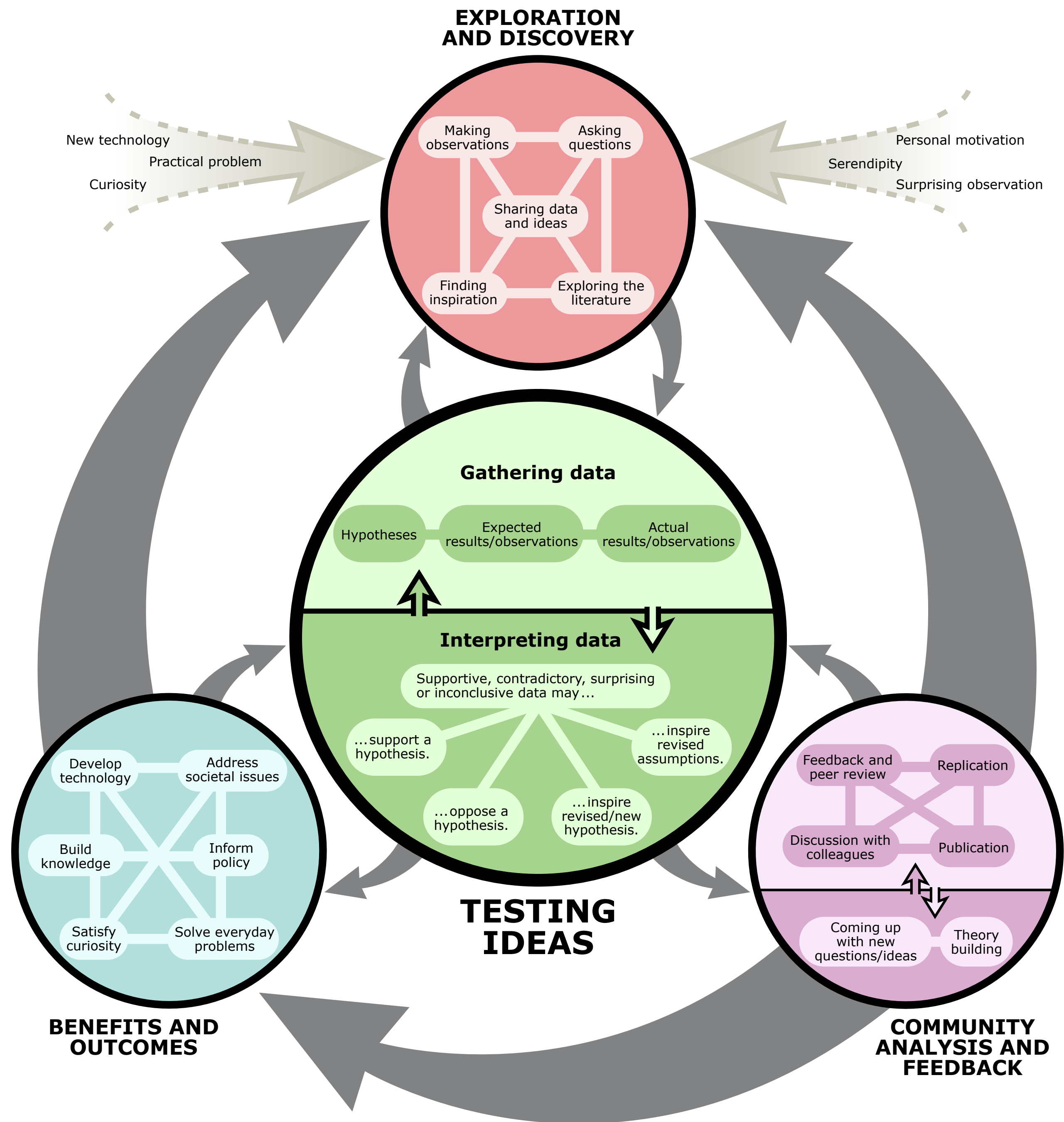


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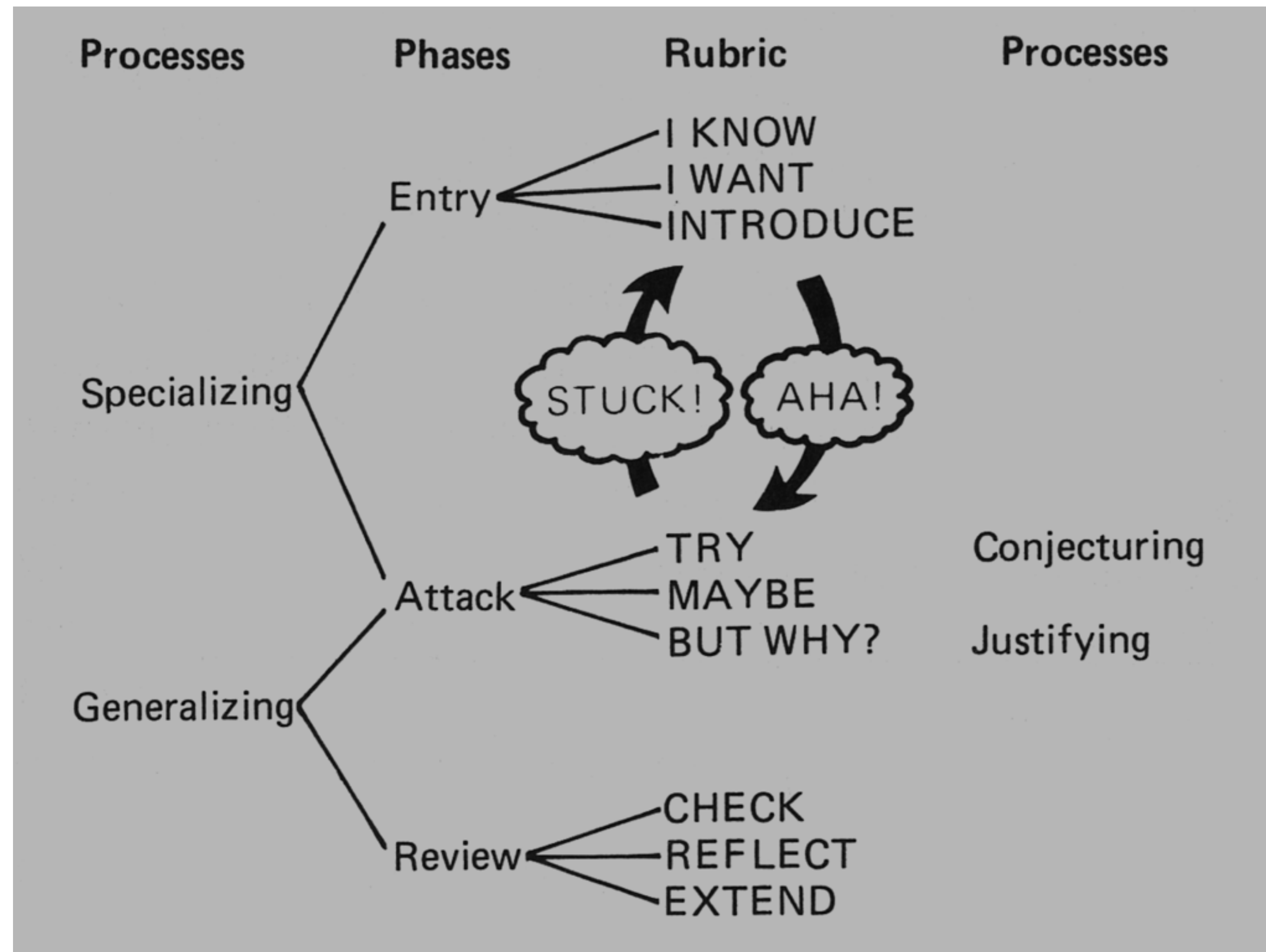


# The Art of Problem Posing: the What-If-Not Strategy

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- **Level 0: Choosing a Starting Point**
  - This could be an object, a concrete scenario, or a theorem.
- **Level I: Listing Attributes**
  - What are all the key components involved in this starting point?
- **Level II: What-If-Not-ing**
  - What if each attribute were not so - what could it be then?
- **Level III: Question Asking or Problem Posing**
  - What new questions can we ask using these new alternatives?
- **Level IV: Analyzing the Problem**
  - We select some of these questions and try to analyze or answer them.

# Thinking Mathematically





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1:15 PM 85%

### Aquatic Biomes

Aquatic biomes cover 75 percent of the surface of the Earth. The aquatic and terrestrial biomes are similar in some ways

is more common for organisms to be confined to one of the two environments.

Aquatic environments have less variation globally than those on land. Taking a broad view (the lumpers' perspective), there are four kinds of aquatic biomes: surface waters, deep waters, shores, and bottoms. Within these categories are a variety of distinctive marine and freshwater life zones that are frequently designated as separate biomes.

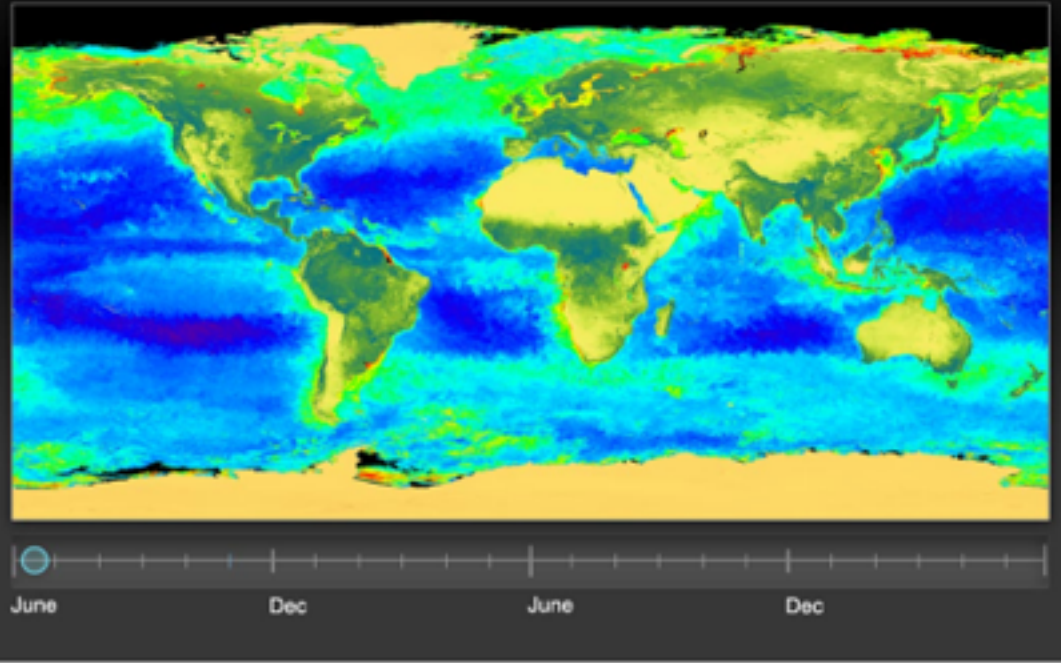
**bi•ome** | 'bī, ōm |  
noun Ecology  
a large naturally occurring community of flora and fauna occupying a major habitat, e.g., forest or tundra.

ORIGIN early 20th cent.: from **BIO-** 'life' + **-OME**

Search Web Search Wikipedia

Some aquatic organisms are adapted to both conditions for parts of their lives, such as salmon and some eels, but it

#### Worldwide Photosynthetic Activity



Interactive The latitudes of peak photosynthesis change with the seasons.

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### EURASIAN COLLARED-DOVE

*Streptopelia decaocto*  
Locally common, exotic

12½–13 in. (32–33 cm)

Recent colonizer of N. America from Caribbean but native to Eurasia; rapidly increasing and spreading. Slightly chunkier than Mourning Dove, *paler beige*, and with *square-cut tail*. Note *narrow black ring on hindneck*. *Grayish undertail coverts*. Three-toned wing pattern in flight.

### SPOTTED DOVE

*Streptopelia chinensis*  
Uncommon, local, exotic

12 in. (30–31 cm)

Note *broad collar of black and white spots* on hindneck. A bit larger than Mourning Dove; tail rounded with much white in corners. *Juvenile*: Lacks collar, but can be told by shape of spread tail.

### ROCK PIGEON (ROCK DOVE, DOMESTIC PIGEON)

*Columba livia*  
Common, exotic

12½ in. (32 cm)

Typical birds are gray with *whitish rump*, *two black wing bars*, and *broad, dark tail band*. Domestic stock or feral birds may have many color variants.



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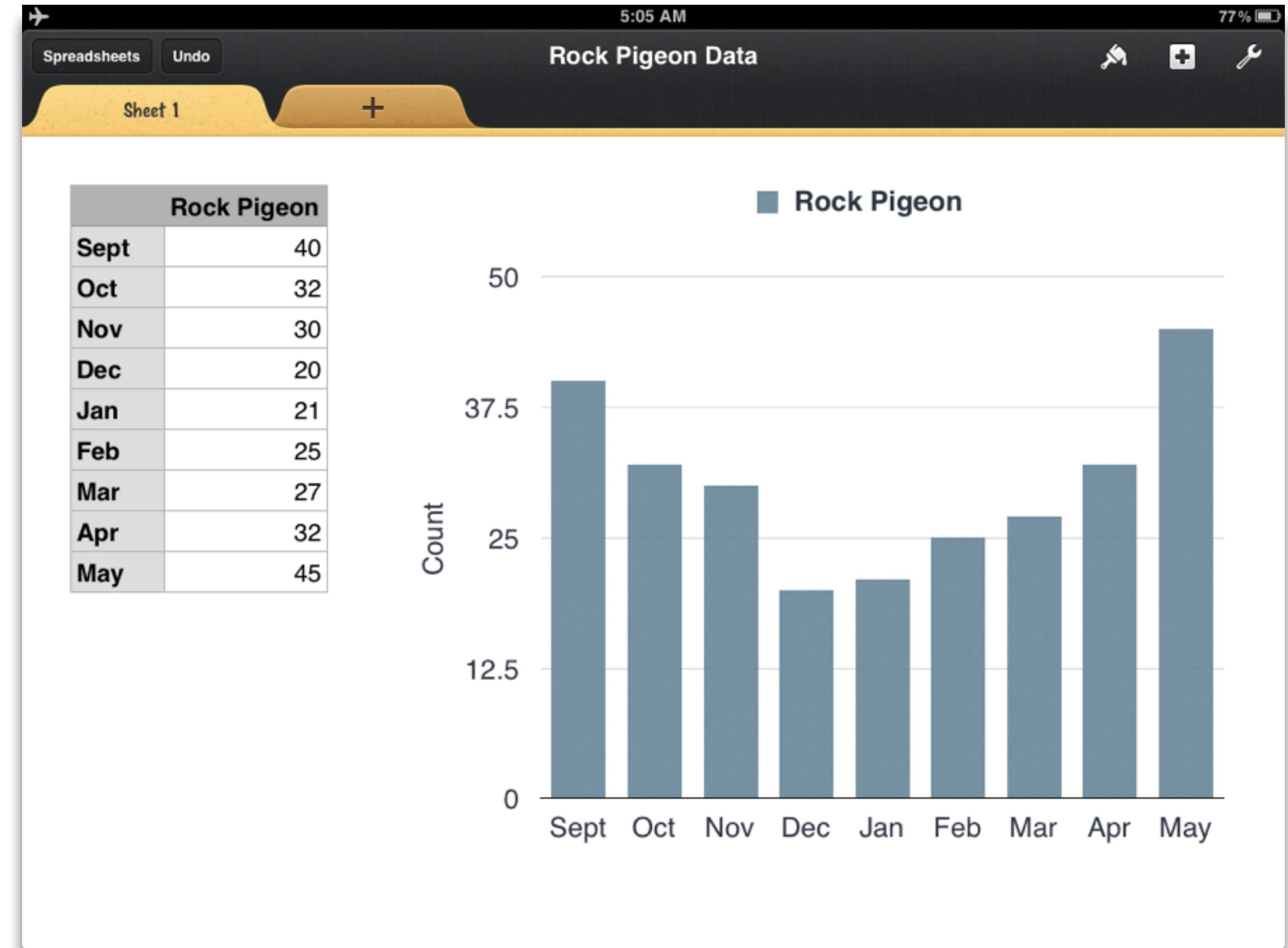
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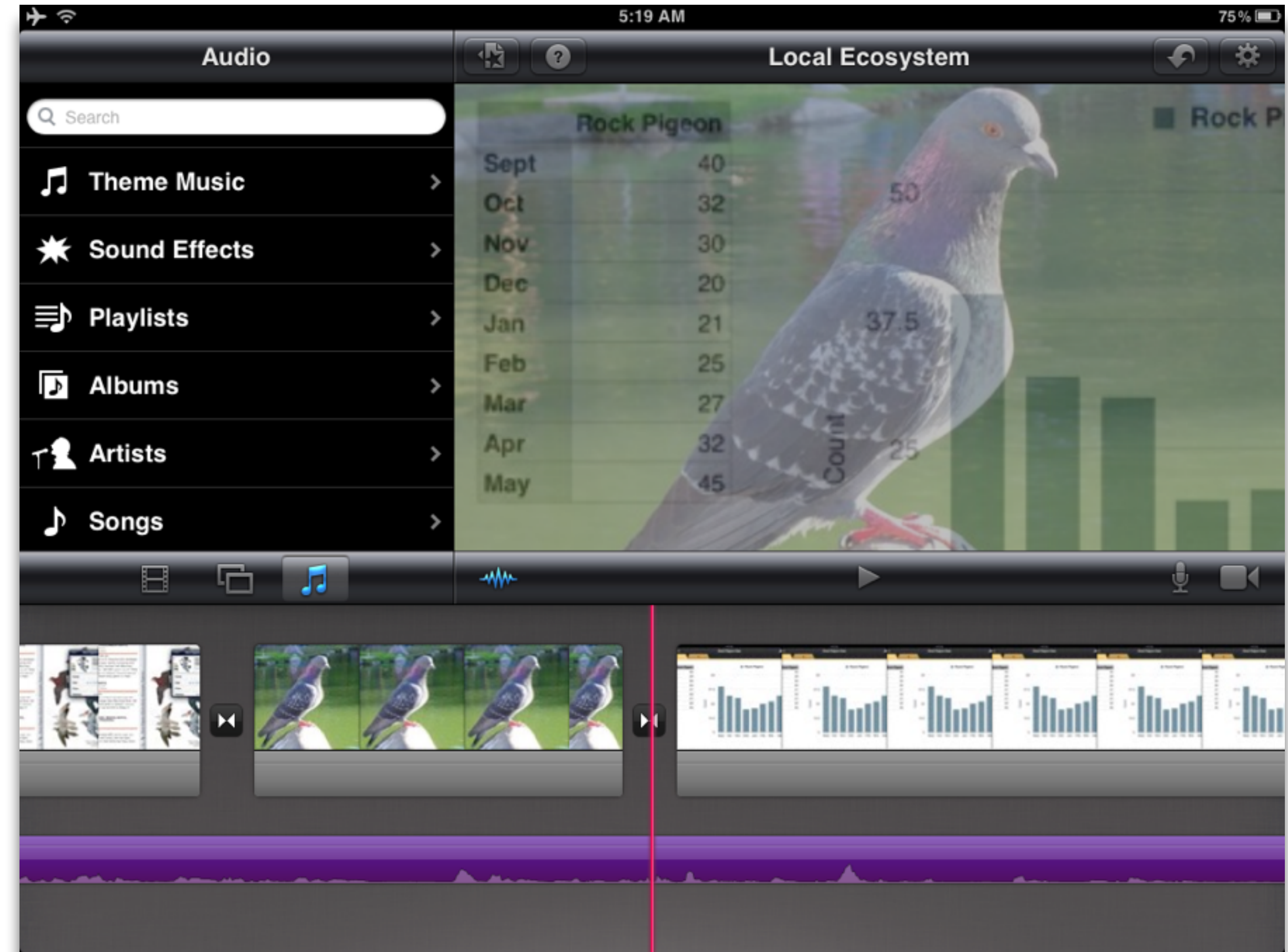
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# English Language Arts & Foreign Languages

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# Facione: Critical Thinking – Cognitive Skills and Subskills

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Skill	Subskills
Interpretation	Categorization Decoding Significance Clarifying Meaning
Analysis	Examining Ideas Identifying Arguments Analyzing Arguments
Evaluation	Assessing Claims Assessing Arguments
Inference	Querying Evidence Conjecturing Alternatives Drawing Conclusions
Explanation	Stating Results Justifying Procedures Presenting Arguments
Self-Regulation	Self-examination Self-correction



# Ten Strategies for Designing Critical Thinking Tasks

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- Tasks linking course concepts to students' personal experience or previously existing knowledge
- Explanation of course concepts to new learners
- Thesis support assignments
- Problem-posing assignments
- Data-provided assignments
- Template assignments
- Assignments requiring role-playing of unfamiliar perspectives or imagining “what if” situations
- Summaries or abstracts of articles or course lectures
- Dialogues or argumentative scripts
- Cases and simulations

# ACTFL Proficiency Guidelines (2012)

	Speaking	Writing	Listening	Reading
Novice	short messages, everyday topics, isolated words/phrases	lists and notes, formulaic information, words and phrases	key words, expressions, simple statements, recognize known phrases	key words, expressions, predictable texts, recognize known text
Intermediate	recombine material, simple questions, sentence-level language	simple messages, simple facts, ideas, connected sentences	sentence-length speech, everyday topics, controlled environment	loosely connected texts, basic information, straightforward texts
Advanced	participatory dialogue, broader topics, paragraph-level	routine texts, factual narratives, paragraph structures	connected discourse, general interest topics, straightforward discourse	main idea of narratives, real-world topics, concrete texts
Superior	accuracy and fluency, abstract elaboration, extended discourse	research texts, complex topics, extended narrative	extended discourse, less familiar topics, specialized narrative	broad range of texts, wide range of subjects, stylistic awareness
Distinguished	articulate users, wide range of concepts, sophisticated discourse	full formal writing, wide range of topics, sophisticated discourse	rich cultural discourse, wide range of topics, sophisticated discourse	wide range of genres, complex topics, sophisticated discourse

# Designing Successful Fluency & Accuracy Activities

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- **Characteristics of Successful Fluency Activities:**

1. Comprehensible input (reading and/or listening texts)

2. Culturally authentic and personalized information gap:

- a. Genuine (students share authentic information, e.g. their own life experiences)

- b. Contrived (students share information assigned to them, e.g. roleplaying someone else's experiences)

3. Strategy Instruction

4. Targeted language functions (e.g. narration, persuasion), text types, modes of language use (e.g. interpretive, interpersonal, presentational)

5. Accountability phase (demonstration of mastery of skills, concepts, or information via multiple formats, e.g. oral presentation, written report, charts, graphs, digital storytelling)

- **Key Accuracy Components:**

- Grammatical/Syntactical

- Pronunciation/Intonation/Spelling

- Lexicon

- Sociolinguistic



# A Five-Phase Lesson Plan

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- **Overview**
  - Statement of goals, learning objectives
- **Preparation**
  - Presentation of listening, reading texts
  - Language processing tasks
  - Cultural context and background
  - Discussion of learning, language processing strategies
- **Drill and Practice**
  - Opportunities for discourse, spoken or written, interpersonal or presentational
  - Drill: teacher-centered
  - Practice: learner-centered
- **Check**
  - Demonstration of mastery of skills, concepts
- **Follow-up**
  - Discussion of outcomes, current and future strategies
  - Larger cultural comparisons, analysis

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The screenshot shows a mobile browser interface with a Telstra 3G signal and a 10:24 AM timestamp. The address bar displays the URL [www.smithmag.net/afterthedeluge/2007/08/26/chapter-6/6/](http://www.smithmag.net/afterthedeluge/2007/08/26/chapter-6/6/). The page title is "Chapter 6 | A.D.: New Orleans After The Deluge". The navigation menu includes "SIX WORDS", "STORY PROJECTS", "COMICS", "STORE", "TEENS", and "ABOUT". The main content is a comic strip titled "A.D. New Orleans After the Deluge". The comic is divided into two panels. The left panel shows a street scene with a car and a building labeled "CALHO HOT MEAL". A speech bubble from the car says: "8:01 a.m. Uptown. --WVL news at the top of the hour. Although the brunt of the storm has shifted to the east, the city is still taking quite a pounding, with wind gusts up to 135 miles per hour." The right panel shows two men looking at a radio. A speech bubble from the man on the left says: "Power is out throughout the city, and we advise all listeners to stay indoors until the hurricane has completely passed us. Stay tuned right here to WVL for 24-hour continuous updates." Below the comic is a link: "Link: WVL, AM 870". At the bottom of the page, there is a note: "{ click on images to advance the story }" and a post date: "posted Sunday, August 26th, 2007" with links for "leave a comment or trackback" and "link to this page or email a friend".



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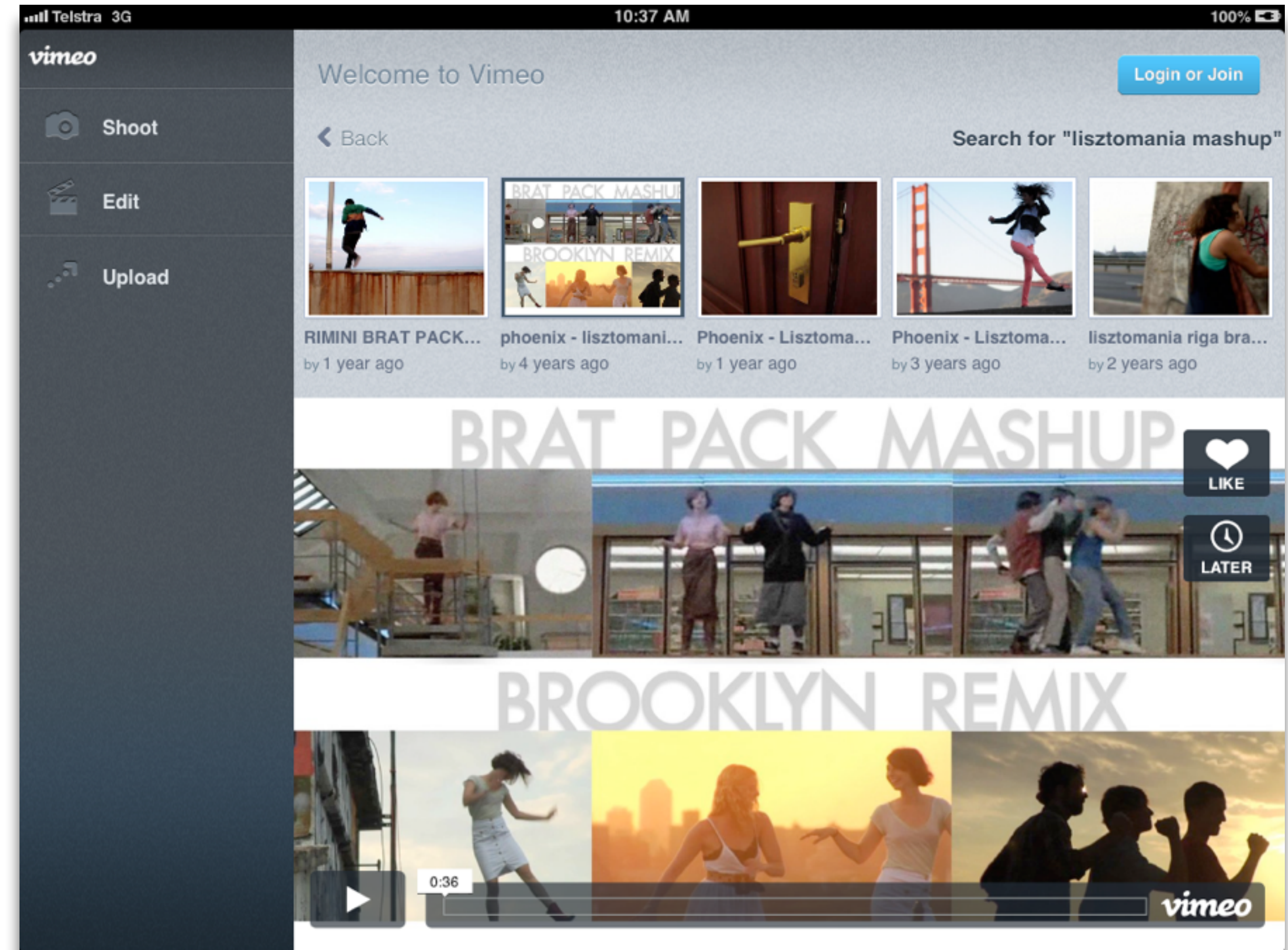
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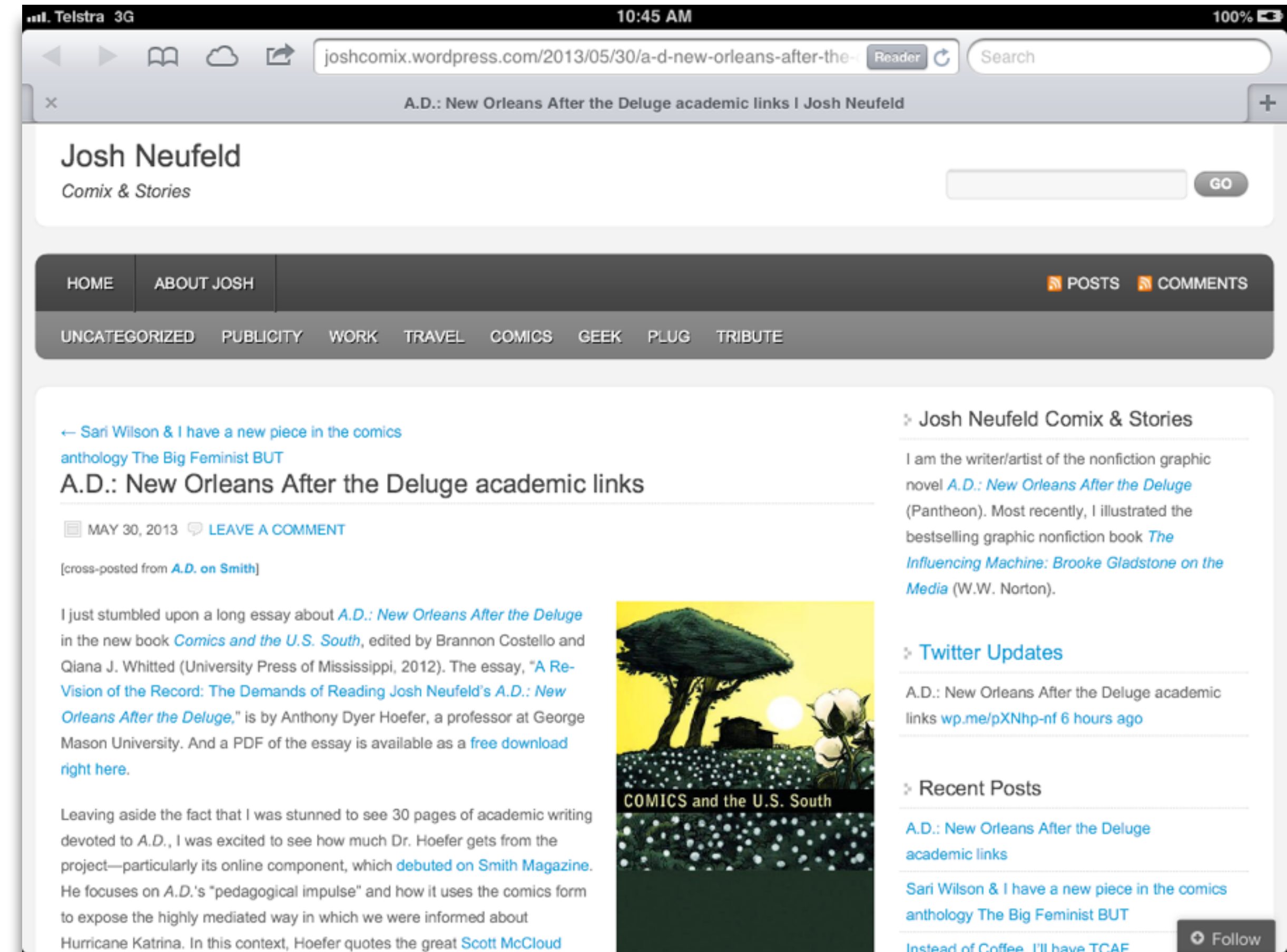
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## Part 2: The Assessment Challenge

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# Surveying Seymour Papert's Four Expectations

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- **Expectation 1:** suitably designed formative/summative assessment rubrics will show improvement when compared to traditional instruction.
- **Expectation 2:** students will show more instances of work at progressively higher levels of Bloom's Taxonomy.
- **Expectation 3:** student work will demonstrate more – and more varied – critical thinking cognitive skills, particularly in areas related to the examination of their own thinking processes.
- **Expectation 4:** student daily life will reflect the introduction of the technology. This includes (but is not limited to) directly observable aspects such as reduction in student attrition, increase in engagement with civic processes in their community, and engagement with communities beyond their own.

# Black and William: Defining Formative Assessment

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“Practice in a classroom is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited.”

# Bloom's Taxonomy: Cognitive Processes

Anderson & Krathwohl (2001)	Characteristic Processes	
<b>Remember</b>	<ul style="list-style-type: none"> <li>• Recalling memorized knowledge</li> <li>• Recognizing correspondences between memorized knowledge and new material</li> </ul>	
<b>Understand</b>	<ul style="list-style-type: none"> <li>• Paraphrasing materials</li> <li>• Exemplifying concepts, principles</li> <li>• Classifying items</li> <li>• Summarizing materials</li> </ul>	<ul style="list-style-type: none"> <li>• Extrapolating principles</li> <li>• Comparing items</li> </ul>
<b>Apply</b>	<ul style="list-style-type: none"> <li>• Applying a procedure to a familiar task</li> <li>• Using a procedure to solve an unfamiliar, but typed task</li> </ul>	
<b>Analyze</b>	<ul style="list-style-type: none"> <li>• Distinguishing relevant/irrelevant or important/unimportant portions of material</li> <li>• Integrating heterogeneous elements into a structure</li> <li>• Attributing intent in materials</li> </ul>	
<b>Evaluate</b>	<ul style="list-style-type: none"> <li>• Testing for consistency, appropriateness, and effectiveness in principles and procedures</li> <li>• Critiquing the consistency, appropriateness, and effectiveness of principles and procedures, basing the critique upon appropriate tests</li> </ul>	
<b>Create</b>	<ul style="list-style-type: none"> <li>• Generating multiple hypotheses based on given criteria</li> <li>• Designing a procedure to accomplish an untyped task</li> <li>• Inventing a product to accomplish an untyped task</li> </ul>	



# Facione: Critical Thinking – Cognitive Skills and Subskills

---

<b>Skill</b>	<b>Subskills</b>
<b>Interpretation</b>	Categorization Decoding Significance Clarifying Meaning
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<b>Explanation</b>	Stating Results Justifying Procedures Presenting Arguments
<b>Self-Regulation</b>	Self-examination Self-correction

# Wiliam: A Framework for Formative 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 classroom 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	

# 1. Clarifying, Sharing, and Understanding Learning Intentions and Criteria for Success

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- Rubric Dichotomies:
  - Task-specific vs. generic rubrics
  - Product-focused vs. process-focused
  - Official vs. student-friendly Language
- Rubric Design:
  - Three key components in presenting learning intentions and success criteria to students:
    - WALT: we are learning to
    - WILF: what I'm looking for
    - TIB: this is because
  - Make explicit progressions within rubrics, and progressions across rubrics
- Students and Rubrics:
  - Have students look at samples of other students' work, then rank them by quality
    - Students become better at seeing issues in their own work by recognizing them in others' work
    - Not a “somebody wins” exercise, but rather a quality exercise that engages students
  - Have students design test items, rubrics



# Traditional Rubric Design

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	Advanced	Proficient	Basic	Below Basic
Topic	Topic is clear	Topic is generally clear	Topic is vague	Topic is unclear
Focus	Demonstrates focus on topic	Minor lapses in focus on topic	Major lapses in focus on topic	Fails to demonstrate focus on topic
...	...	...	...	...

	Advanced	Proficient	Basic	Below Basic
Pretty noises	Has multiple pretty noises	Has only one pretty noise	No pretty noises	Bad, bad, ugly noises
Photos	Lots of colorful photos	One colorful photo	No colorful photos	Ugly, drab photos
(Oh yeah, we'll get to why they created this - eventually...)	...	...	...	...

# Example: A Rubric for Concept Maps (Shuman *et al.*, 2004)

	<i>1</i>	<i>2</i>	<i>3</i>
<i>Comprehensiveness</i> – covering completely/broadly	The map lacks subject definition; the knowledge is very simple and/or limited. Limited breadth of concepts (i.e. minimal coverage of coursework, little or no mention of employment, and/or lifelong learning). The map barely covers some of the qualities of the subject area.	The map has adequate subject definition but knowledge is limited in some areas (i.e., much of the coursework is mentioned but one or two of the main aspects are missing). Map suggests a somewhat narrow understanding of the subject matter.	The map completely defines the subject area. The content lacks no more than one extension area (i.e., most of the relevant extension areas including lifelong learning, employment, people, etc. are mentioned).
<i>Organization</i> – to arrange by systematic planning and united effort	The map is arranged with concepts only linearly connected. There are few (or no) connections within/between the branches. Concepts are not well integrated.	The map has adequate organization with some within/between branch connections. Some, but not complete, integration of branches is apparent. A few feedback loops may exist.	The map is well organized with concept integration and the use of feedback loops. Sophisticated branch structure and connectivity.
<i>Correctness</i> - conforming to or agreeing with fact, logic, or known truth	The map is naïve and contains misconceptions about the subject area; inappropriate words or terms are used. The map documents an inaccurate understanding of certain subject matter.	The map has few subject matter inaccuracies; most links are correct. There may be a few spelling and grammatical errors.	The map integrates concepts properly and reflects an accurate understanding of subject matter meaning little or no misconceptions, spelling/grammatical errors.



# Example: A Rubric for Sociology Online Discussion (Evans, 2010)

	<b>4 Points</b>	<b>2 Point</b>	<b>0 Points</b>
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.
	<b>2 Points</b>	<b>1 Point</b>	<b>0 Points</b>
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.



**Three Features Dichotomous Rubric**  
 (Focus, Elaboration/Details, Organization)

Level 4: everything in place  
 Level 3: most things in place  
 some lapses  
 Level 2: a few things in place  
 but not everything  
 Level 1: very few things in  
 place

Writing  
 Assignment:

Is there a  
 clear topic?

Yes, the topic  
 is  
 clear.

Are there  
 supporting  
 details written in a  
 sequence that makes  
 sense?

Yes, the details  
 support the topic  
 and are well  
 developed. The  
 order of details  
 makes sense.  
 No, go to 3

*Level 4  
 Paper*

Yes. Some  
 details support  
 topic, but it is  
 confusing.  
 Reader cannot  
 figure out order  
 of details.  
 No go to 2

*Level 3  
 Paper*

No, topic is  
 vague or  
 unclear.  
 No focus is  
 established

Are there some  
 interesting thoughts,  
 even though topic is  
 not clear?

Yes, some interesting  
 sentences that could  
 be developed into  
 paper with clear topic  
 No go to 1

*Level 2  
 Paper*

Yes, There seems to  
 be no topics or  
 thoughts for  
 development

*Level 1  
 Paper*

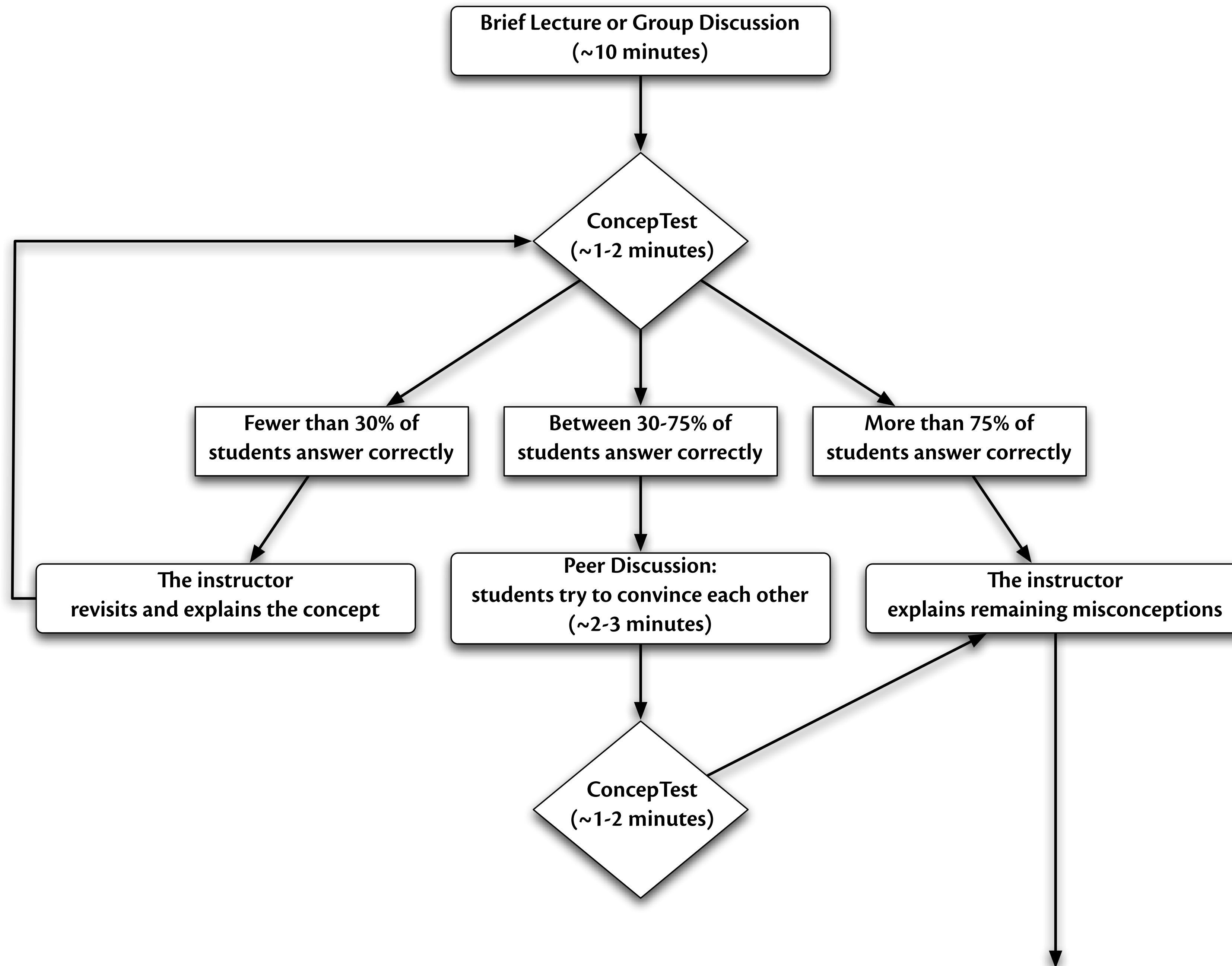
Developed by Vickie Hedrick

## 2. Eliciting Evidence of Learners' Achievement in the (Extended) Classroom

---

- Asking questions in class:
  - Chosen to act as a discussion/thinking trigger
  - Should provide info for varying instruction on the fly and in the long term
  - Examples:
    - ConcepTest
    - POE (Predict-Observe-Explain)
    - TPS (Think-Pair-Share)
    - Virtual Whiteboard





## Redefinition

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

## Modification

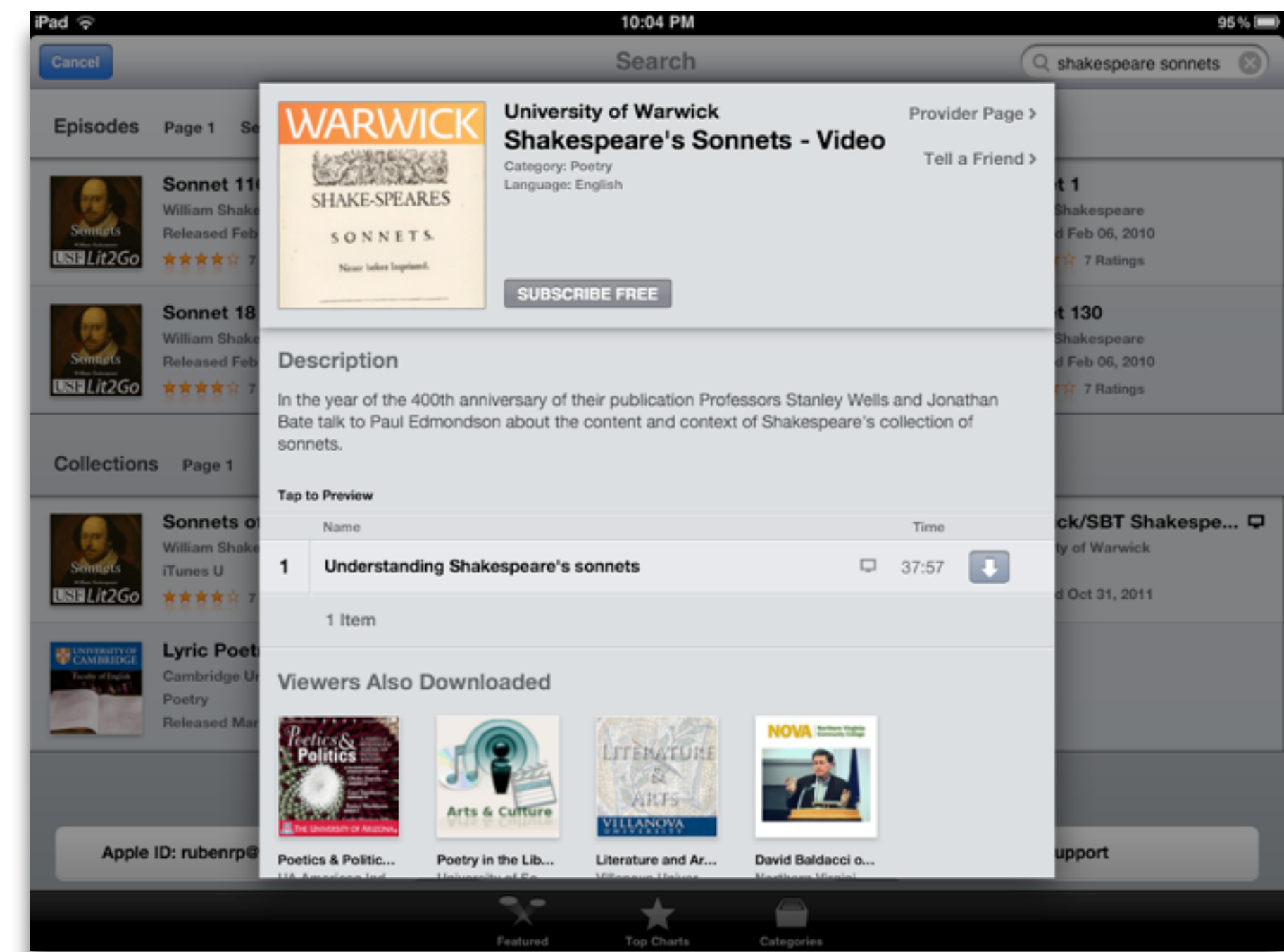
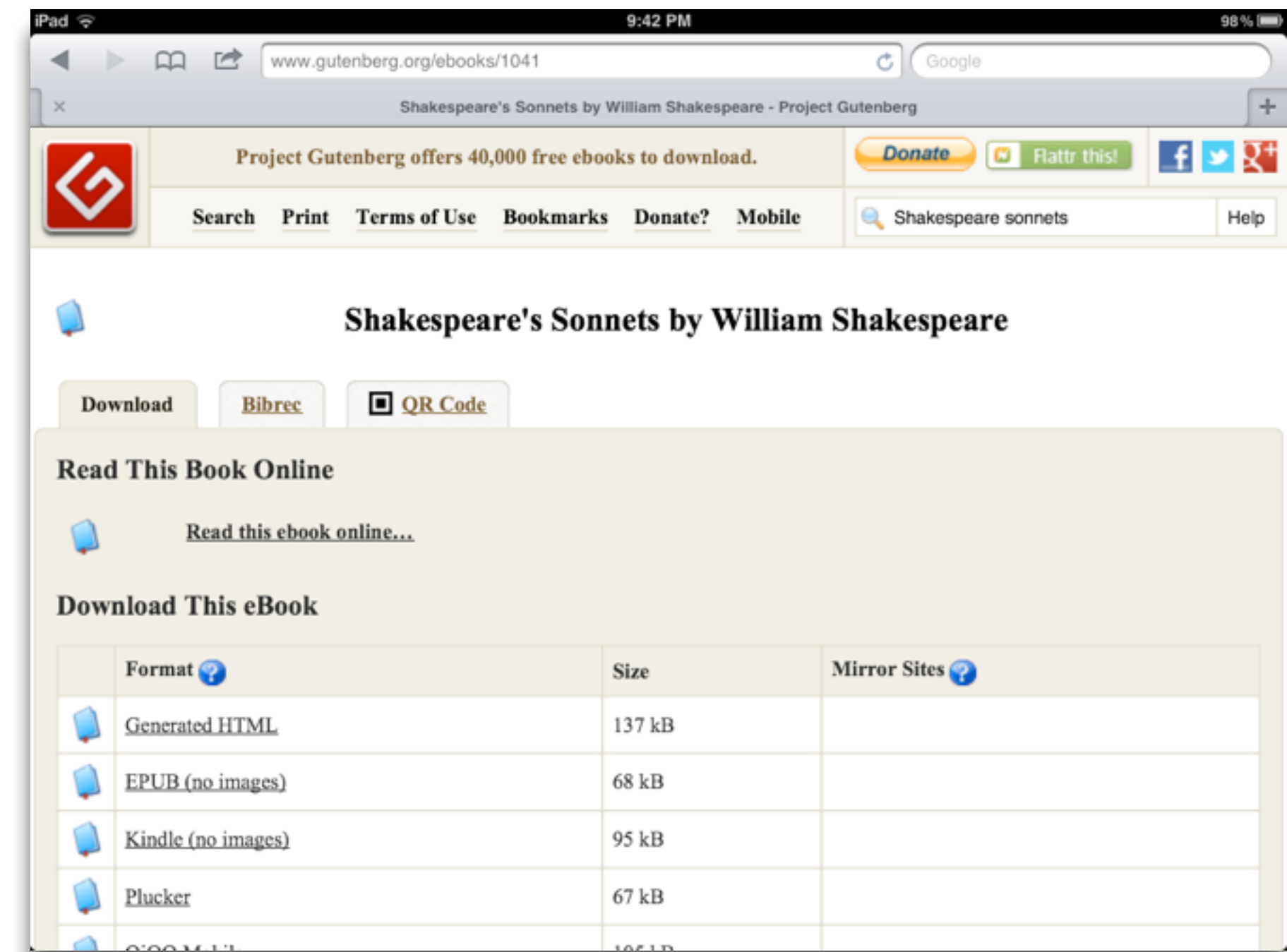
*Tech allows for significant task redesign*

## Augmentation

*Tech acts as a direct tool substitute, with functional improvement*

## Substitution

*Tech acts as a direct tool substitute, with no functional change*







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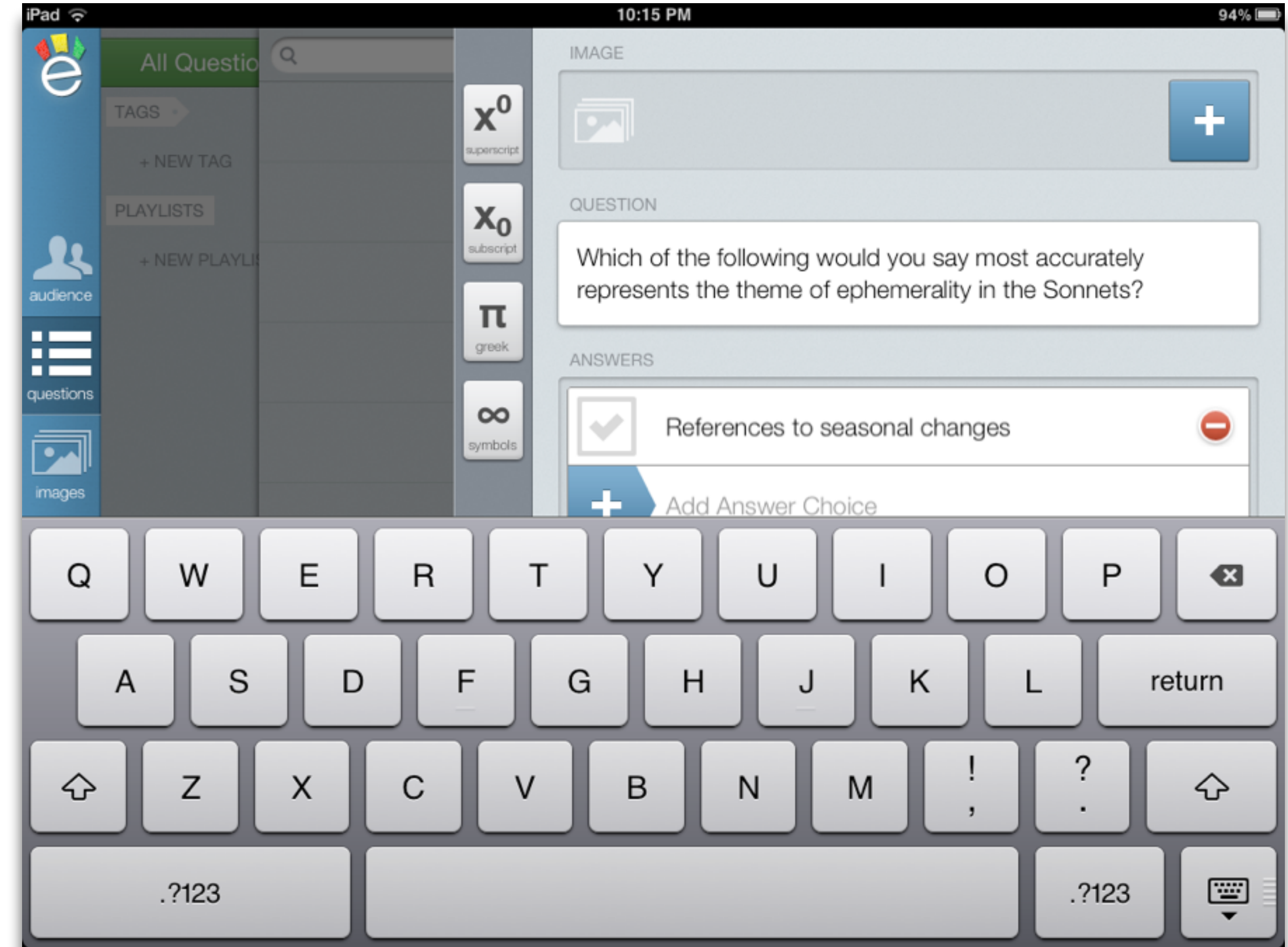
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# 3. Providing Feedback that Moves Learners Forward

---

- The feedback process must provide a recipe for future action
- Feedback should:
  - Be more work for the recipient than the donor, i.e., not just right/wrong – make them think about what did not work
  - Be focused: less is more
  - Relate explicitly to goals/rubrics
- How:
  - Scores or praise alone do not provide this; comments do
  - Supplying minimal scaffolded responses (i.e., where the student got stuck) >> supplying a full response to the problem
    - This emphasizes the crucial role of the draft object and process
  - Oral feedback >> written feedback
    - Consider using recordings
  - Create (sometimes together with students) process rubrics that embody this scaffold
  - Provide time for students to use this feedback
- Minimize grading:
  - Avoid false stopping points
  - Avoid ratchet effect



## 4. Activating Students as Instructional Resources for One Another

---

- Two key elements:
  - Group goals
  - Individual accountability
- Effectiveness due to (in order of importance):
  - Personalization
  - Cognitive Elaboration
  - Motivation
  - Social Cohesion
- Reciprocal help only works when it takes the form of elaborated explanations:
  - Not simple answers or procedures
  - Looks to the upper levels of Bloom for both participants
- Reciprocal help is more effective (by a factor of up to 4) if the product being assessed is the result of the aggregate of individual contributions, rather than just one group product

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**The Problem of the Random Walk**  
Karl Pearson

*A MAN STARTS FROM POINT O AND WALKS L YARDS IN A STRAIGHT LINE; HE THEN TURNS THROUGH ANY ANGLE WHATEVER AND WALKS ANOTHER L YARDS IN A SECOND STRAIGHT LINE. HE REPEATS THIS PROCESS N TIMES.*  
*Nature (July 27 1905): 294*

Science and Cooking - Random Walk, Diffusion and Einstein's Equation of Mean Squared Displacement  
875 views  
Published on Nov 10, 2013 · lecture by Prof. Michael P. Brenner

taken from the fantastic edX HarvardX Course  
"SPU27x Science & Cooking: From Haute Cuisine to Soft Matter Science"

Covered Topics in the course:  
- Energy, Temperature and Heat Transfer  
- Phase Transitions  
- Elasticity  
- Diffusion  
- Viscosity and Polymers  
- Emulsions and Foams  
- Fermentation and Enzymatic Reactions

Respect Chemistry  
6,797 subscribers

Suggestions

- Thermodynamics 4: Entropy 837 views
- "Kirchhoff's rule is for th..." 11,789 views
- Measurements (Accuracy...) 602 views
- Popular Random walk Videos 200 videos
- Acid-Base Equilibria 5:... 263 views
- Chemical Equilibrium... 551 views
- 1 2 White Noise and...

## Redefinition

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## Modification

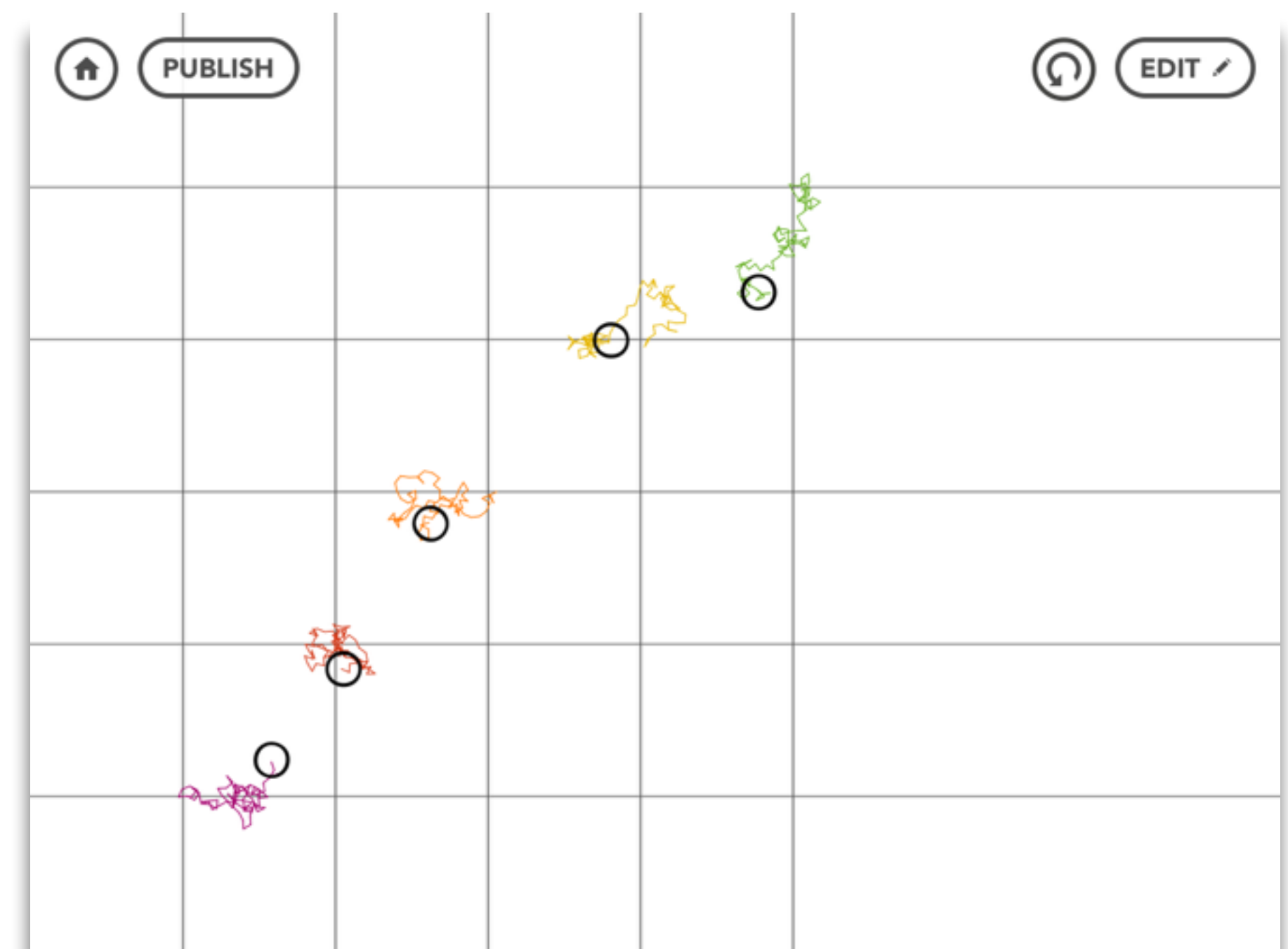
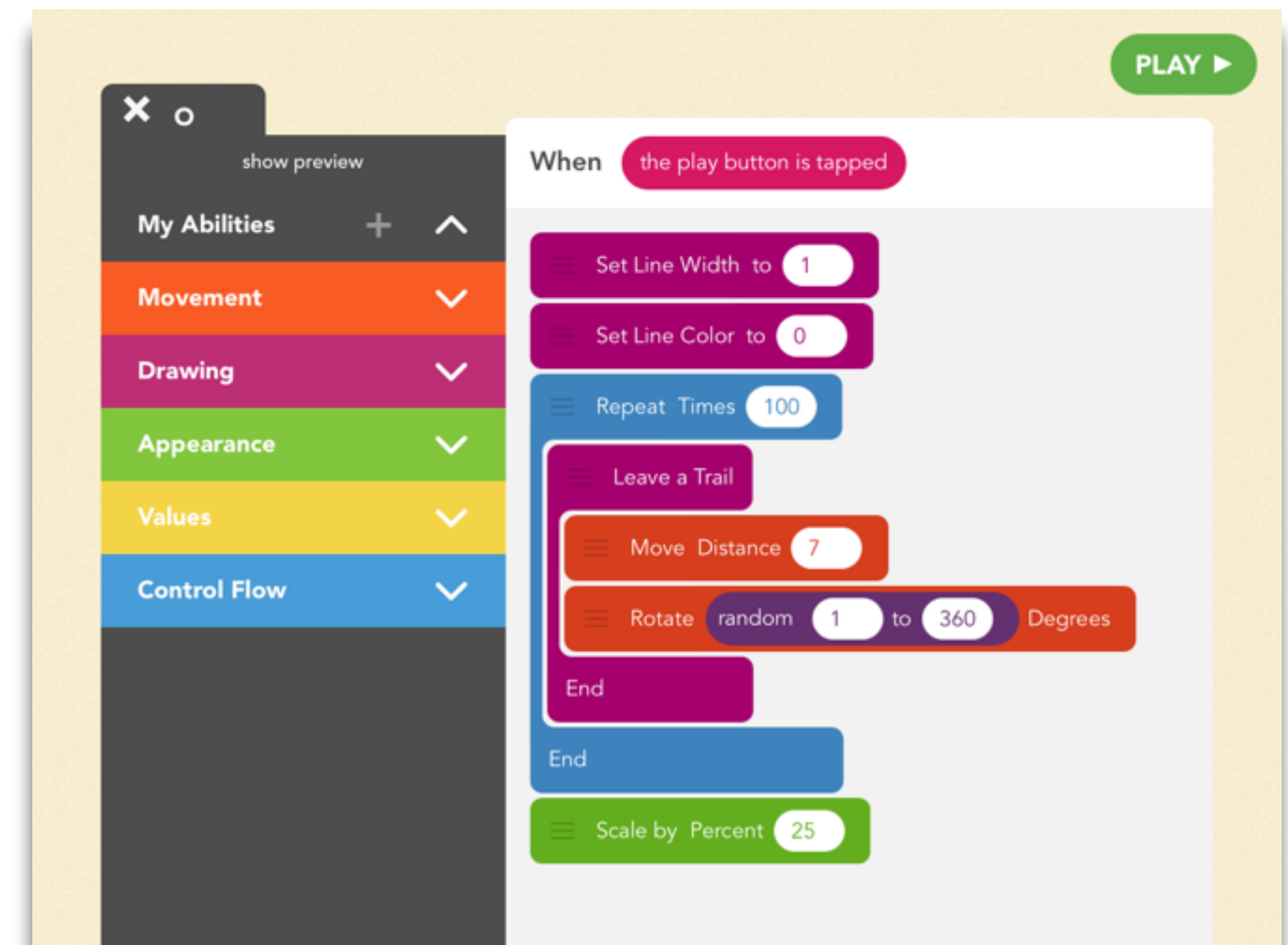
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```
import math
import random
import sys
import time
from collections import deque

reptile = deque() # represent r

# define some constants for direction
EAST = 0; NORTH = 1; WEST = 2; SOUTH = 3

# constants to select initial configuration
STAIR = 1 # East-North
COIL = 2 # tight coil,
LINE = 3 # straight line

def create_reptile(steps, config=LINE):
    # remove all sites
    global reptile
    reptile.clear()

    # add center site as tail of reptile
    x = 0; y = 0
    reptile.append([x, y])

    # add steps from tail to head
    for step in range(1, steps+1):
        # determine direction of next step
        if config == STAIR: # stair
            if random.randrange(2) == 0:
                x += 1
            else:
                y += 1
        elif config == COIL: # coil
```

5:12 AM 38%

Console Docs

Reptation Method for Self-Avoiding Walks on a Square Lattice  
Code based upon source at:  
<http://www.physics.buffalo.edu/phy410-505/2011/topic5/app1/reptation.py.txt>

Enter maximum number of steps in walk: 30  
Enter number of walks to generate: 100  
Enter initial configuration 1=stair, 2=coil, 3=line: 2

Steps	<r^2>	Std. Dev.	Success%	CPU secs
1	1	0	100	0.000507
2	2.78	0.9755	100	0.001531
3	4.6	2.07846	93	0.000107
4	7.22	3.85637	92	0
5	9.12	4.64603	90	0.002203
6	15.72	8.36191	93	0.001708
7	14.76	8.96785	83	0.001721
8	13.06	7.44825	86	0.00188
9	19.2	10.916	89	0.002837
10	21.82	14.8084	85	0.001229
11	49.16	23.2063	89	0.001122
12	20.5	16.0484	79	0.001089
13	27.6	16.5251	92	0.001156
14	23.14	17.7026	79	0
15	33.36	20.0487	84	0.018693
16	22.5	18.1645	82	0.001902
17	122.68	66.8806	97	0.002043
18	16.26	13.3226	78	0.001635
19	33.52	34.3844	74	0
20	26.48	21.0221	87	0.001887
21	41.92	21.9078	78	0
22	44.76	26.7773	80	0
23	69.28	50.6636	86	0.002202
24	52.38	26.9321	86	0.001706
25	92.64	48.1733	91	0.002245
26	27.38	22.8643	80	0.000705
27	74.8	71.2211	72	0
28	34.34	19.7161	70	0.00189
29	38.68	31.2266	77	0
30	143.04	87.9425	88	0.001408

Data in file reptation.data

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## Modification

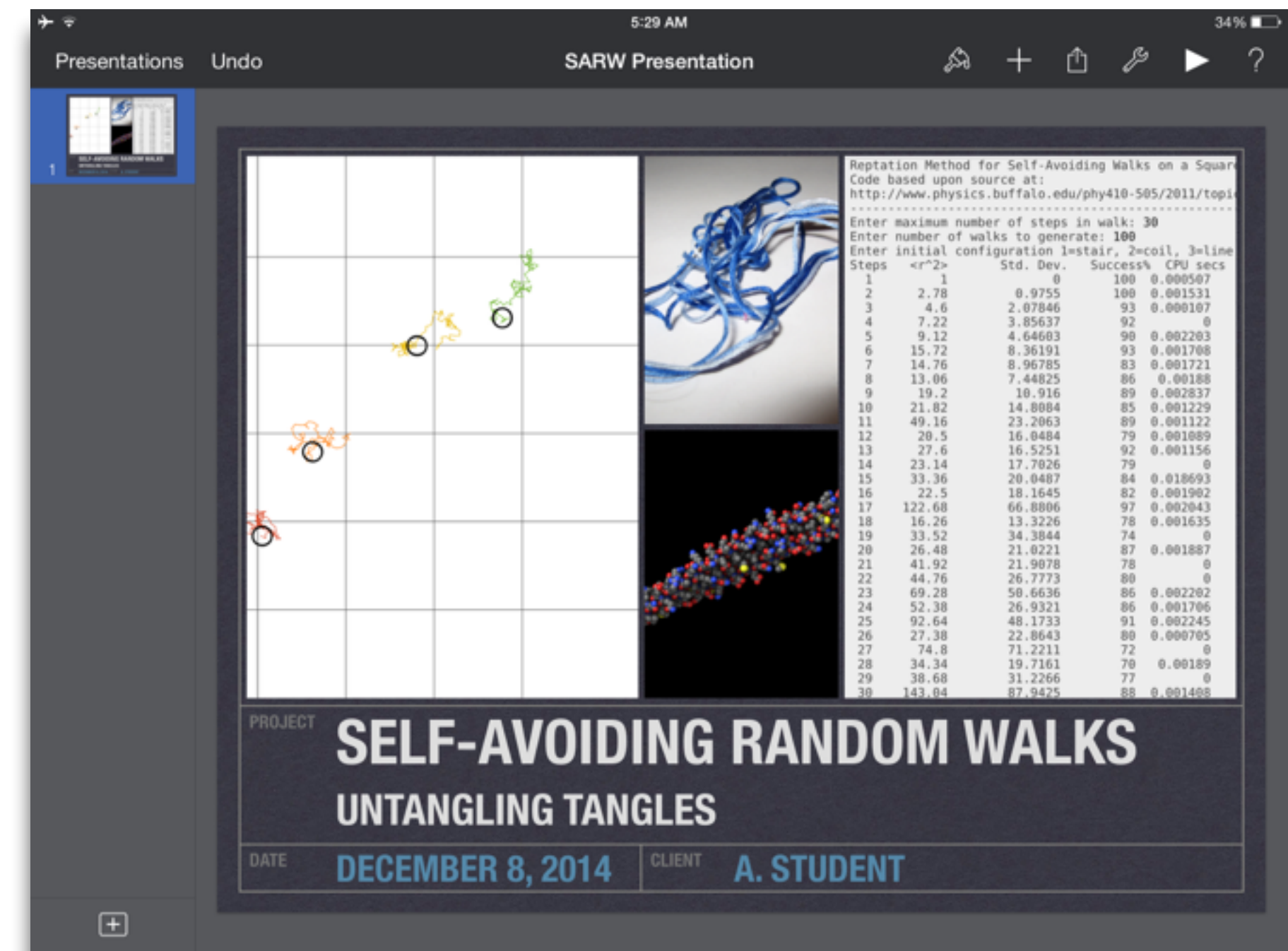
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AT&T 4:36 AM 83%

About

  
**Alex Freeman**  
University of Texas at Austin

Story

**Tagline**  
"The best way to predict the future is to invent it." —Alan Kay

Work

**Work**

**MIDEA**  
Associate Director

Basic Information

**Gender**  
Male

**Relationship**  
Unknown

Education

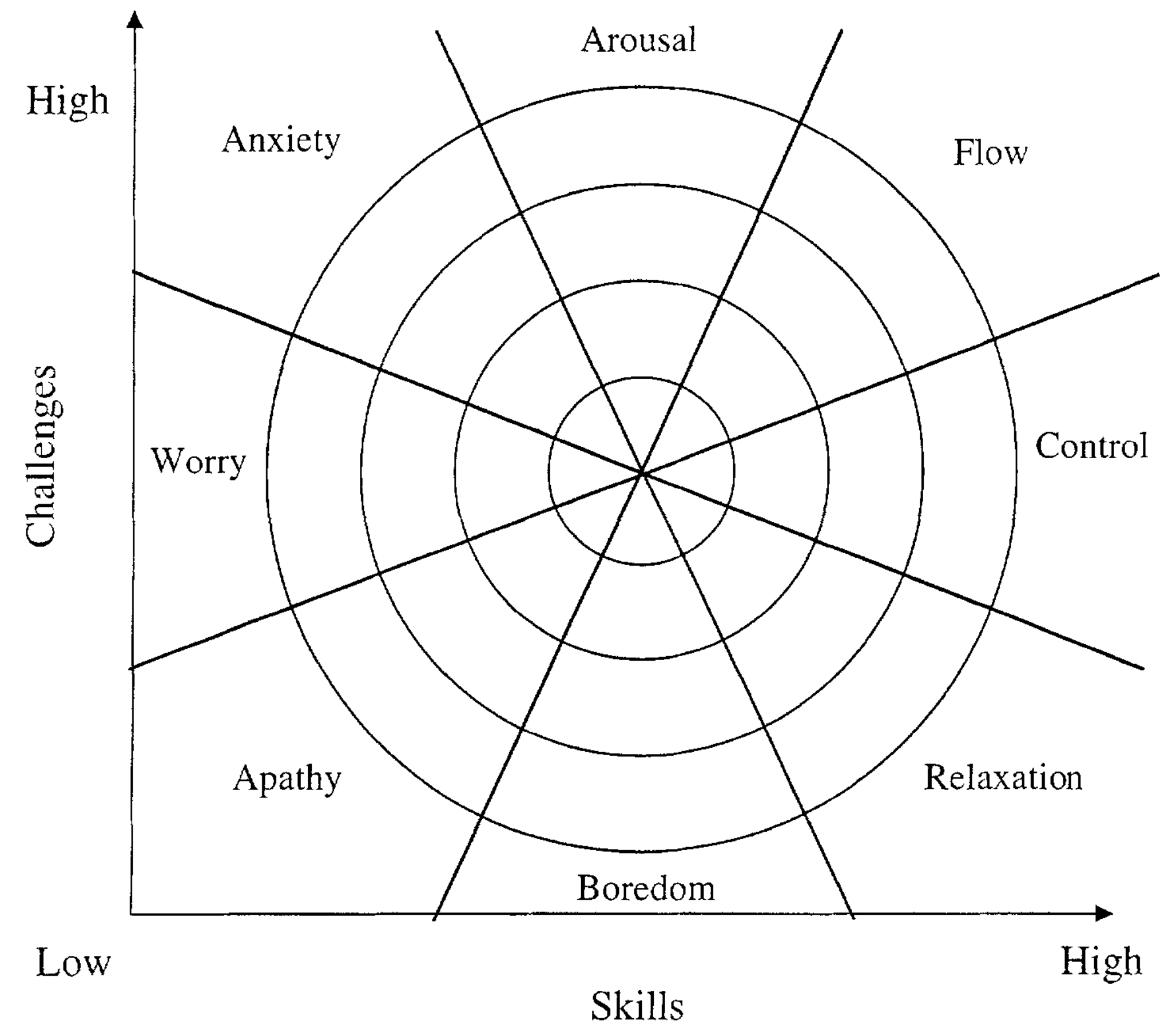
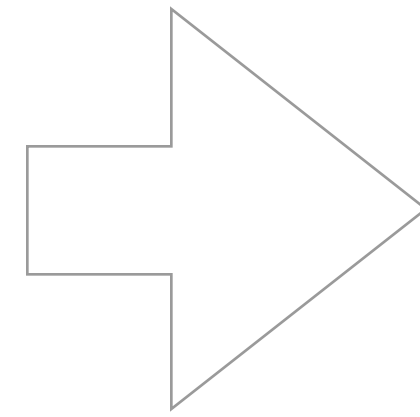
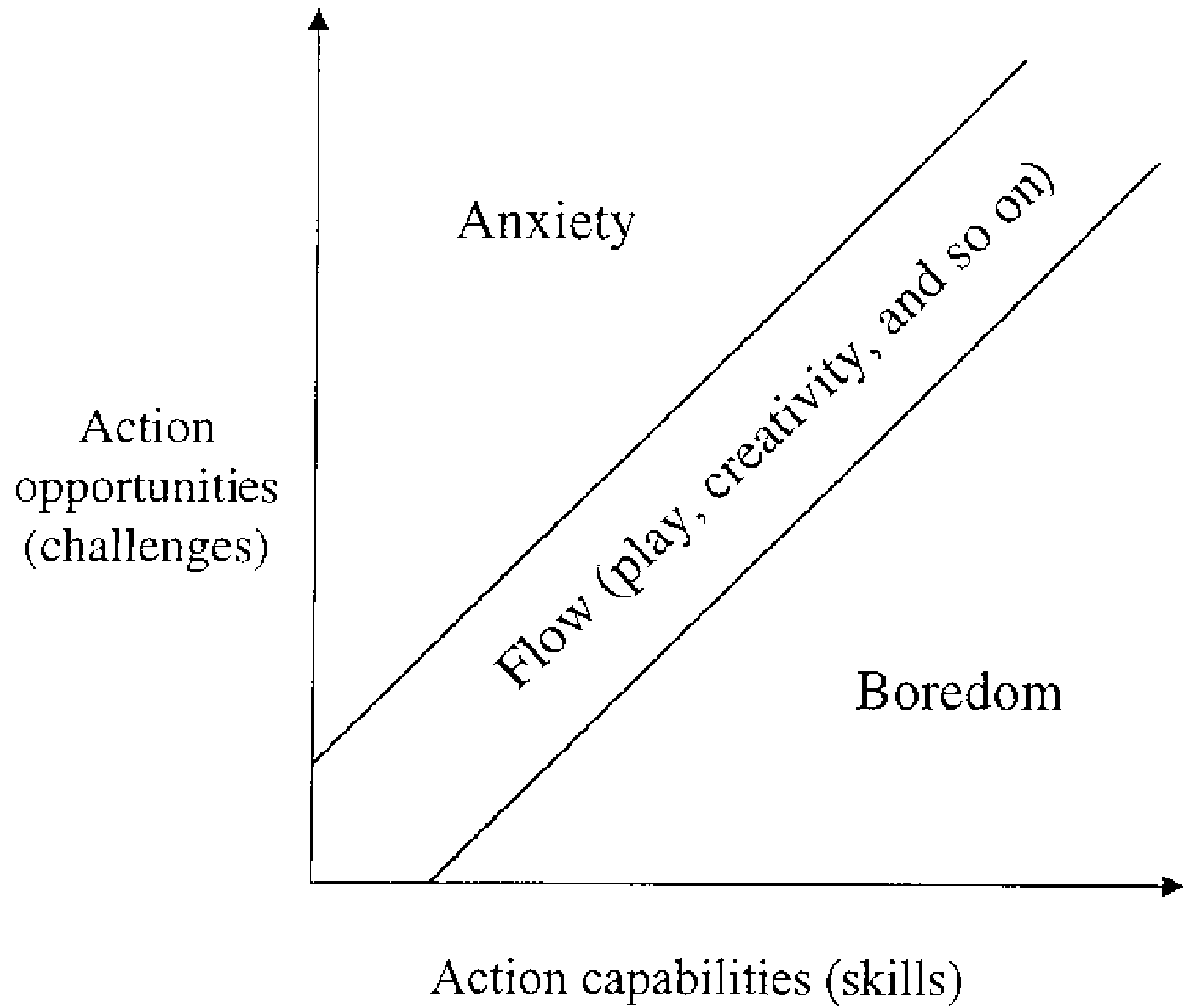
University of Texas at Austin

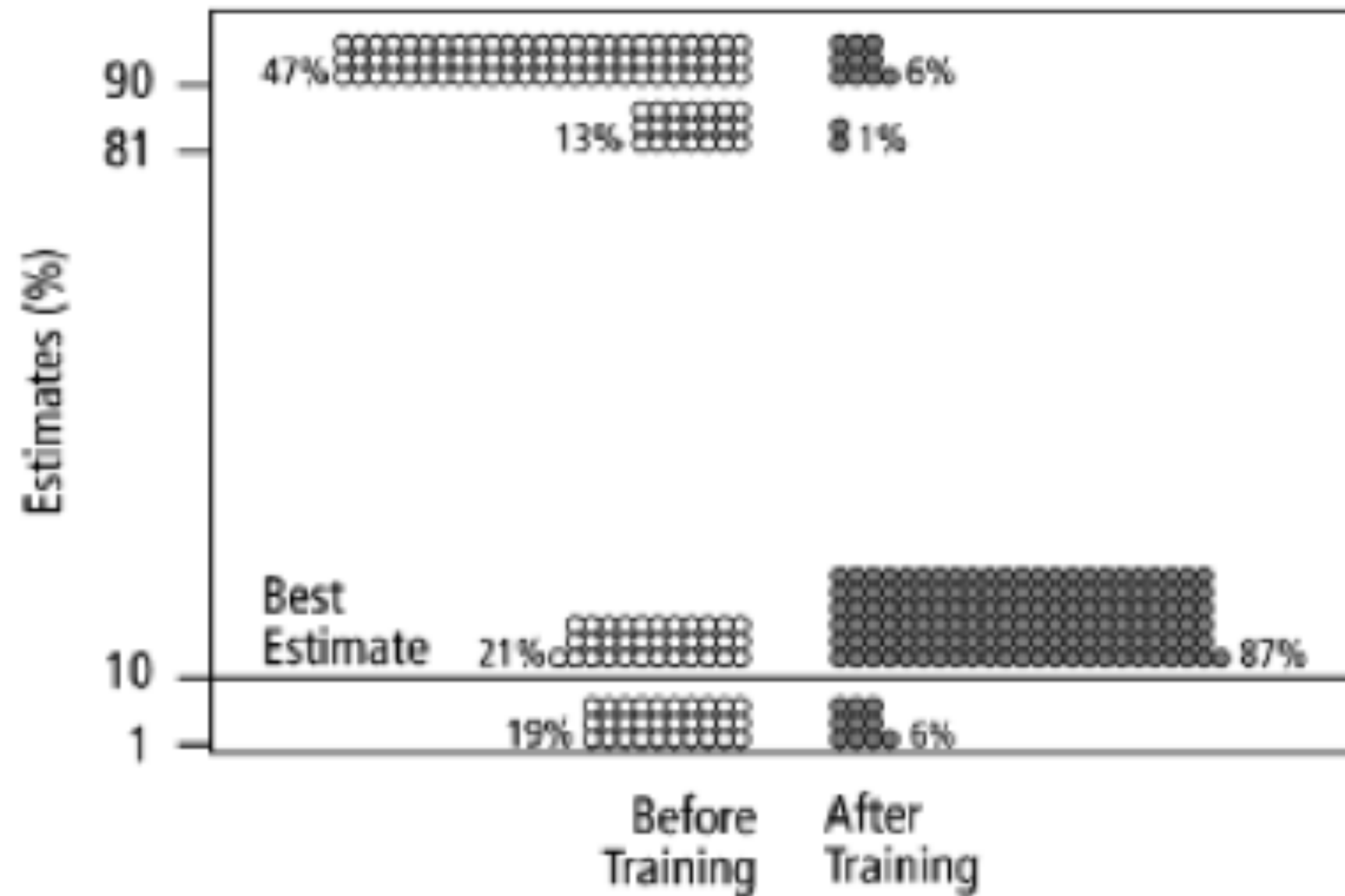
# 5. Activating Students as Owners of their Own Learning

---

- Effective self-assessment is up to twice as effective as other-assessment
- Two key components:
  - Metacognition:
    - Metacognitive knowledge: know what you know
    - Metacognitive skills: what you can do
    - Metacognitive experience: what you know about your cognitive abilities
  - Motivation:
    - Traditionally viewed as a cause (intrinsic/extrinsic), but is better viewed as an outcome:
      - Flow (M. Csikszentmihalyi): the result of a match between capability and challenge
        - Students are motivated to reach goals that are specific, within reach, and offer some degree of challenge
- Three sources of info for students to decide what they will do:
  - Perceptions of the task and its context
  - Knowledge about the task and what it will take to be successful
  - Motivational beliefs
- The role of the draft process and object resurfaces as a crucial component here
- Important Tools:
  - Learning logs and journals
  - Learning portfolios







**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.

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## Modification

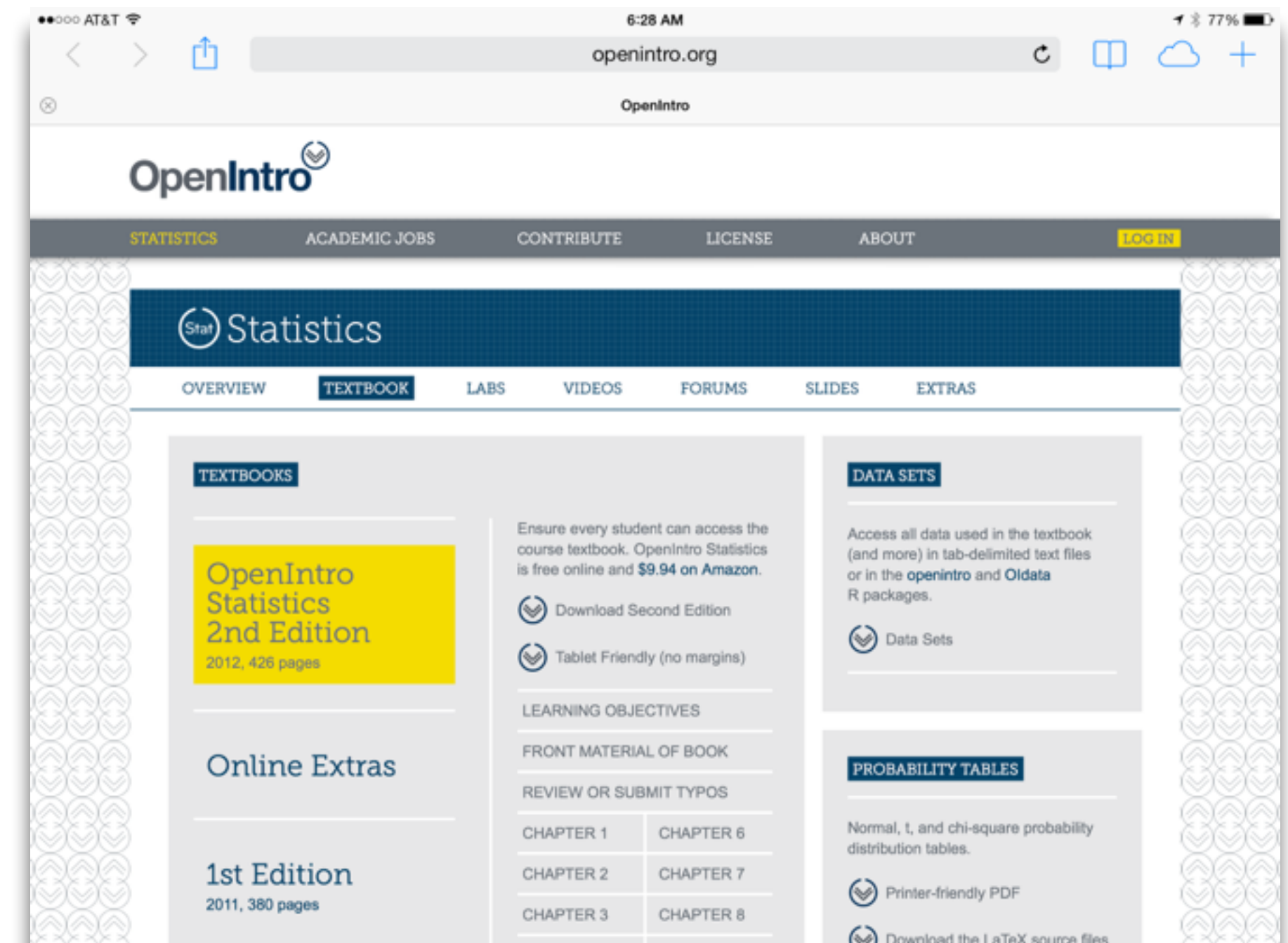
*Tech allows for significant task redesign*

## Augmentation

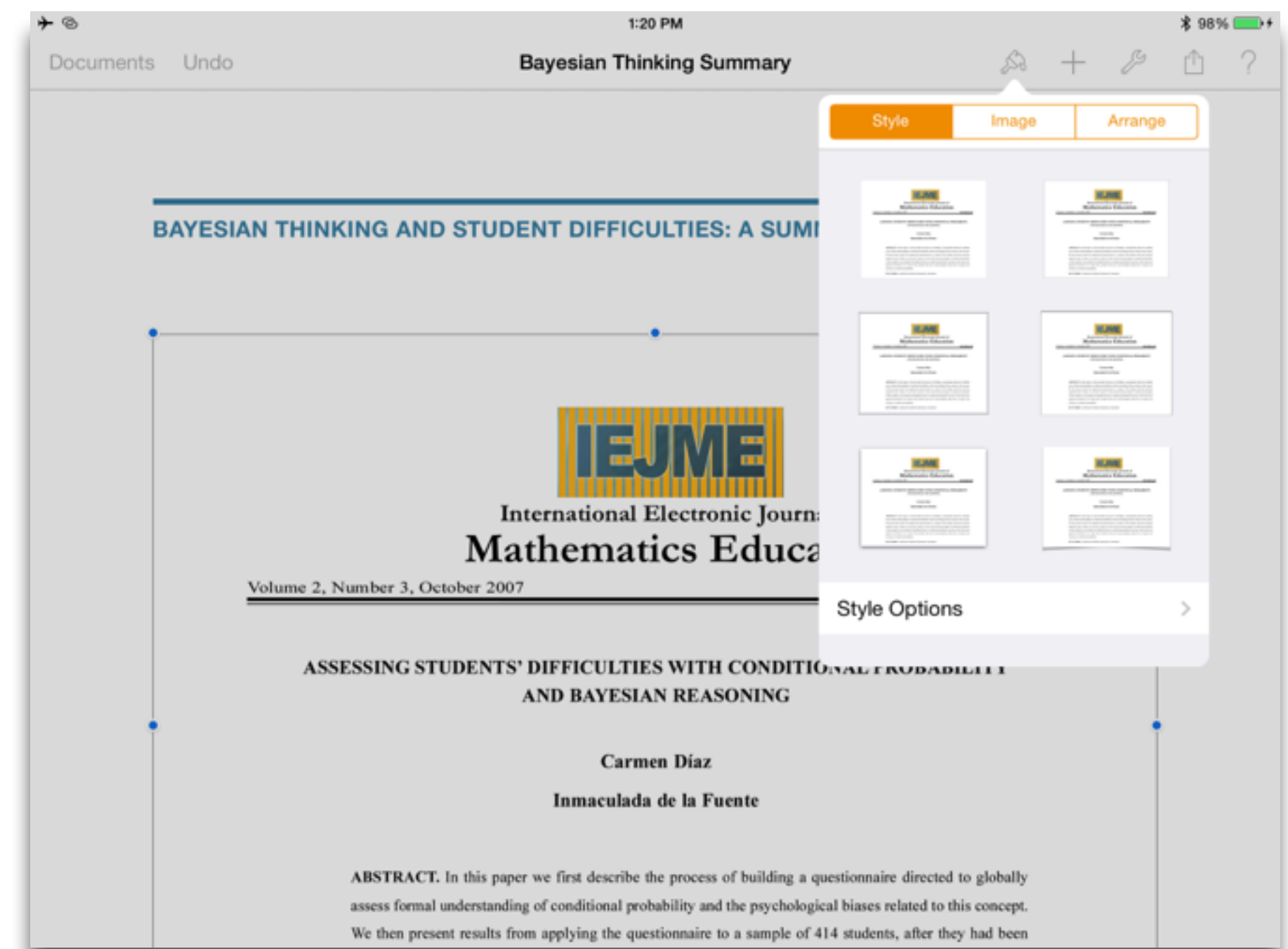
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The screenshot shows the OpenIntro Statistics website. The main navigation bar includes 'STATISTICS', 'ACADEMIC JOBS', 'CONTRIBUTE', 'LICENSE', 'ABOUT', and 'LOGIN'. Below this is a 'Statistics' header with sub-navigation for 'OVERVIEW', 'TEXTBOOK', 'LABS', 'VIDEOS', 'FORUMS', 'SLIDES', and 'EXTRAS'. The 'TEXTBOOKS' section features two options: 'OpenIntro Statistics 2nd Edition' (2012, 426 pages) and '1st Edition' (2011, 380 pages). The 2nd edition is highlighted with a yellow background. To the right, there are sections for 'DATA SETS' and 'PROBABILITY TABLES'. The 'DATA SETS' section offers 'Download Second Edition' and 'Tablet Friendly (no margins)'. The 'PROBABILITY TABLES' section provides 'Normal, t, and chi-square probability distribution tables' and options for 'Printer-friendly PDF' and 'Download the LaTeX source files'.



The screenshot shows a document editor interface with a document titled 'Bayesian Thinking Summary'. The document content includes the title 'BAYESIAN THINKING AND STUDENT DIFFICULTIES: A SUMMARY', the journal name 'IEJME International Electronic Journal of Mathematics Education', the volume information 'Volume 2, Number 3, October 2007', the article title 'ASSESSING STUDENTS' DIFFICULTIES WITH CONDITIONAL PROBABILITY AND BAYESIAN REASONING', the authors 'Carmen Diaz' and 'Inmaculada de la Fuente', and an abstract. A style menu is open on the right side of the document, showing options for 'Style', 'Image', and 'Arrange'. The 'Style' option is selected, and a 'Style Options' dropdown is visible below it.



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Computing Not So Basic Probabilities from

DataSet = 2 Seed = 64

in the table below, dosage calculations from a sample of 56 doctors are sorted according to whether the label on the drug bottle contained a concentration or a ratio, and whether the calculation was correct or wrong.

	Correct	Wrong	Row Totals
Concentration	22	6	28
Ratio	4	24	28
Column Totals	26	30	56

a) What is the probability that a calculation in the sample was based on a concentration or was correct?

Check the box to see the answer to (a).

b) Given that a calculation in the sample was correct, what is the probability that the calculation was based on a ratio?

Check the box to see the answer to (b).

Number

- ANm1 = 22
- ANm2 = 6
- ANm3 = 4
- APrb = 0.571
- ATot = 32
- BDnm = 26
- BNum = 4
- BOp = 0
- BPrb = 0.154
- DataSet = 2
- GrTt = 56
- OpANm1 = 1
- OpANm2 = 1

Input Bar

Apr 8, 2014, 1:26 PM Edit

age = 48

Number

- age = 48
- factor1 = 0.44
- factor2 = 0.25

Line

- a:  $y = 0.44x + 0.25$

Trying to look at different ways of visualizing how different factors come together in determining the probability of the result - some questions are brought up by the diagram above, though:

- Can you collapse multiple factors into one trivially? The graph would seem to imply that - but it isn't obvious from the equations.
- Are there ways of simplifying the calculations for some limiting cases?

1:26 PM TUESDAY, APRIL 8, 2014

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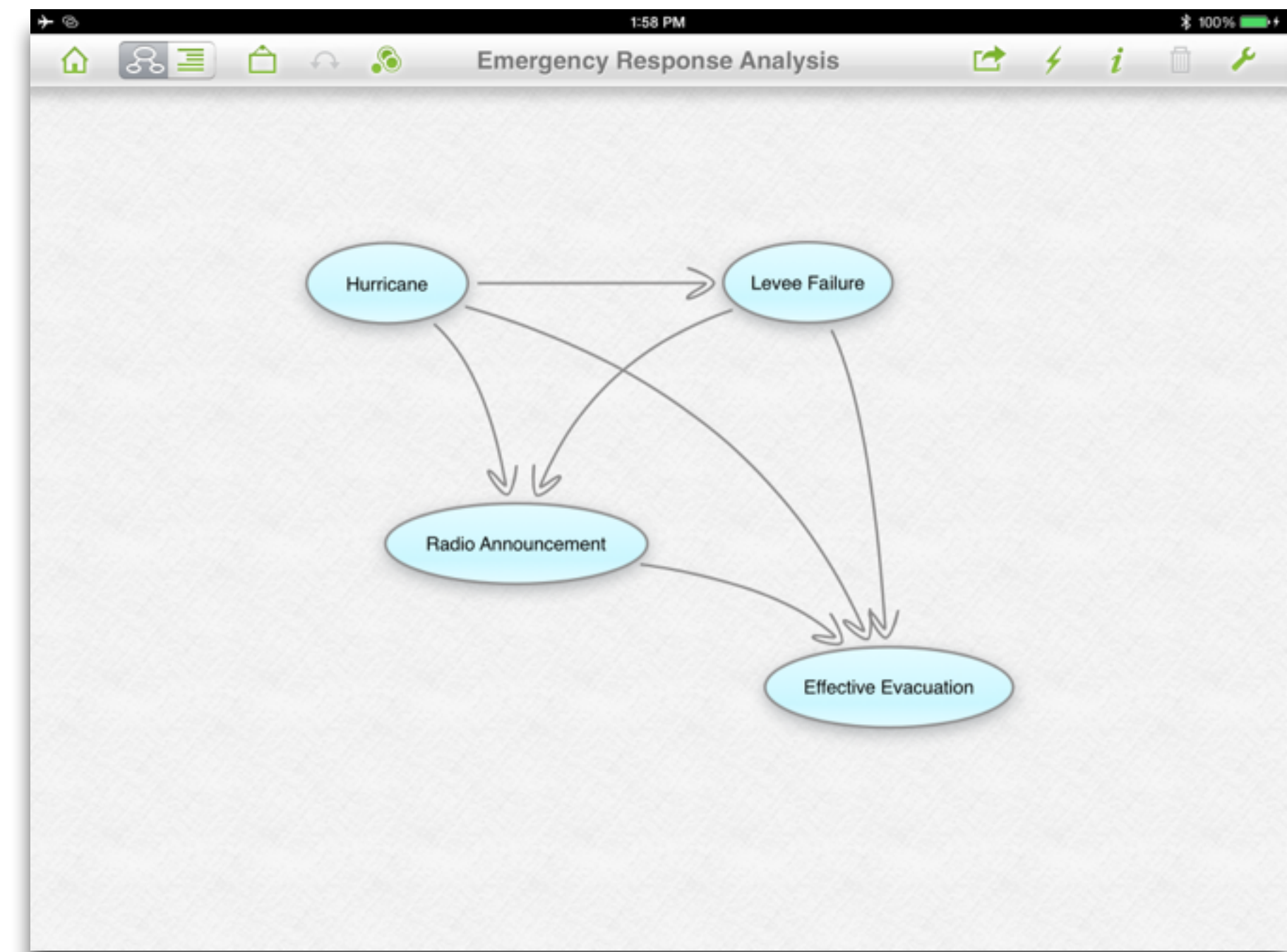
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Changing the conditions that might trigger an event can sometimes have unexpected results. Consider the following diagram, designed as a simplified version of possible responses in a scenario similar to Katrina:

```
graph TD; Hurricane --> Levee_Failure; Hurricane --> Radio_Announcement; Hurricane --> Effective_Evacuation; Levee_Failure --> Effective_Evacuation; Radio_Announcement --> Effective_Evacuation;
```

► Now, let's assign some reasonable values to the probabilities involved:

Posted with Blogsy



## Redefinition

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## Modification

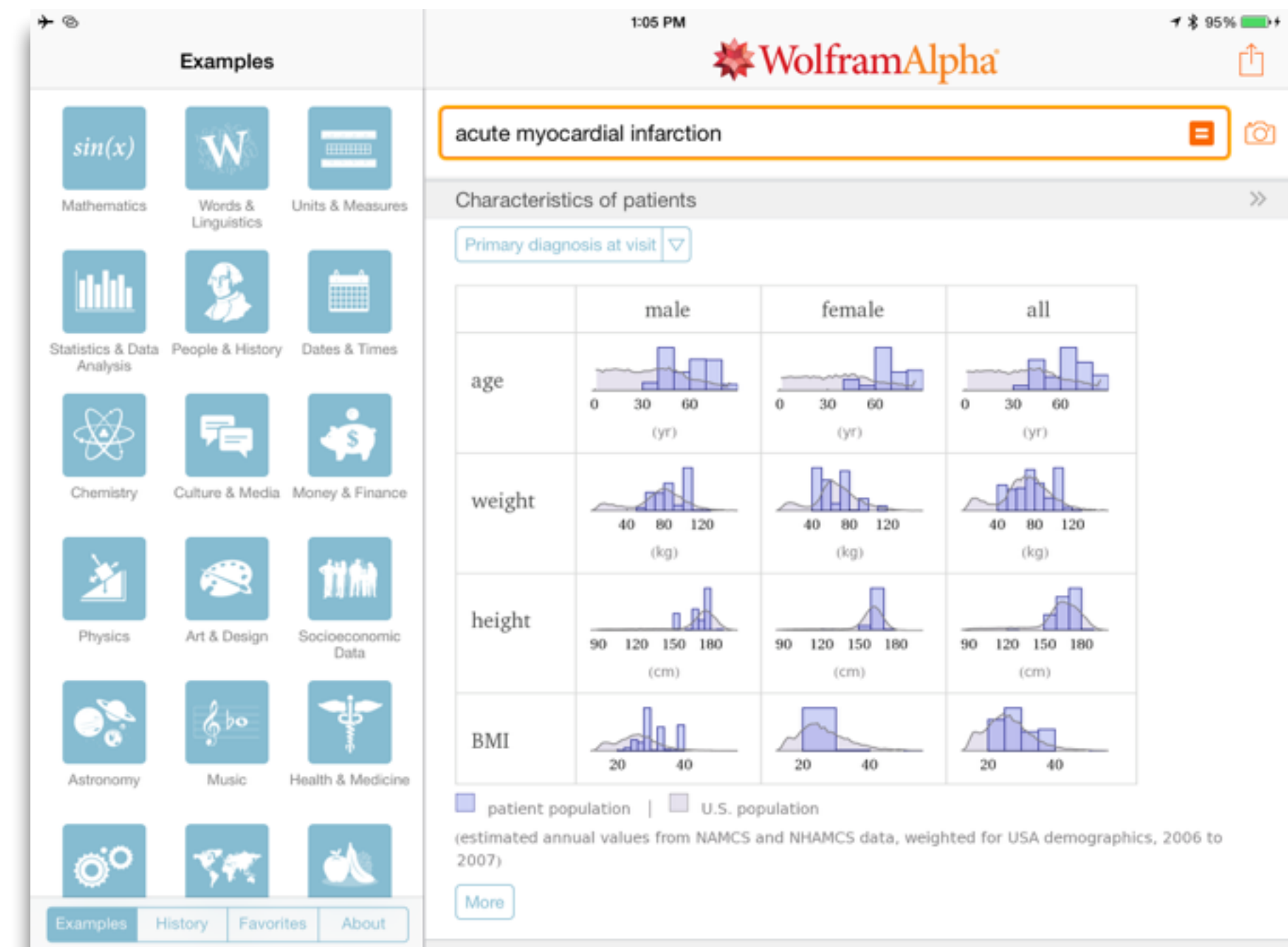
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Presentations Undo Stent Policy Analysis

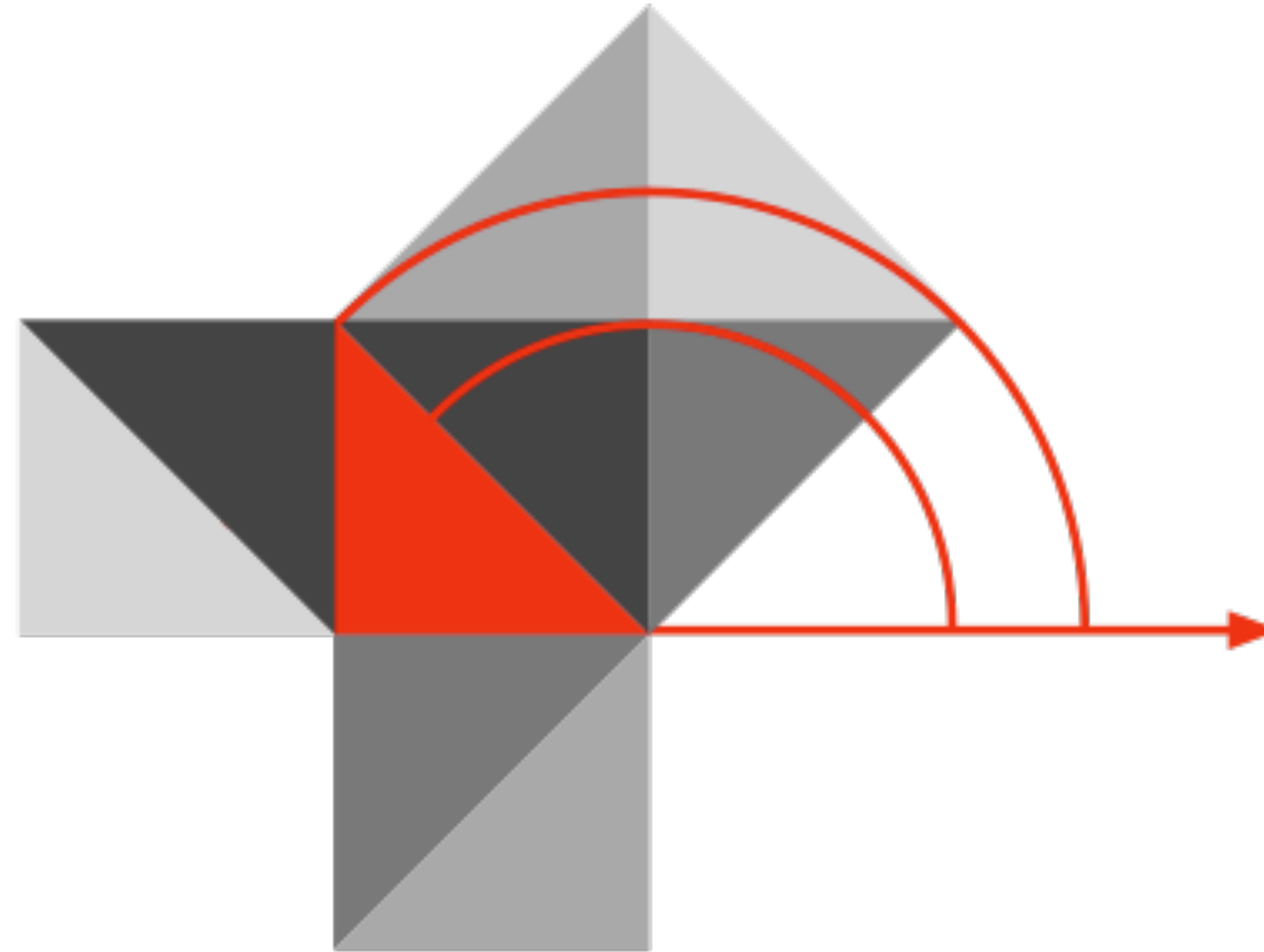
Independent Predictor	Hazard Ratio	95% CI	P Value
<b>30-Day Major Adverse Cardiac or Cerebrovascular Event</b>			
>1 vessel treated	1.416	1.138-1.762	0.0018
Urgent procedure	3.27	2.5-5.54	<0.0001
Female sex	1.464	1.03-2.07	0.0321
Chronic obstructive pulmonary disease	1.541	1.04-2.276	0.03
Hypertension	1.622	1.037-2.535	0.0339
<b>3-Year Survival</b>			
>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



# Hippasus

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

Email: [rubenrp@hippasus.com](mailto:rubenrp@hippasus.com)

Twitter: @rubenrp

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