SAMR and the EdTech Quintet:
Pragmatic Approaches and New Directions

Ruben R. Puentedura, Ph.D.

Substitution	Augmentation	Modification	Redefinition

EdTech Quintet

Shared Practices

TPCK

2\IC Learning Framework

Refraction

Conversational Framework

Communities of Practice

Personal Learning Networks

Dynamic Learning Structures

1. Starting Out

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

Modification
Tech allows for significant task redesign

Transformation

- -

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

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

Enhancement

Ruben R. Puentedura, *As We May Teach: Educational Technology, From Theory Into Practice*. (2009)

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

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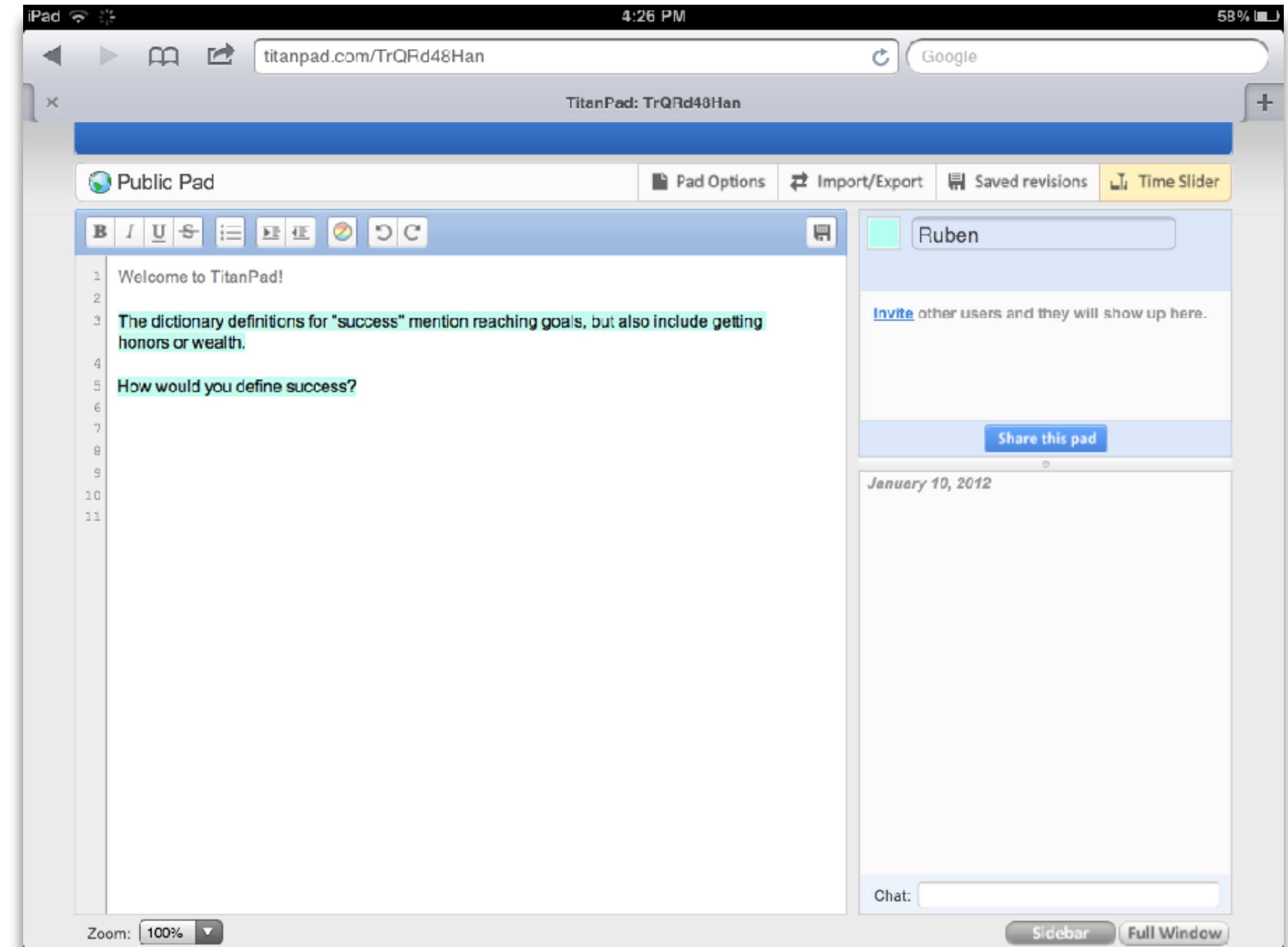*Tech allows for the creation of new tasks, previously inconceivable*

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

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
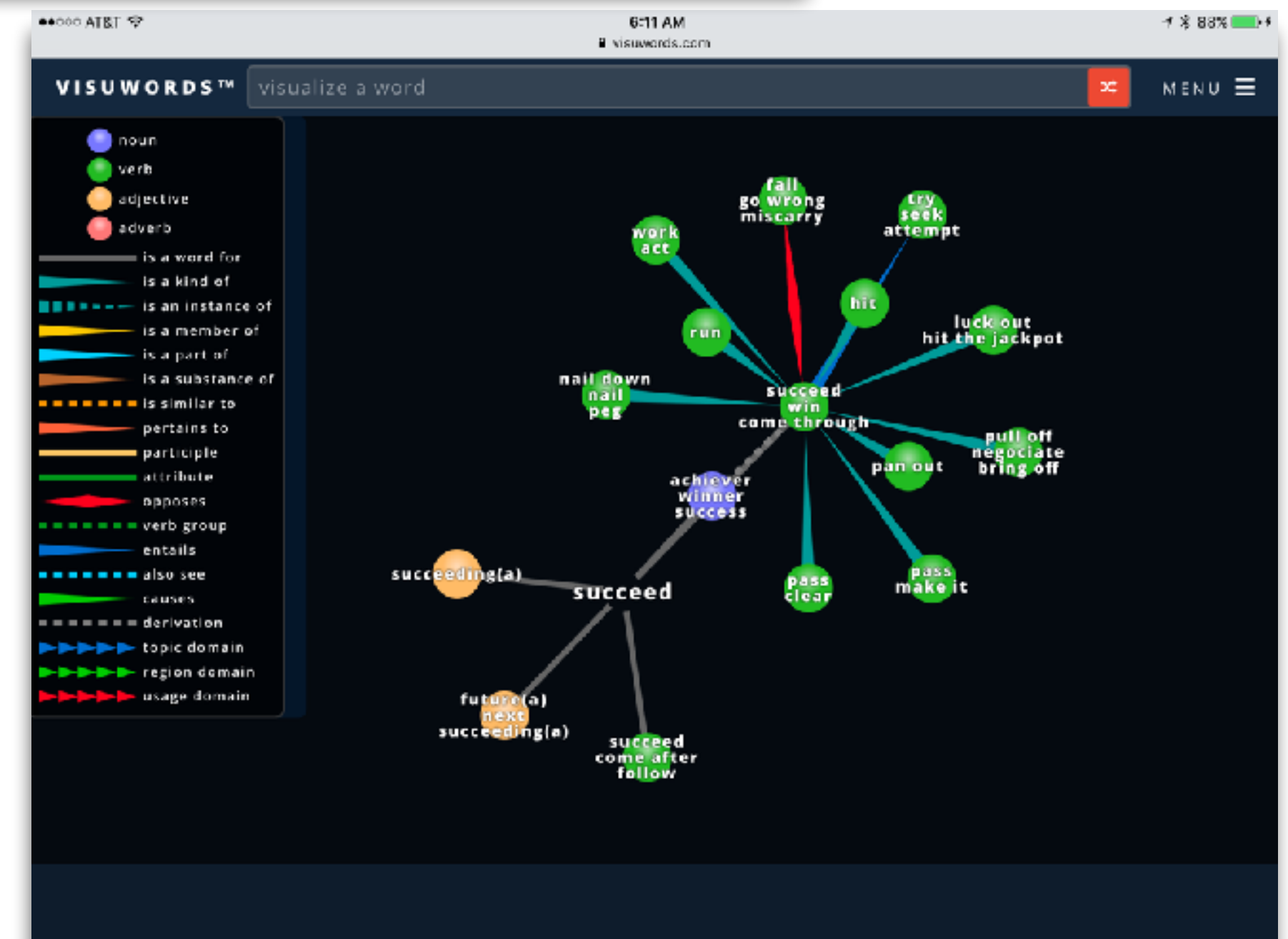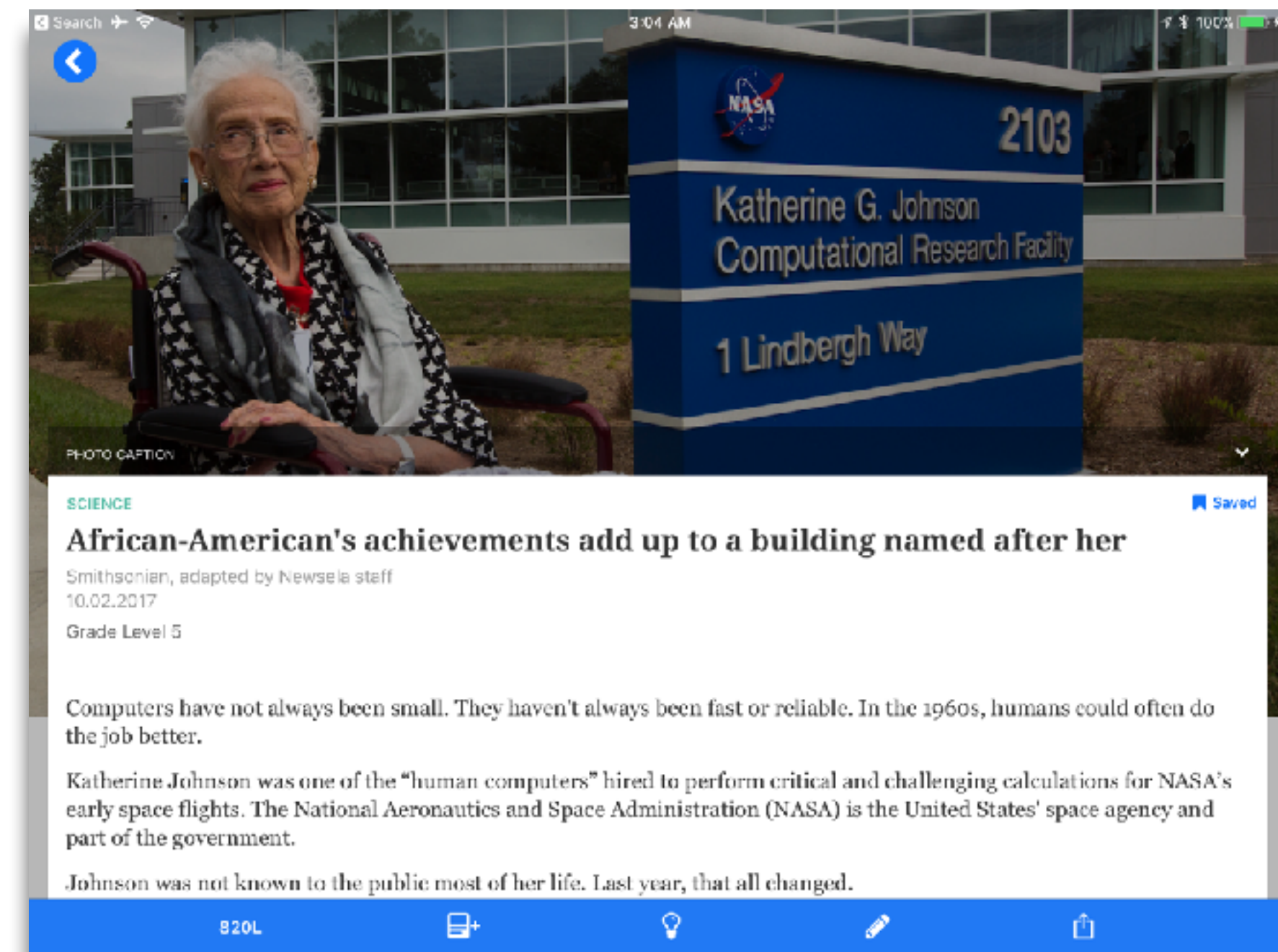
Modification
Tech allows for significant task redesign

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

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

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

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
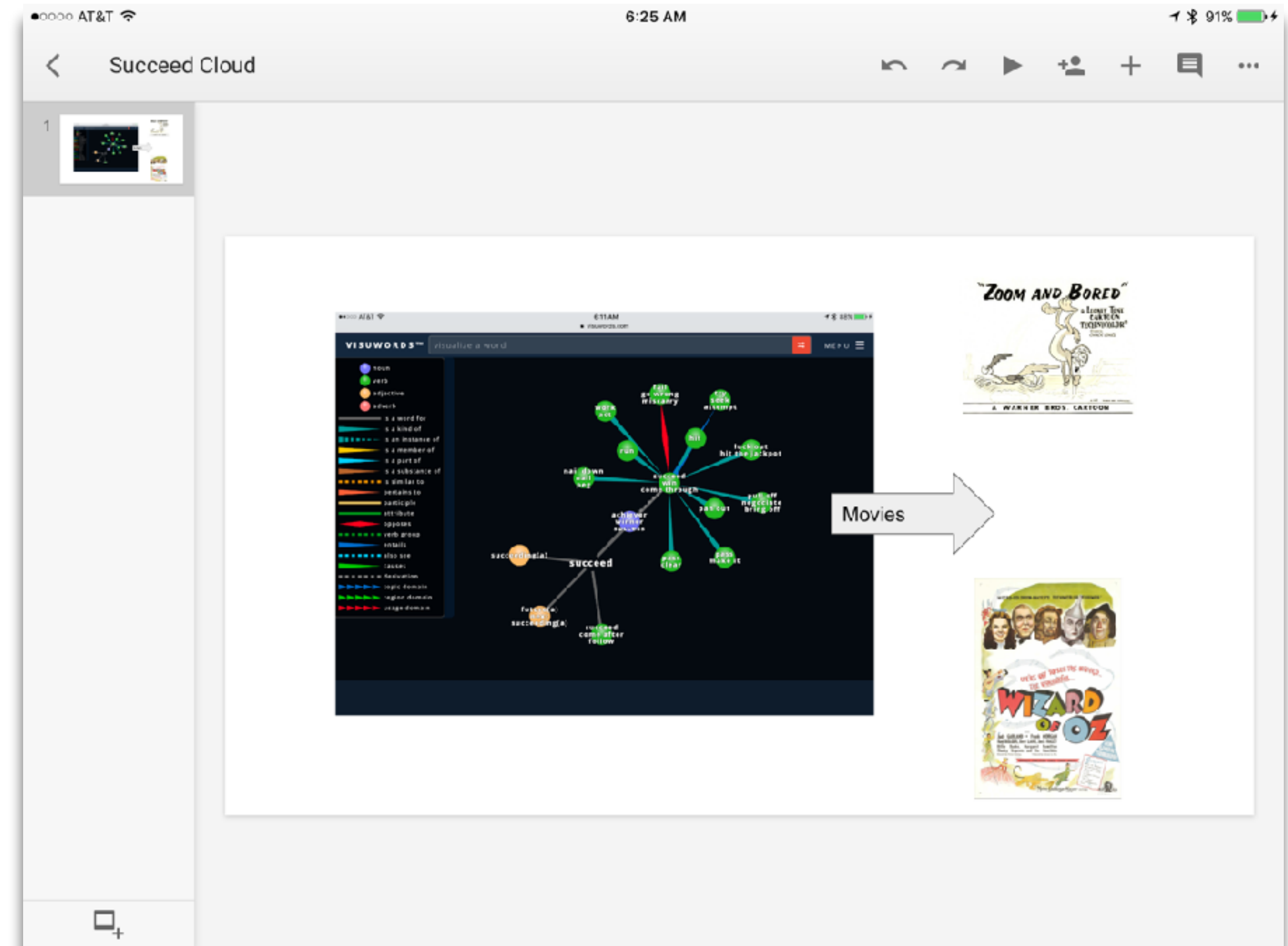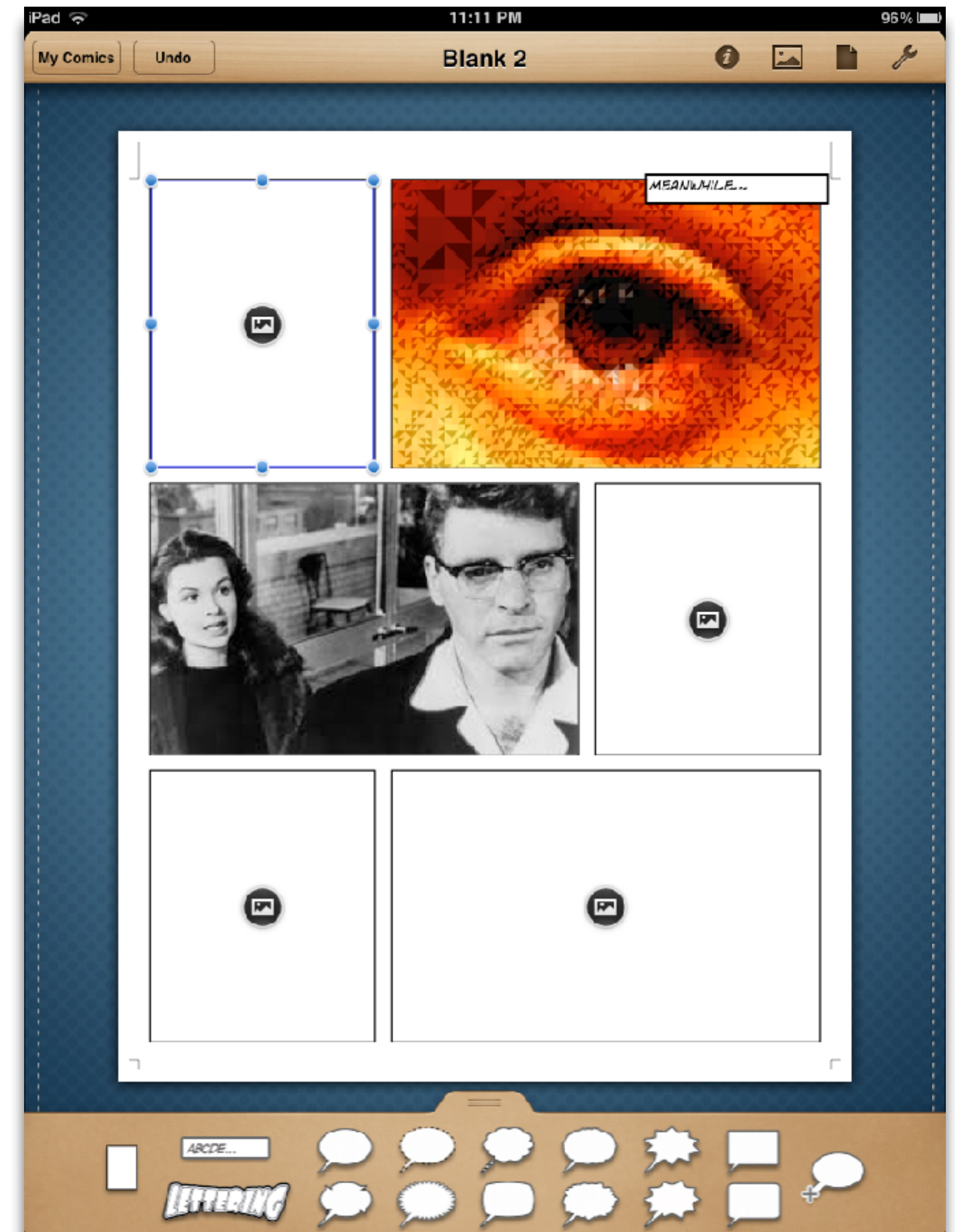
Modification
Tech allows for significant task redesign

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

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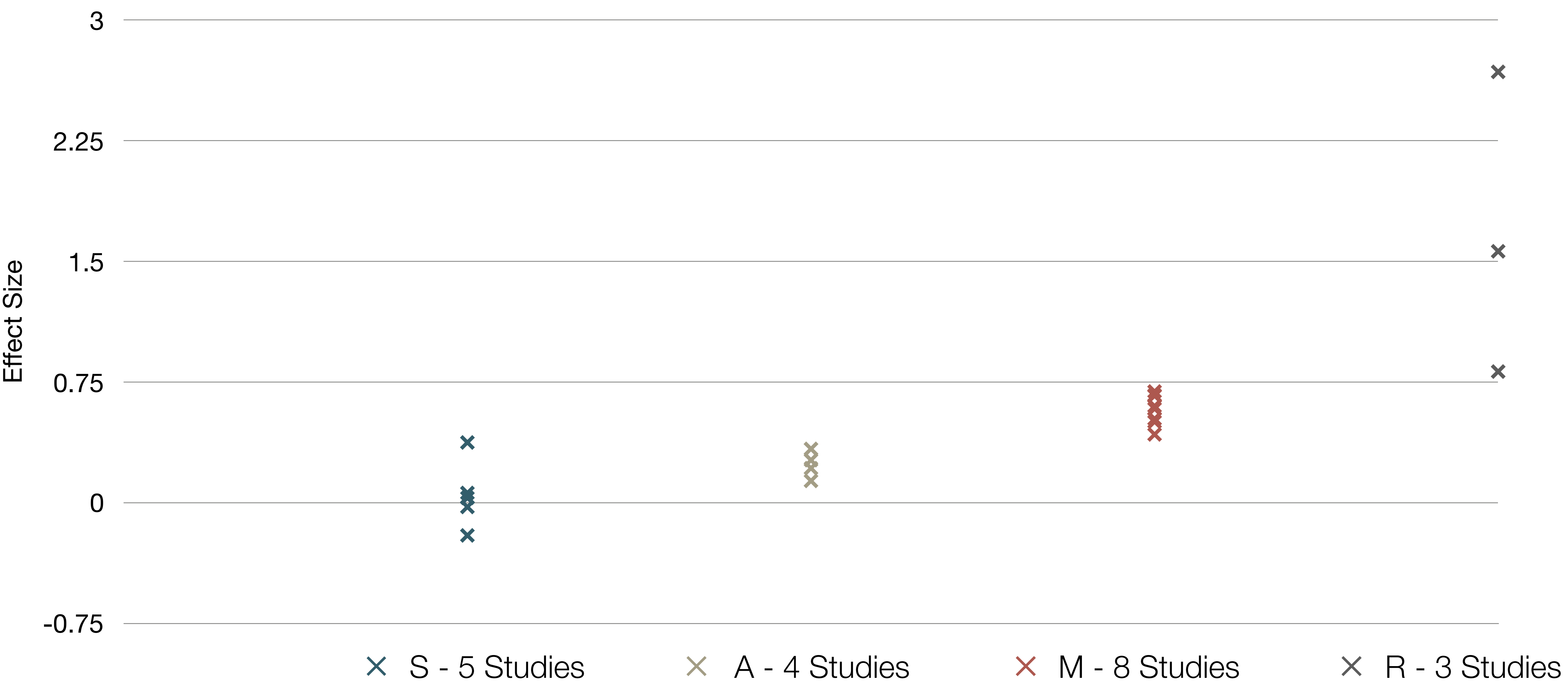*Tech acts as a direct tool substitute, with no functional change*

Meta-analysis	Number of studies	ES type	Mean ES	SE
Bangert-Drowns (1993)	19	Missing	0.27	0.11
Bayraktar (2000)	42	Cohen's d	0.27	0.05
Blok, Oostdam, Otter, and Overmaat (2002)	25	Hedges's g	0.25	0.06
Christmann and Badgett (2000)	16	Missing	0.13	0.05
Fletcher-Flinn and Gravatt (1995)	120	Glass's Δ	0.24	0.05
Goldberg, Russell, and Cook (2003)	15	Hedges's g	0.41	0.07
Hsu (2003)	25	Hedges's g	0.43	0.03
Koufogiannakis and Wiebe (2006)	8	Hedges's g	−0.09	0.19
Kuchler (1998)	65	Hedges's g	0.44	0.05
Kulik and Kulik (1991)	239	Glass's Δ	0.30	0.03
Y. C. Liao (1998)	31	Glass's Δ	0.48	0.05
Y.-I. Liao and Chen (2005)	21	Glass's Δ	0.52	0.05
Y. K. C. Liao (2007)	52	Glass's Δ	0.55	0.05
Michko (2007)	45	Hedges's g	0.43	0.07
Onuoha (2007)	35	Cohen's d	0.26	0.04
Pearson, Ferdig, Blomeyer, and Moran (2005)	20	Hedges's g	0.49[a]	0.11
Roblyer, Castine, and King (1988)	35	Hedges's g	0.31	0.05
Rosen and Salomon (2007)	31	Hedges's g	0.46	0.05
Schenker (2007)	46	Cohen's d	0.24	0.02
Soe, Koki, and Chang (2000)	17	Hedges's g and Pearson's r[a]	0.26[a]	0.05
Timmerman and Kruepke (2006)	114	Pearson's r[a]	0.24	0.03
Torgerson and Elbourne (2002)	5	Cohen's d	0.37	0.16
Waxman, Lin, and Michko (2003)	42	Glass's Δ	0.45	0.14
Yaakub (1998)	20	Glass's Δ and g	0.35	0.05
Zhao (2003)	9	Hedges's g	1.12	0.26

a. Converted to Cohen's d.

SAMR and the Use of Technology to Enhance Reading Performance in Middle School

Pearson, P.D., Ferdig, R.E., Blomeyer Jr, R.L., & Moran, J. "The Effects of Technology on Reading Performance in the Middle-School Grades: A Meta-Analysis With Recommendations for Policy." *Learning Point Associates/North Central Regional Educational Laboratory (NCREL)* (2005).

SAMR and the Use of Tablets in Education

Effect Size

3

2.25

1.5

0.75

0

-0.75

✕ S - 14 Studies   ✕ A - 7 Studies   ✕ M - 4 Studies   ✕ R - 2 Studies

Tamim, R.M., Borokhovski, E., Pickup, D., Bernard, R.M. & El Saadi, L. "Tablets for Teaching and Learning: A Systematic Review and Meta-Analysis." *Commonwealth of Learning (COL)* (2015).
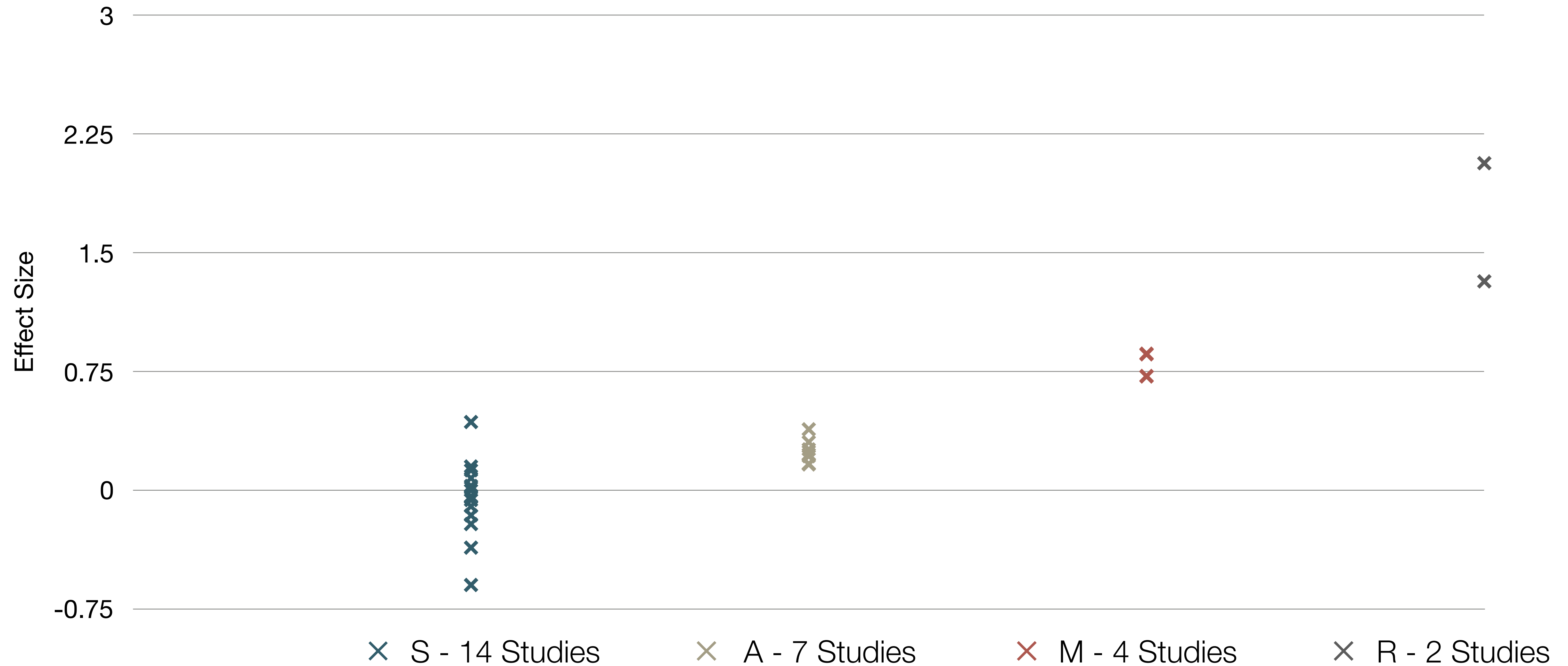
Choosing the First SAMR Ladder Project: Three Options

- **Your Passion:**
  - If you had to pick one topic from your class that best exemplifies why you became fascinated with the subject you teach, what would it be?

- **Barriers to Your Students' Progress:**
  - Is there a topic in your class that a significant number of students get stuck on, and fail to progress beyond?

- **What Students Will Do In the Future:**
  - Which topic from your class would, if deeply understood, best serve the interests of your students in future studies or in their lives outside school?

2. Shared Practices and Deep Learning

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

Social

Bookmarks
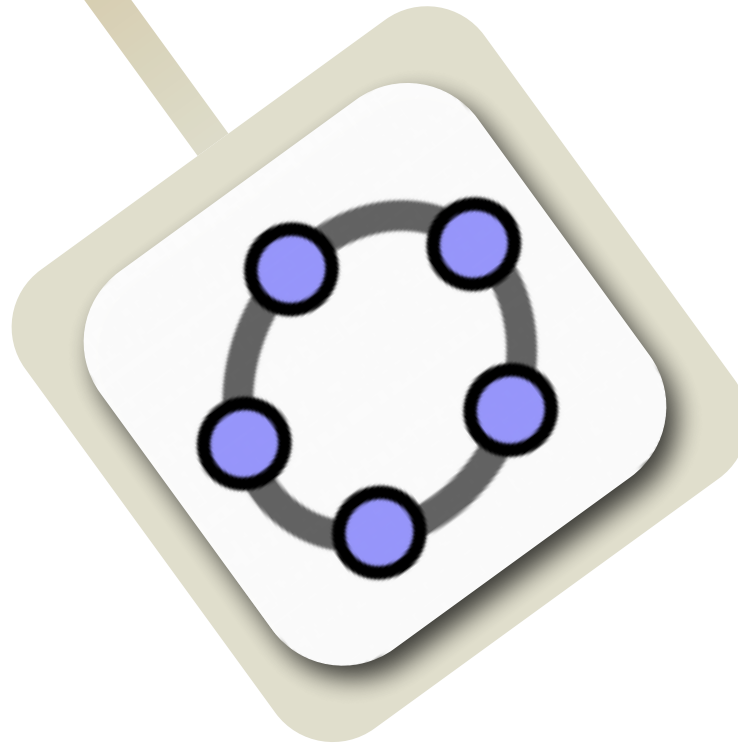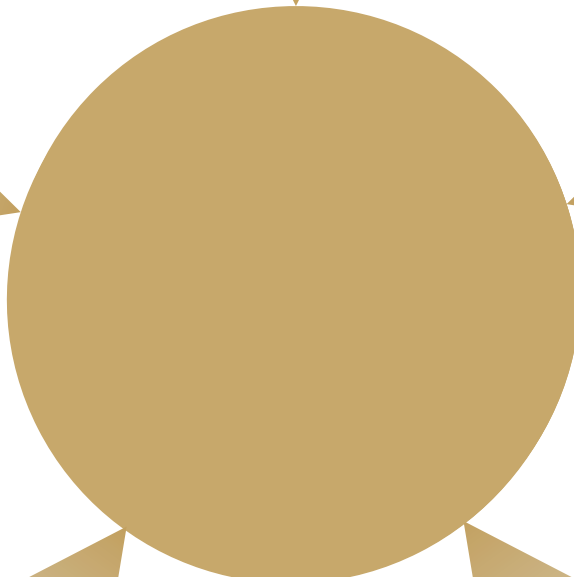
RSS Feeds

Discussions

Microblogging

Blogging

Wikis

Telepresence
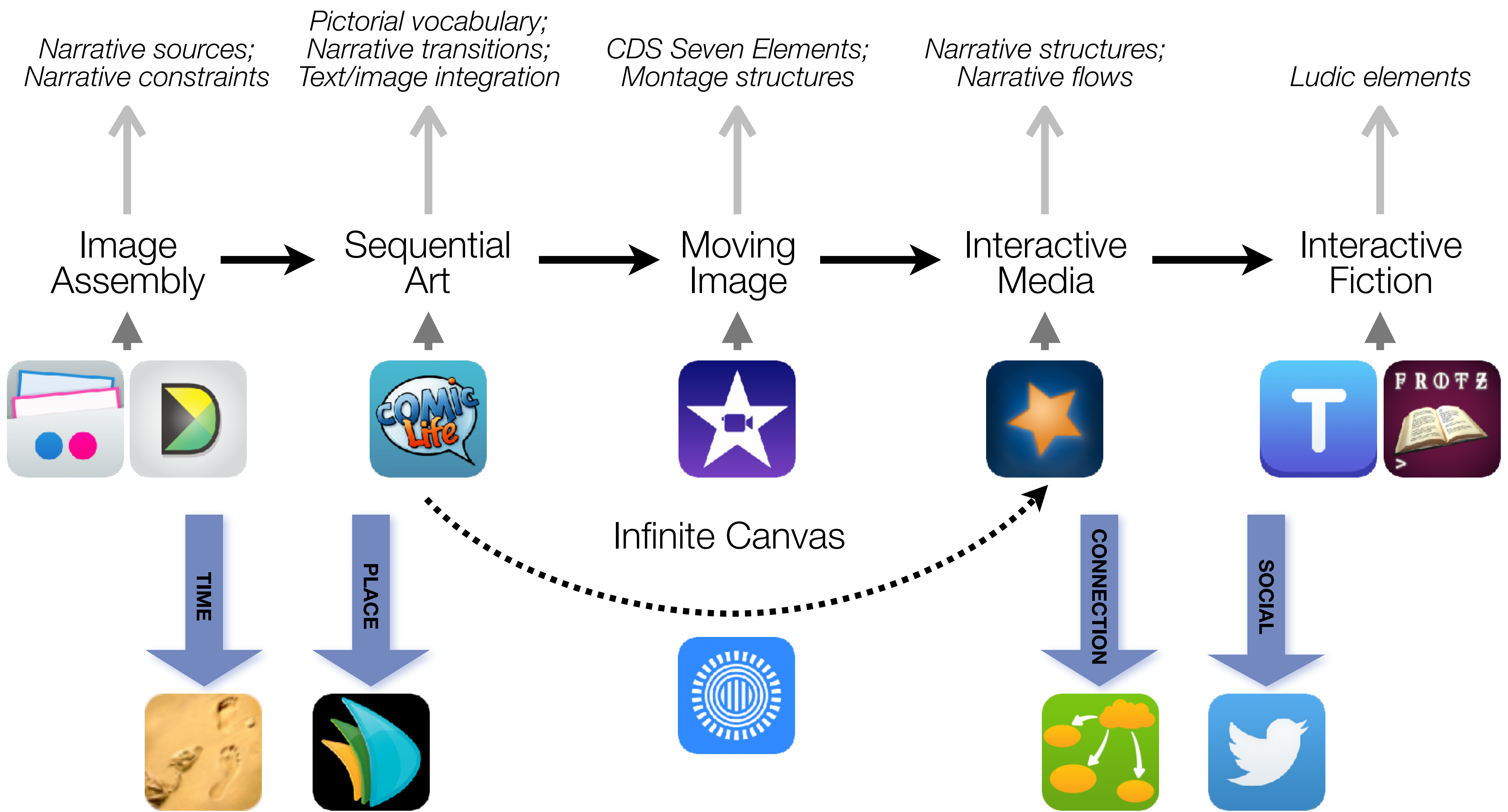
File Sharing

Mobility

Class

Homework

School

World

Home

Learning Environments

Contextual Search/Augmented Reality
Sensors/Recorders
Mobile Tools
Cloud Resources

The Curiosity Amplifier

The Lively Sketchbook

John Seely Brown. "A New Culture of Learning". *NMC Summer Conference, Closing Keynote.* (2010)

Ruben R. Puentedura, "The Lively Sketchbook". *Hippasus Blog.* (2010)

Visualization

Storytelling

Narrative sources;
Narrative constraints

Pictorial vocabulary;
Narrative transitions;
Text/image integration

CDS Seven Elements;
Montage structures

Narrative structures;
Narrative flows

Ludic elements

Image
Assembly

Sequential
Art

Moving
Image

Interactive
Media

Interactive
Fiction

Infinite Canvas

TIME

PLACE

CONNECTION

SOCIAL

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."

Gaming

Katie Salen and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. The MIT Press, 2003.

The EdTech Quintet – Associated Practices

Social	Communication, Collaboration, Sharing
Mobility	Anytime, Anyplace Learning and Creation
Visualization	Making Abstract Concepts Tangible
Storytelling	Knowledge Integration and Transmission
Gaming	Feedback Loops and Formative Assessment

The Value of Shared Practices

- Augmented Note Taking and Annotation

- Visualization Methods:

  - 5 Primary Domains: Space, Time, Networks, Text, Number

- Simple Blogging

- Simple Digital Storytelling Video

- Flipped Classroom:

  - Materials Creation

  - Peer Discussion/Instruction Methods

- Simple Interactive Fiction

- LMS Practices

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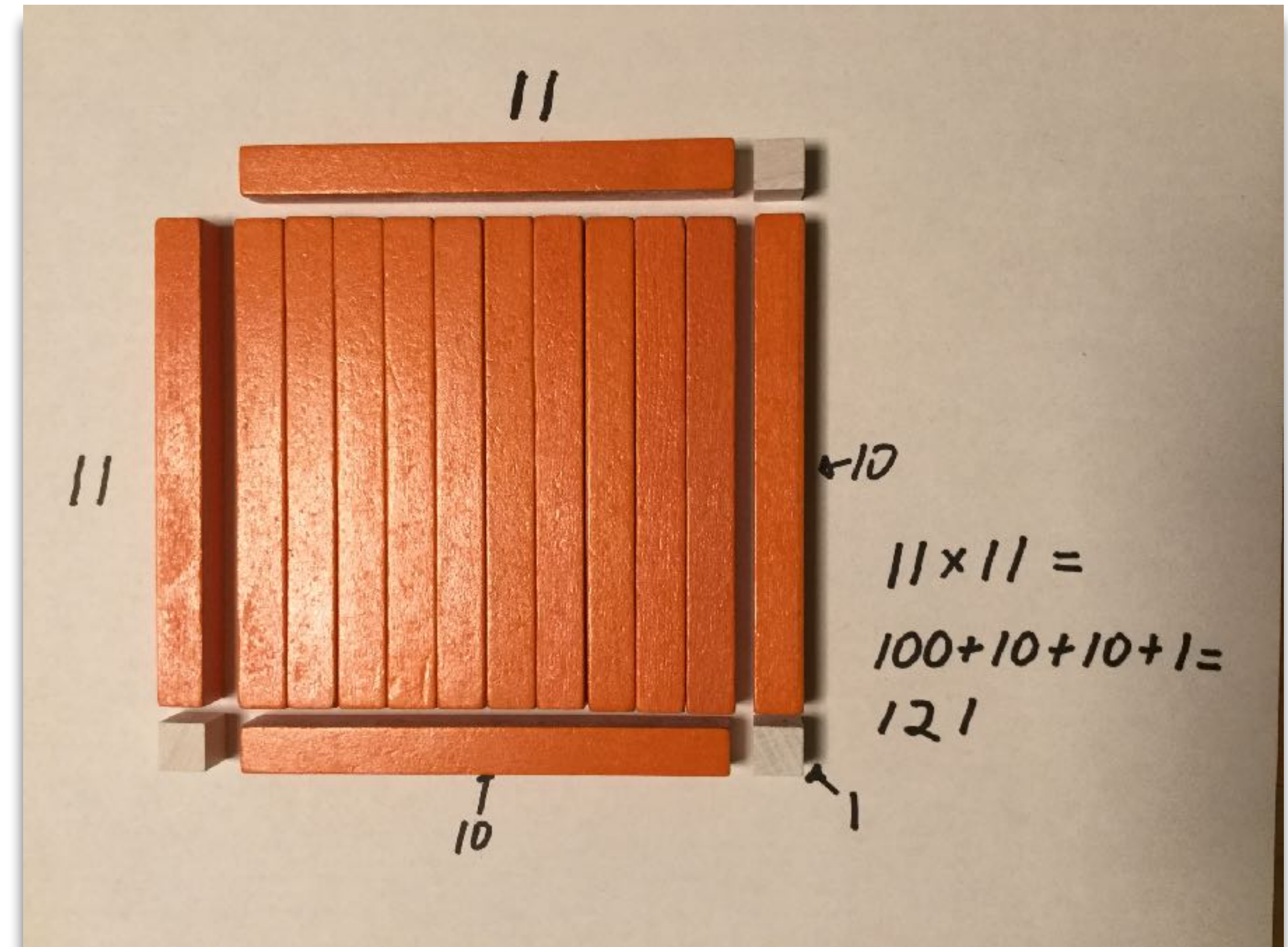*Tech allows for the creation of new tasks, previously inconceivable*

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

Redefinition
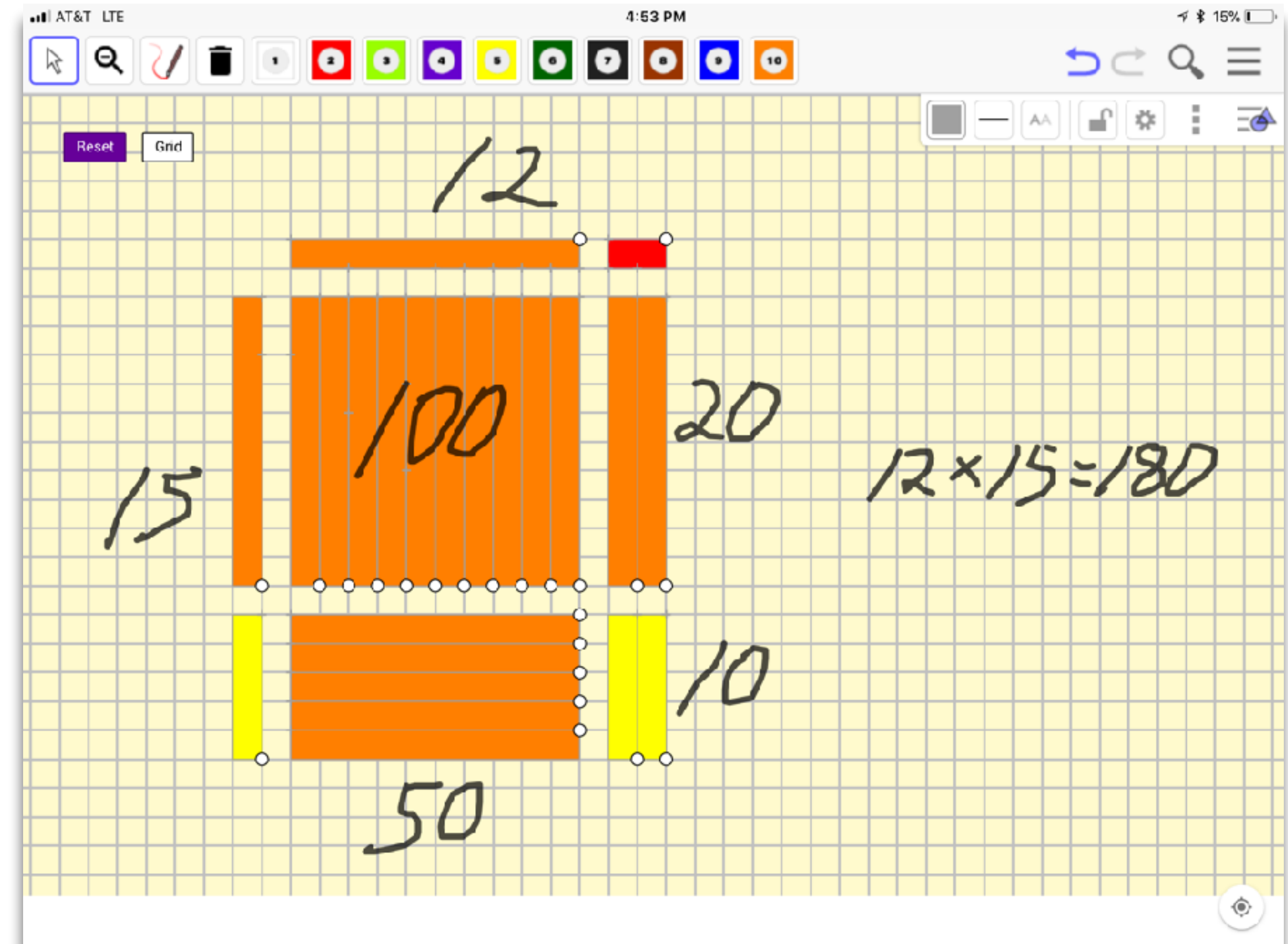*Tech allows for the creation of new tasks, previously inconceivable*
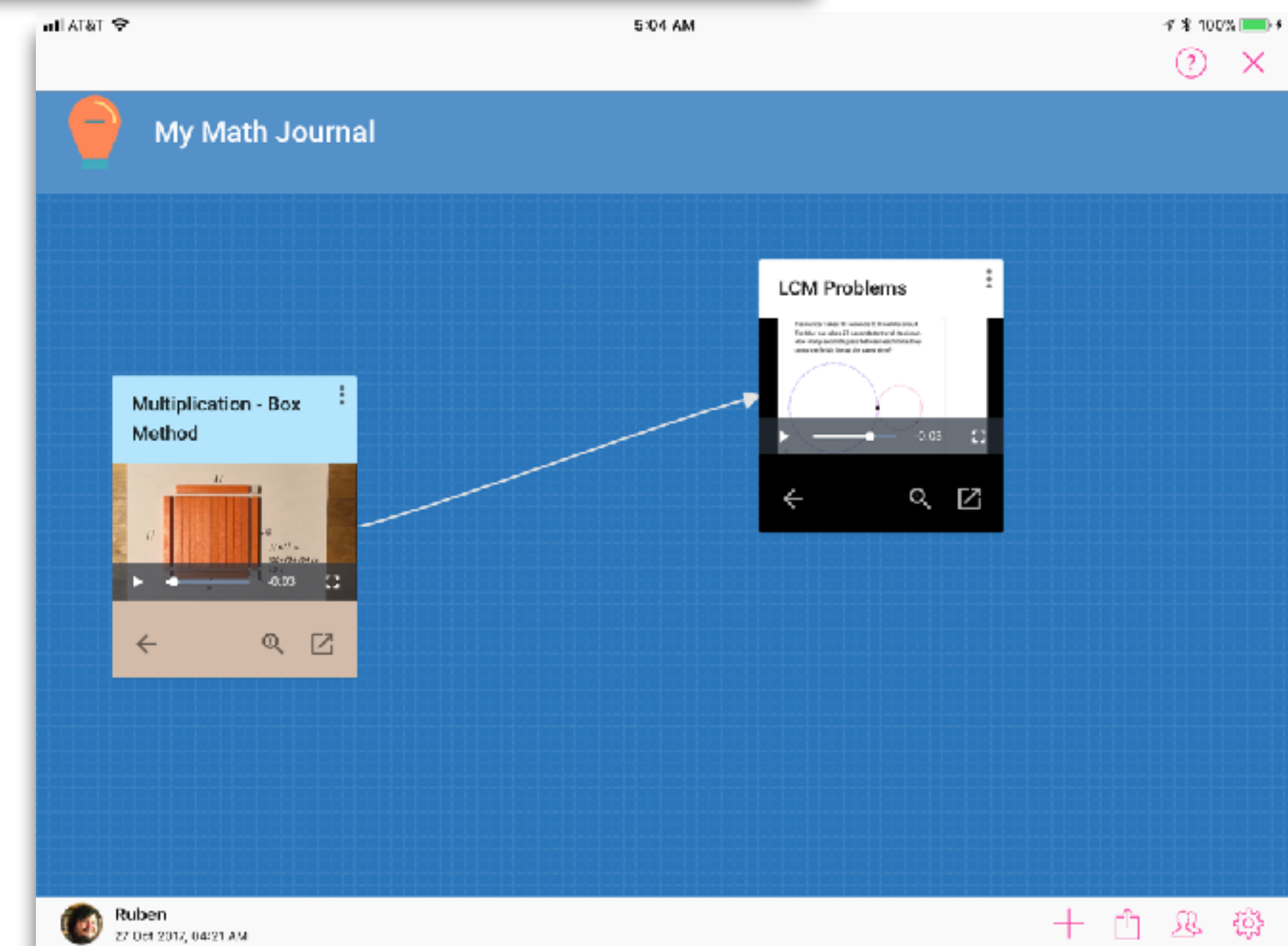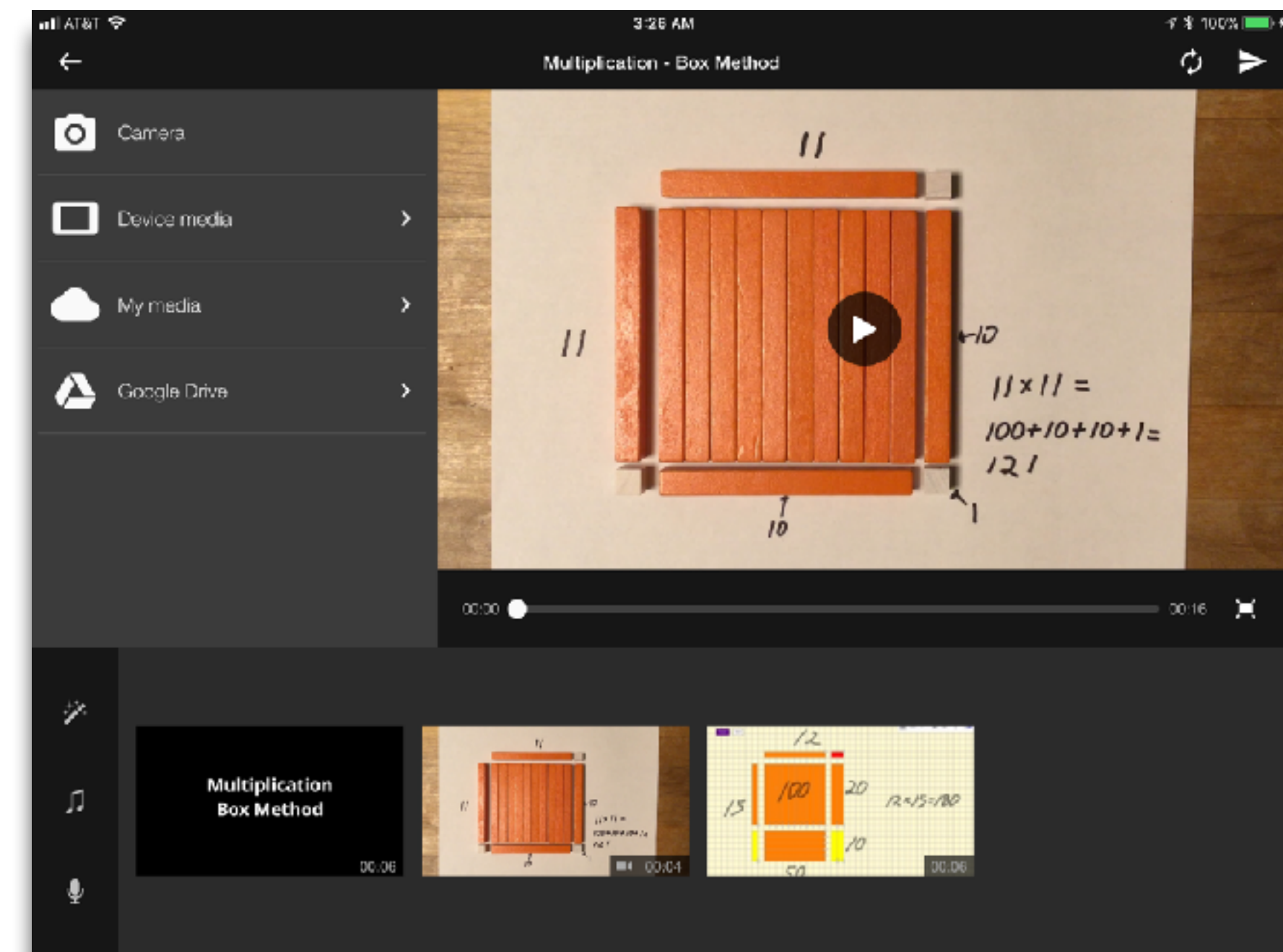
Modification
Tech allows for significant task redesign

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

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

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

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
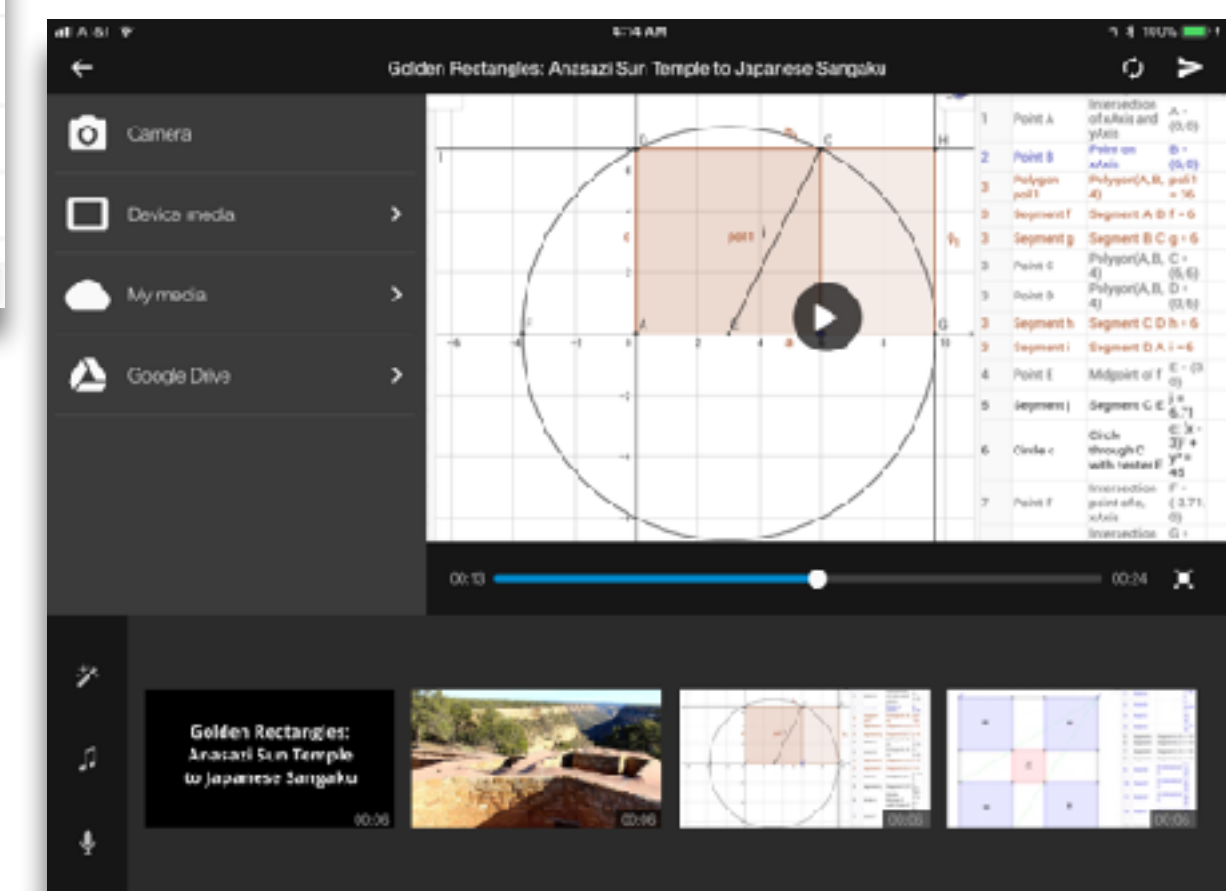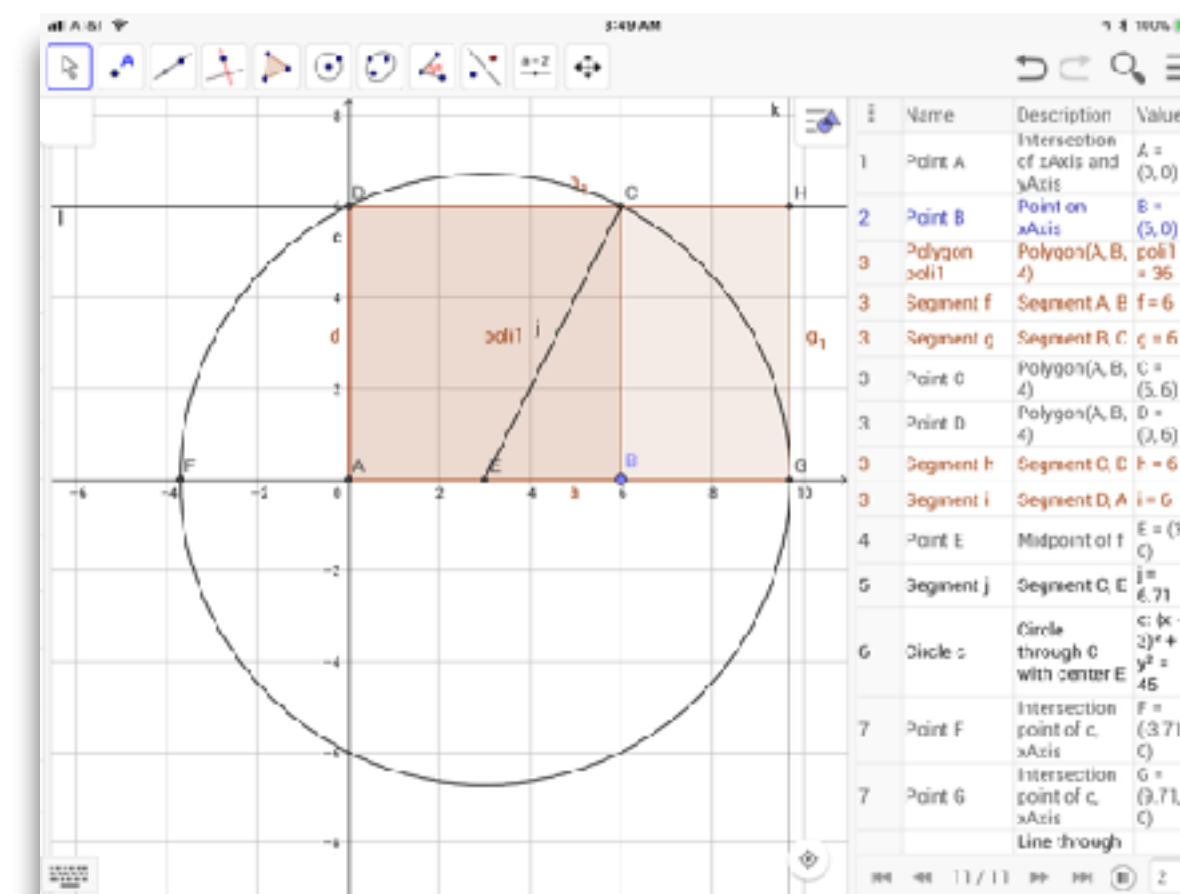
Modification
Tech allows for significant task redesign

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

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

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
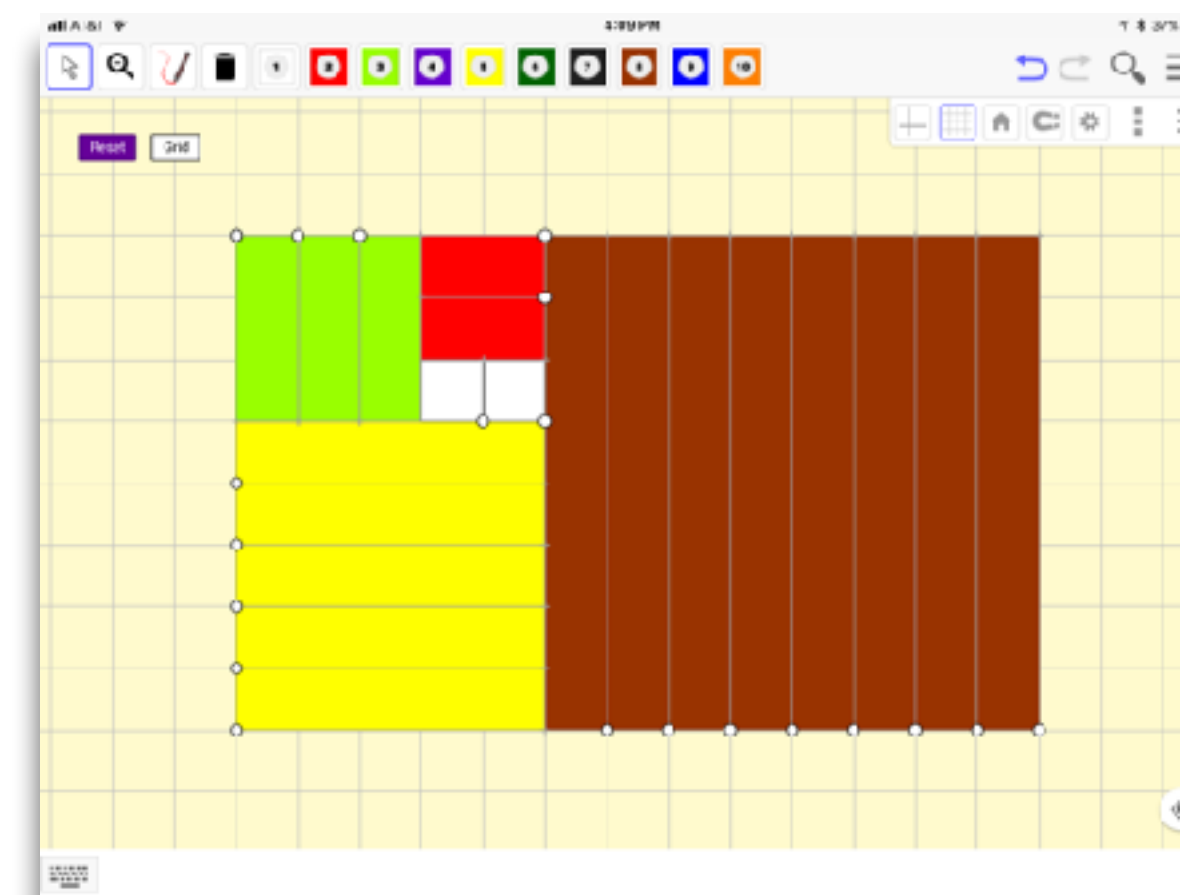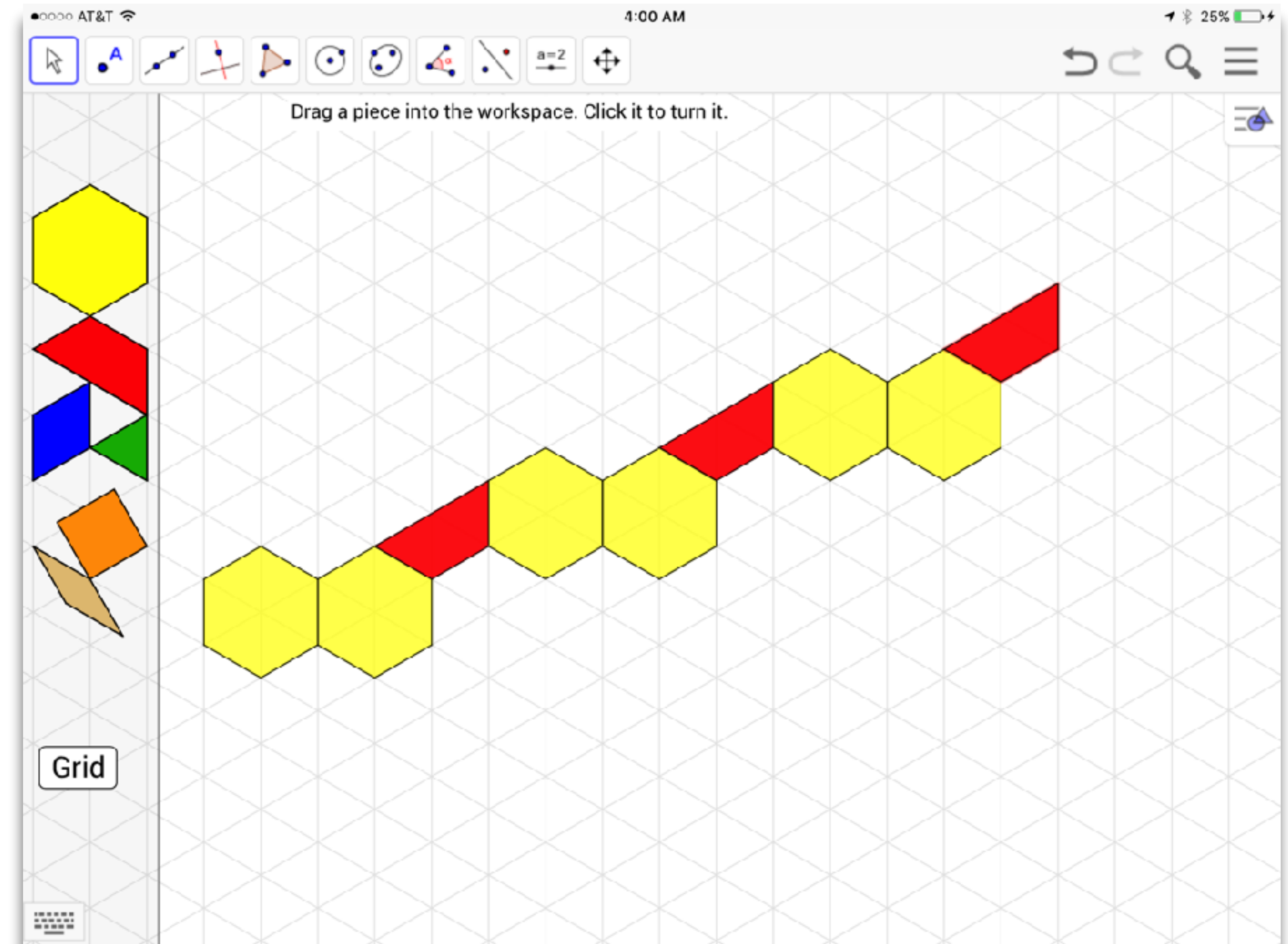
Modification
Tech allows for significant task redesign

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

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

Drag a piece into the workspace. Click it to turn it.

Grid

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

show/hide answer

show/hide intervals

zoom in/out

(2) + (7) =

(2)

(7)

0   2

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
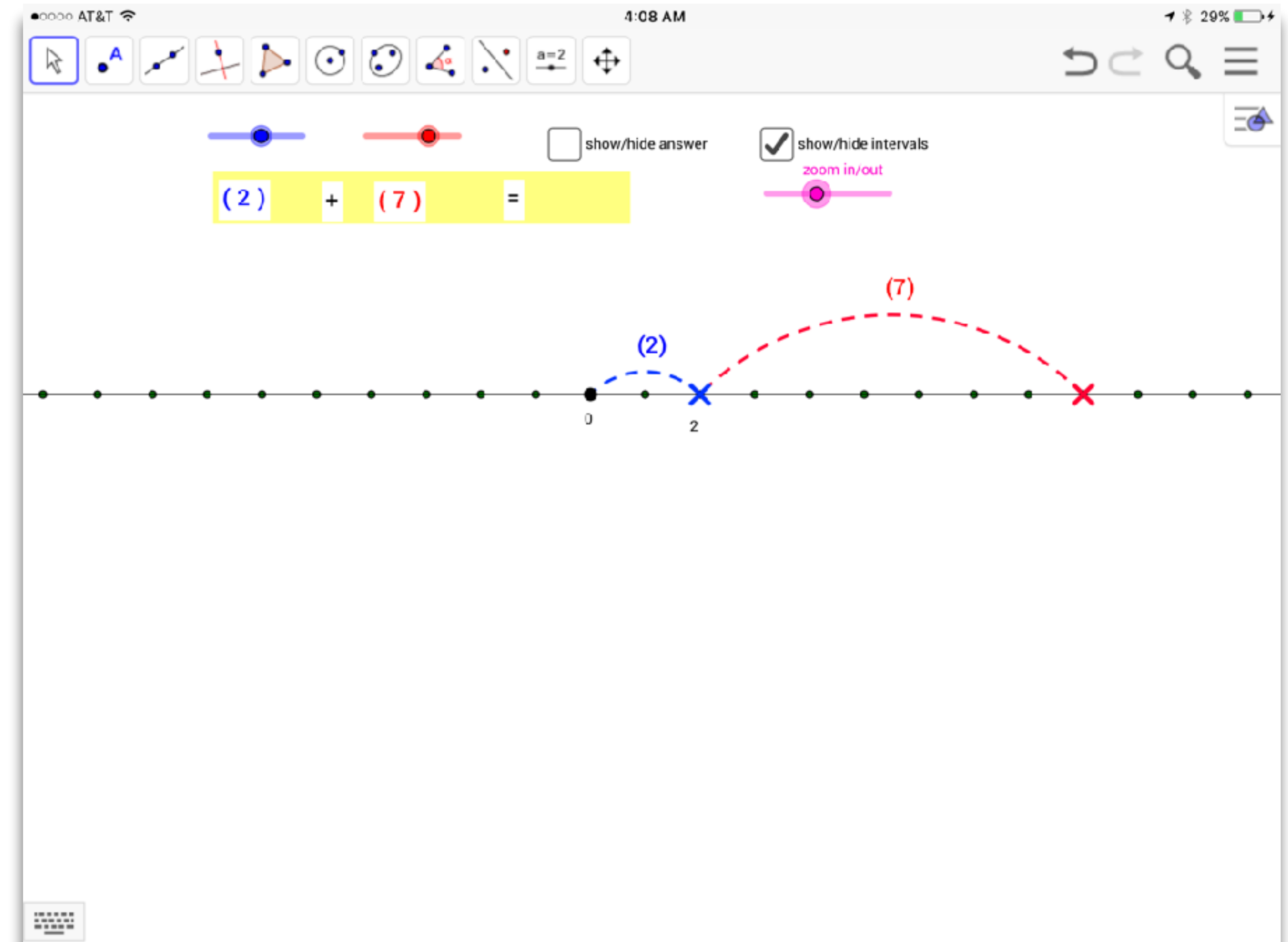
Modification
Tech allows for significant task redesign

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

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

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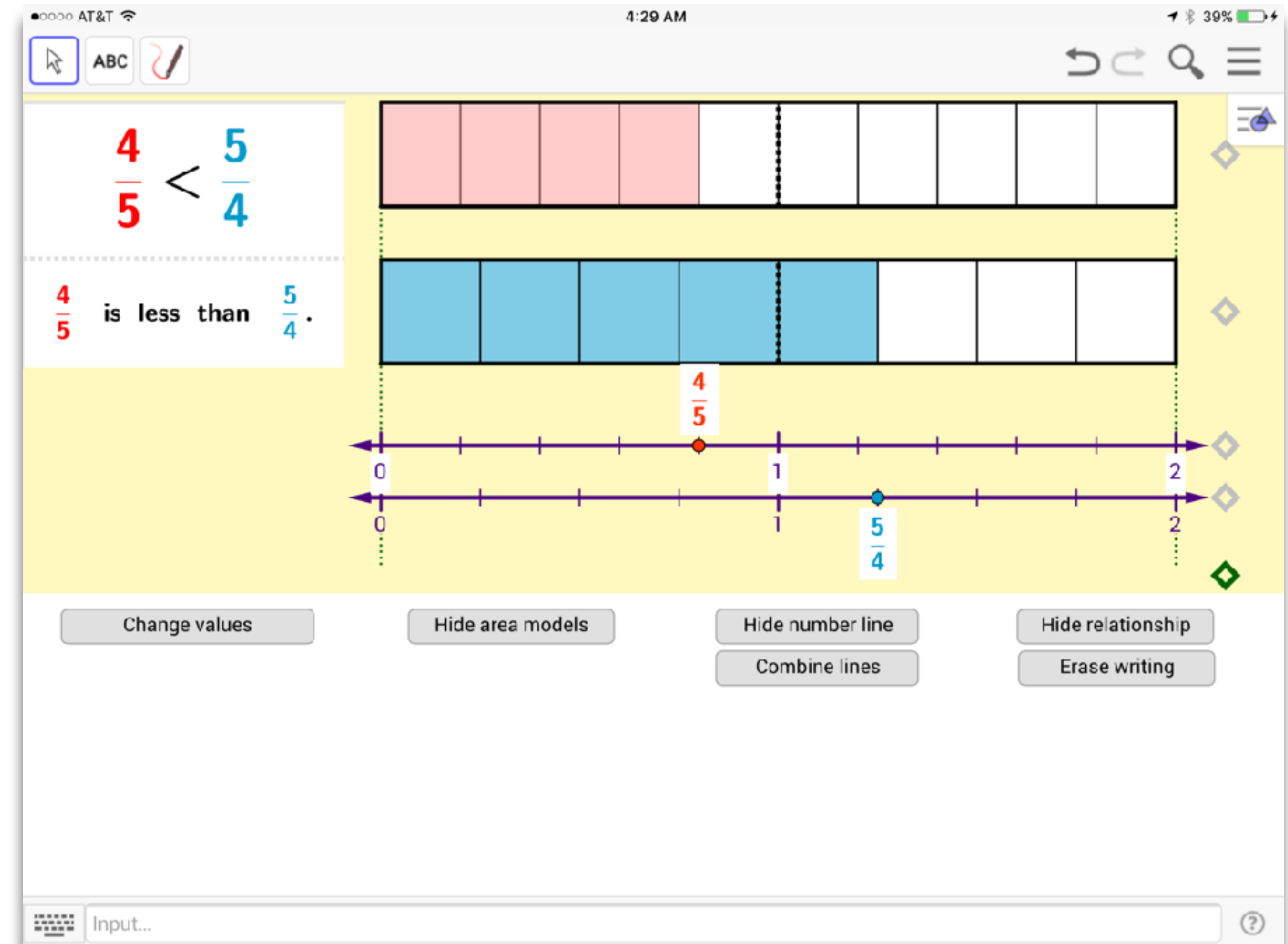previously inconceivable*

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*

Geometry Relationships: Triangle and Rectangle

12

☑ Sliders
☑ Triangle
☑ Rectangle

Height = 12

Triangle base = 14   ☑ Triangle Area   is 84
Rectangle base =10   ☐ Rectangle Area

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
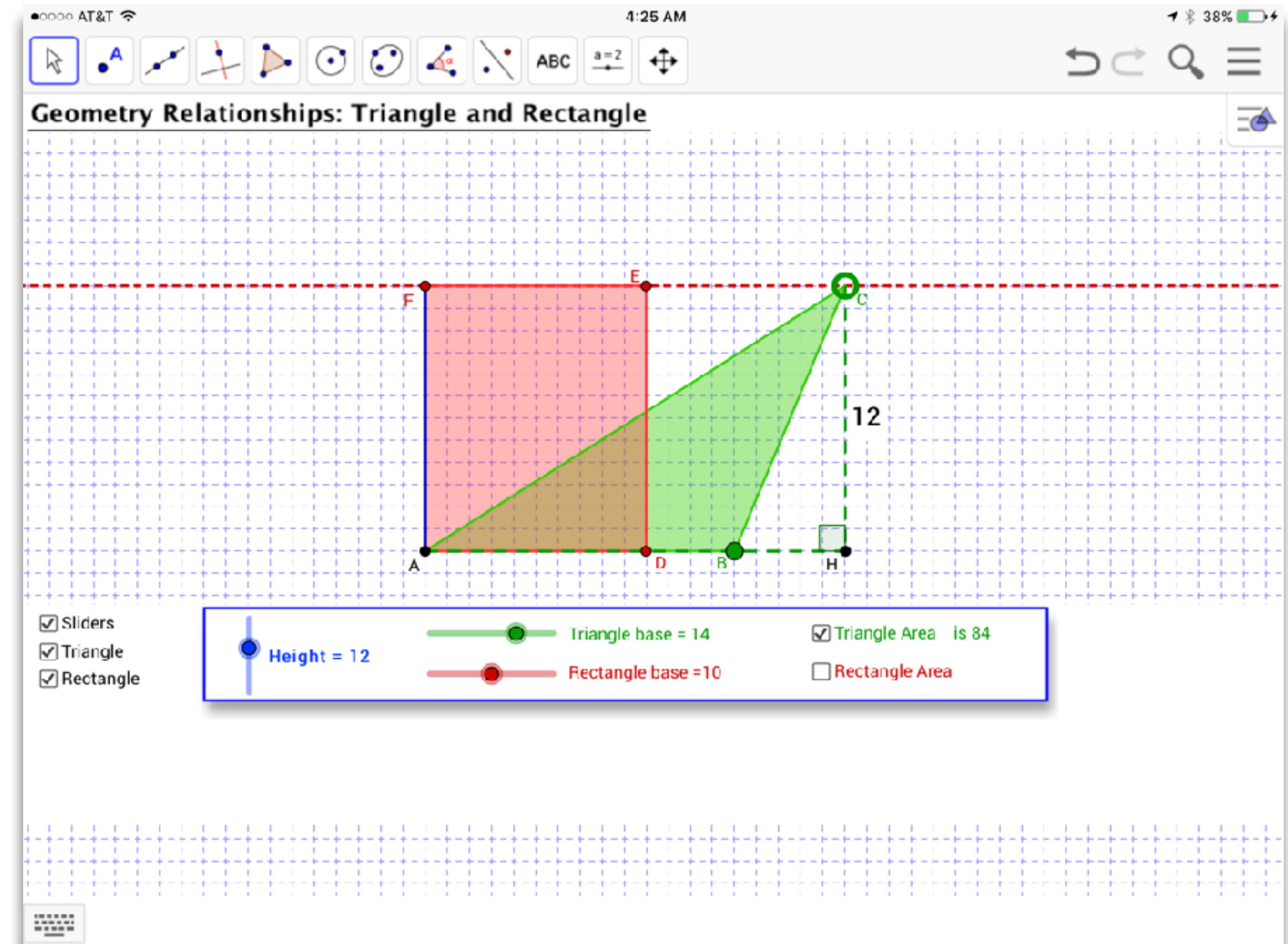
Modification
Tech allows for significant task redesign

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

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

$$-\frac{1}{72}(x-1)(x+3)(x-1)(x-6)$$

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

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
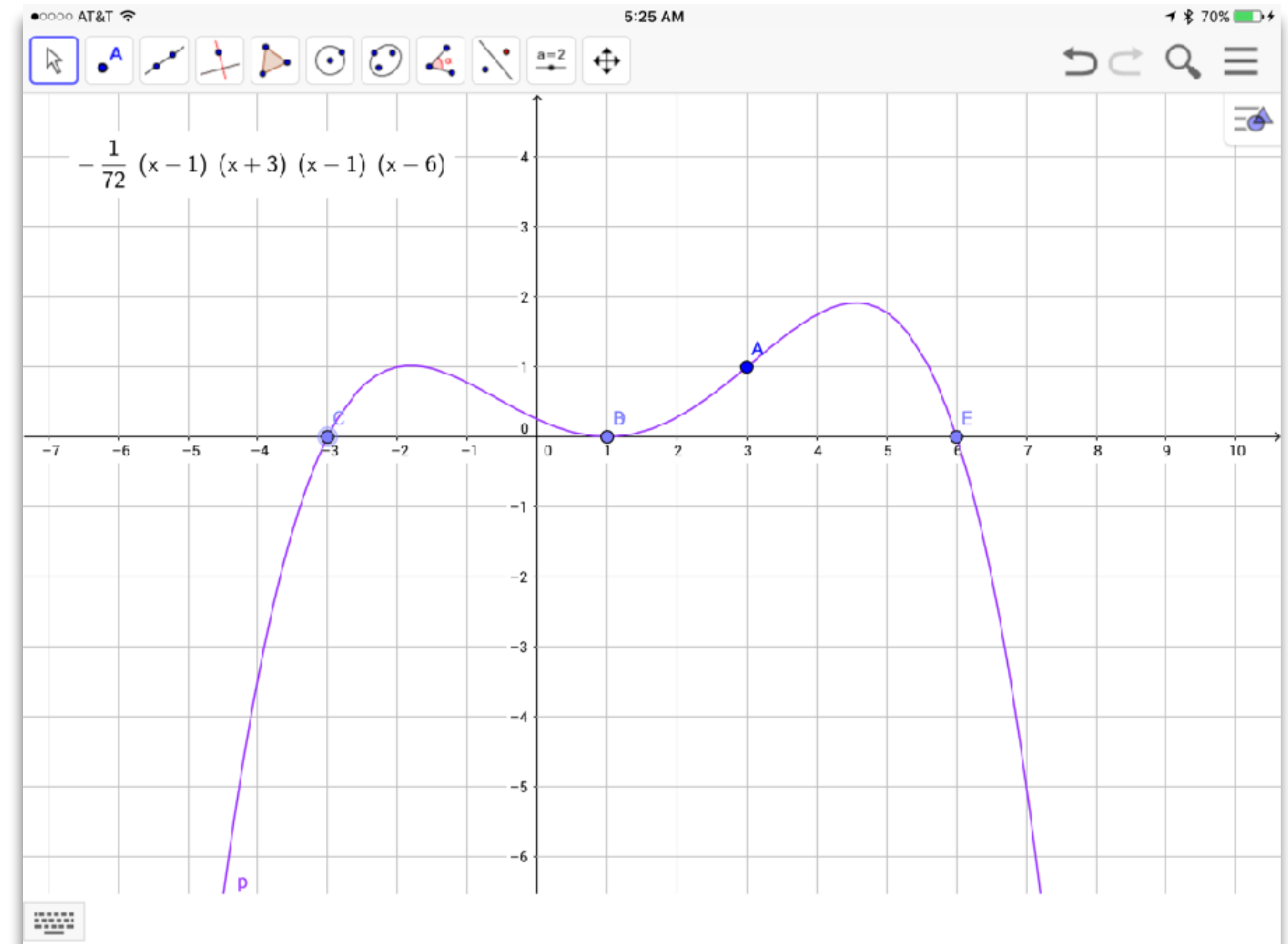
Modification
Tech allows for significant task redesign

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

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

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
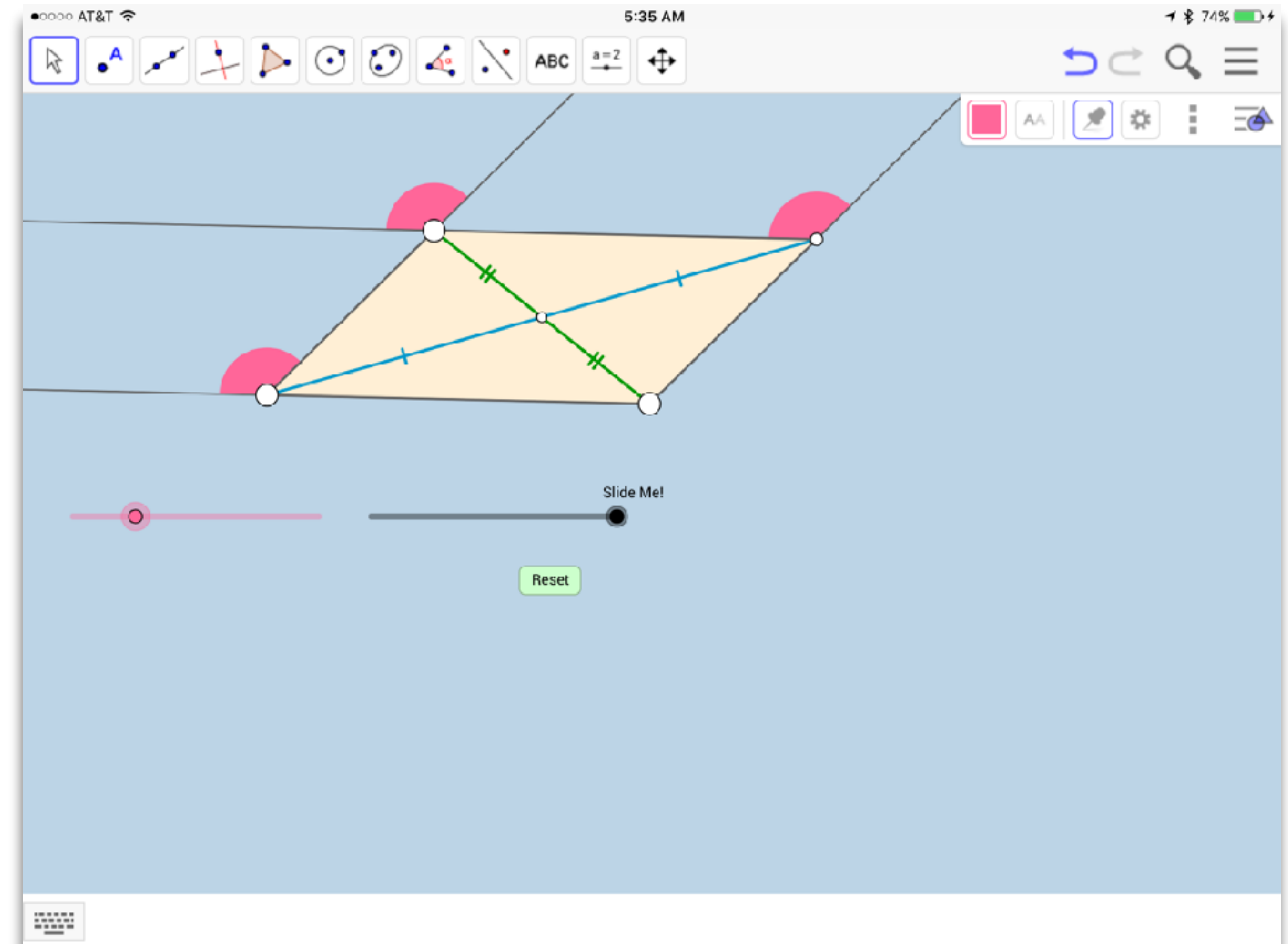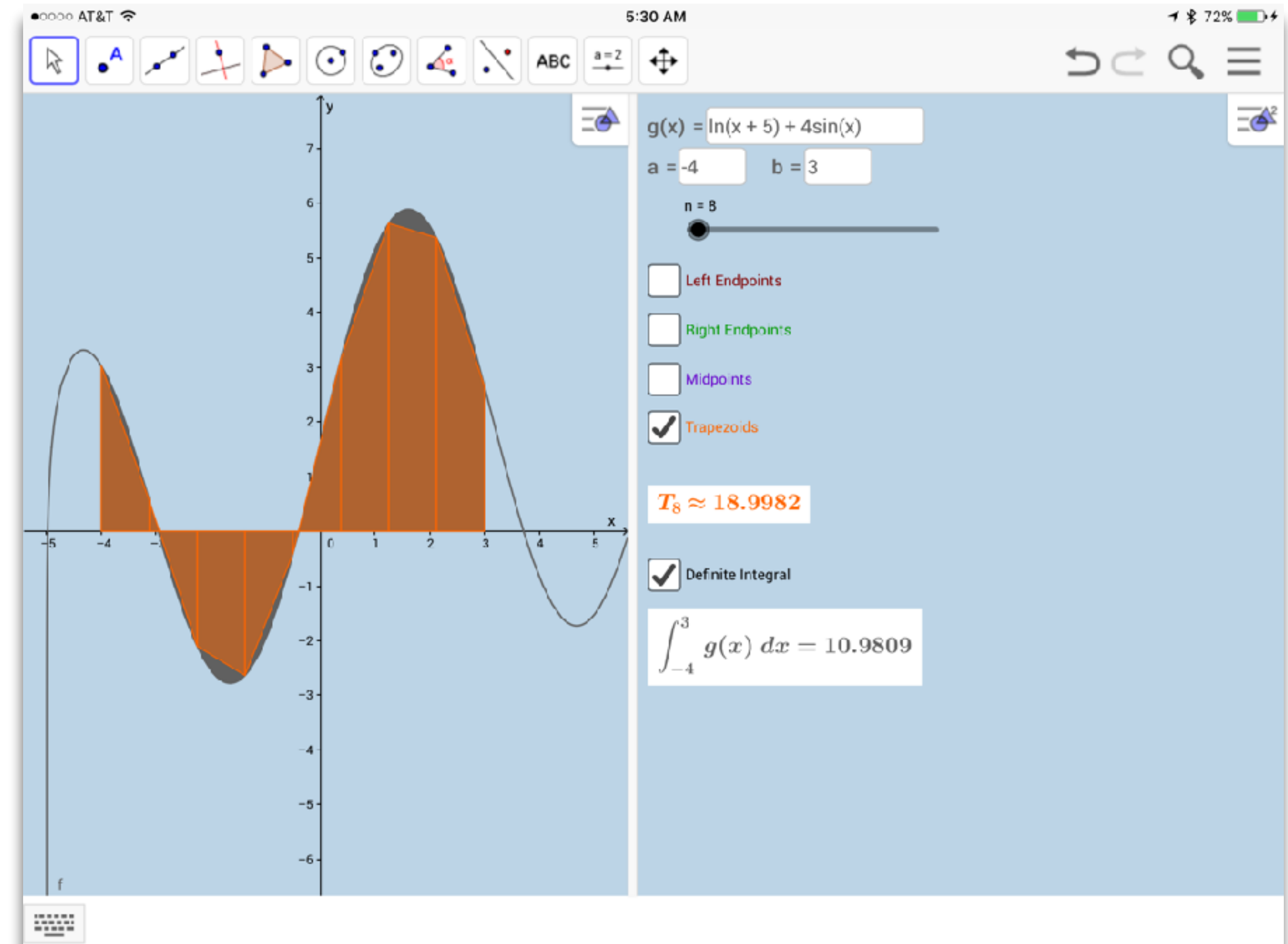
Modification
Tech allows for significant task redesign

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

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

Extended Thinking

Strategic Thinking

Skills and Concepts

Recall and Reproduction

Webb, Norman L. *Depth-of-knowledge levels for four content areas*. (2002)

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

Recall and Reproduction

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

Skills and Concepts

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

Edit Details

Examine the leaves - are they crisp and fresh, or do they show wilting?

Edit Photo   Delete Step   Step 3 of 3

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

Modification
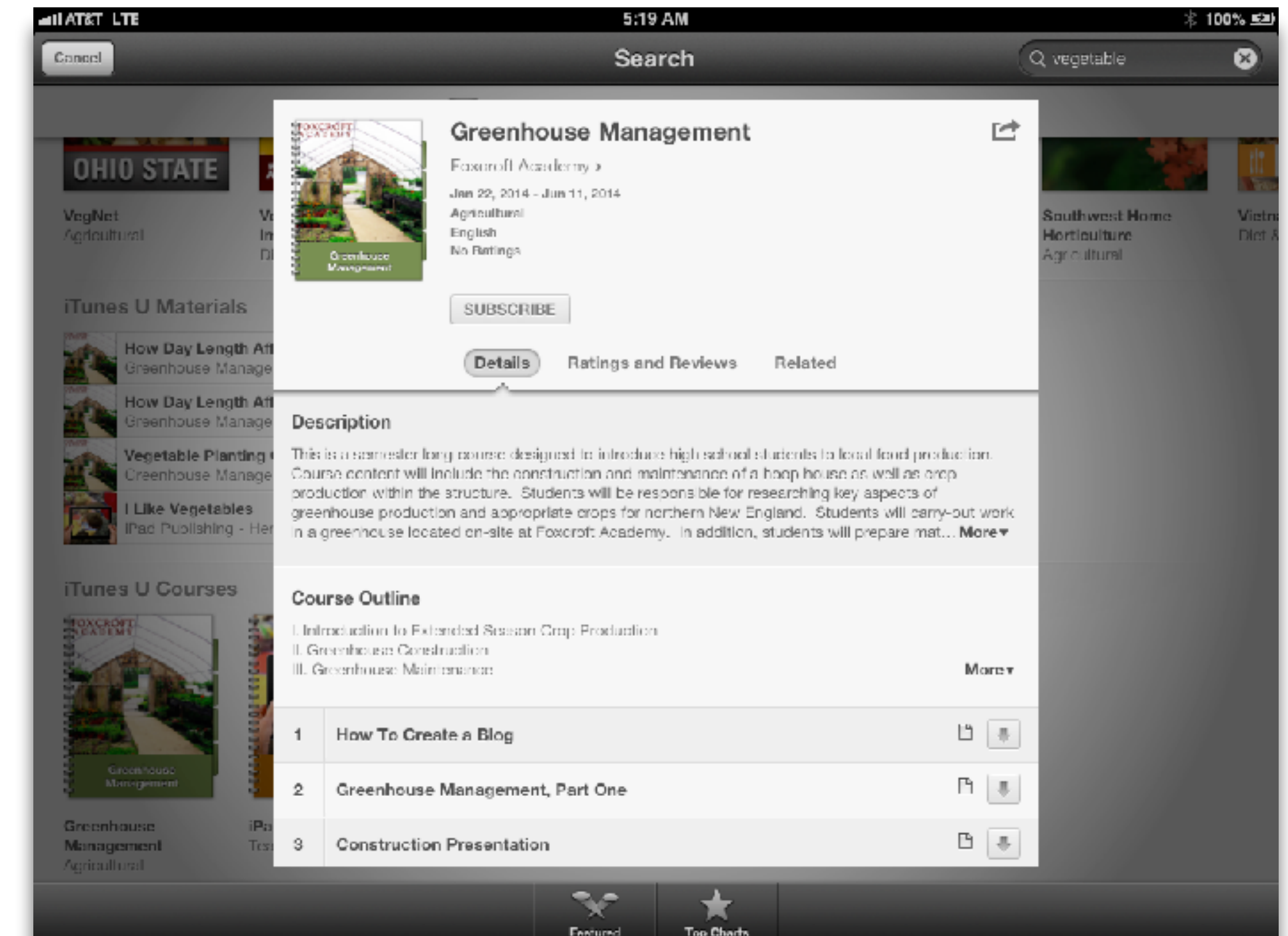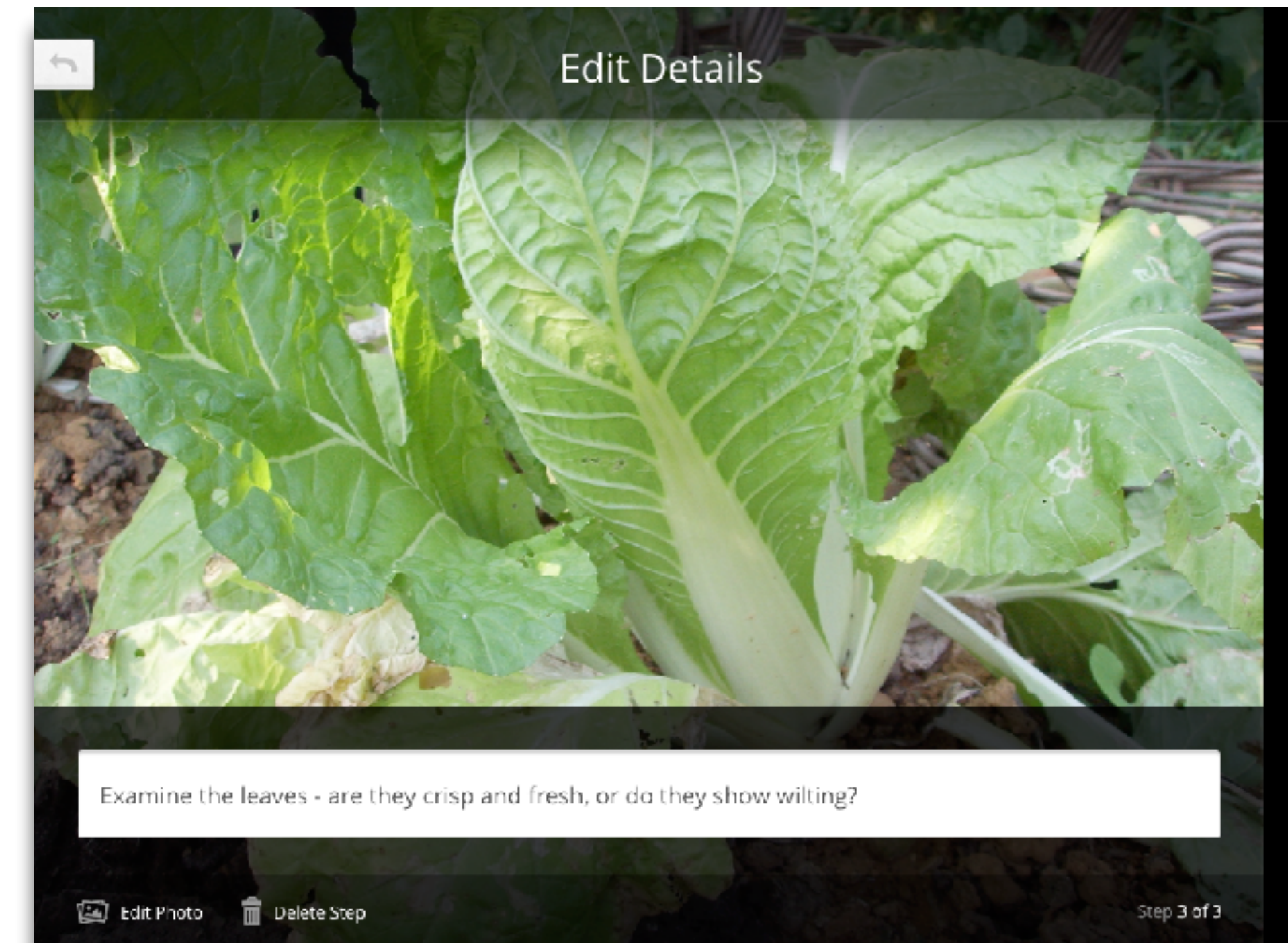*Tech allows for significant task redesign*

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

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

Strategic Thinking

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

Extended Thinking

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

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

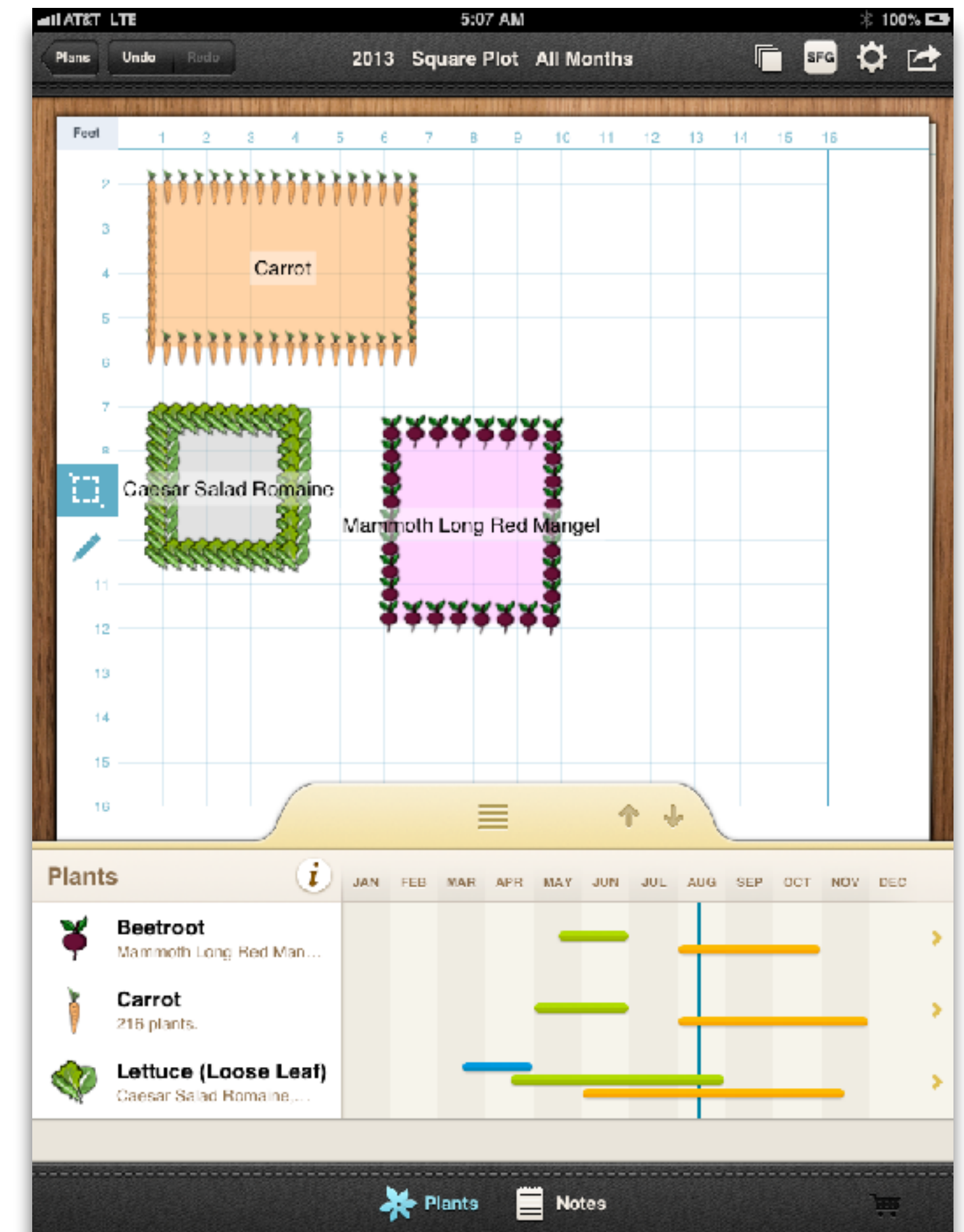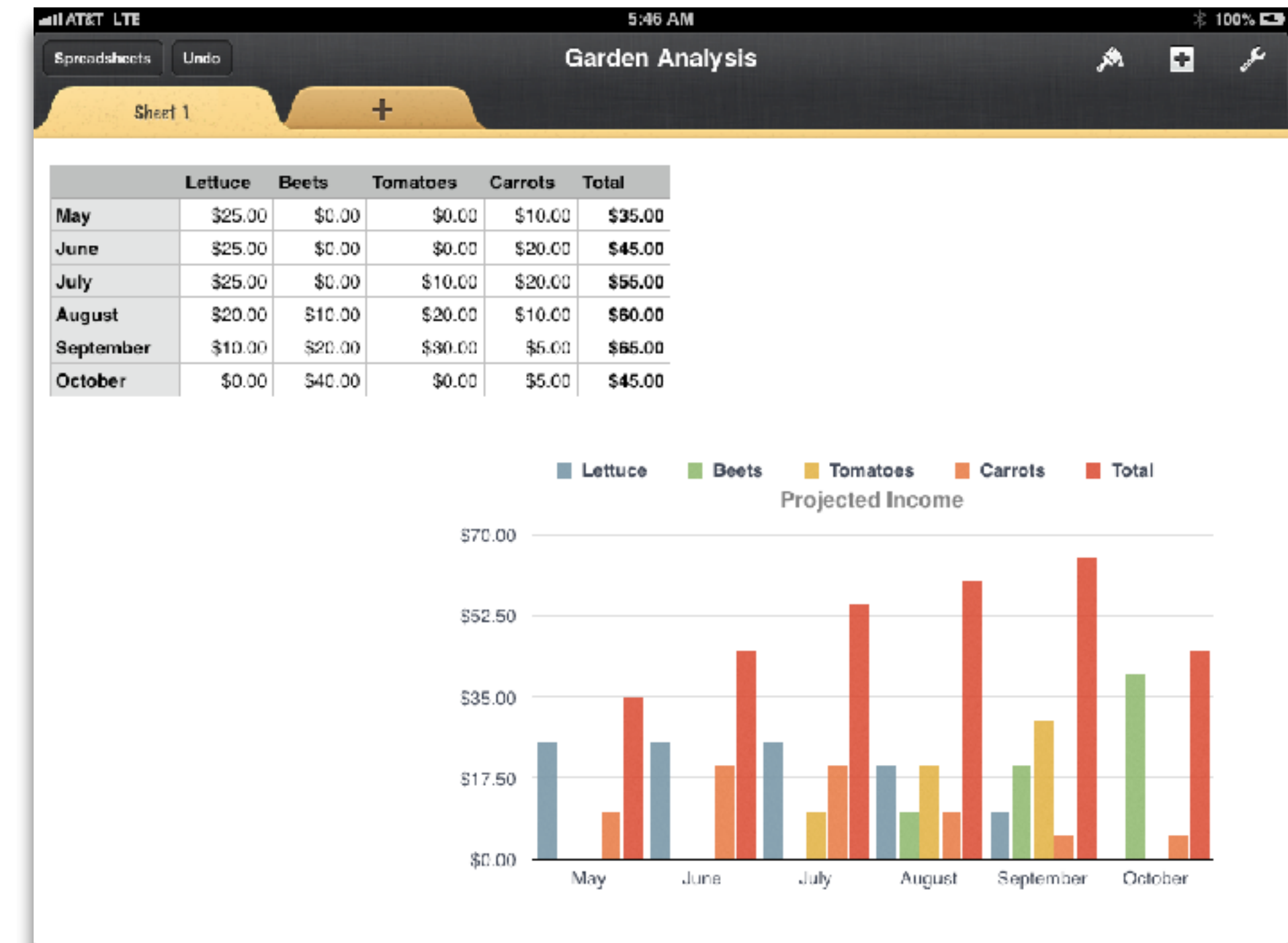**Modification**
Tech allows for significant task redesign

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

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

Create

Evaluate
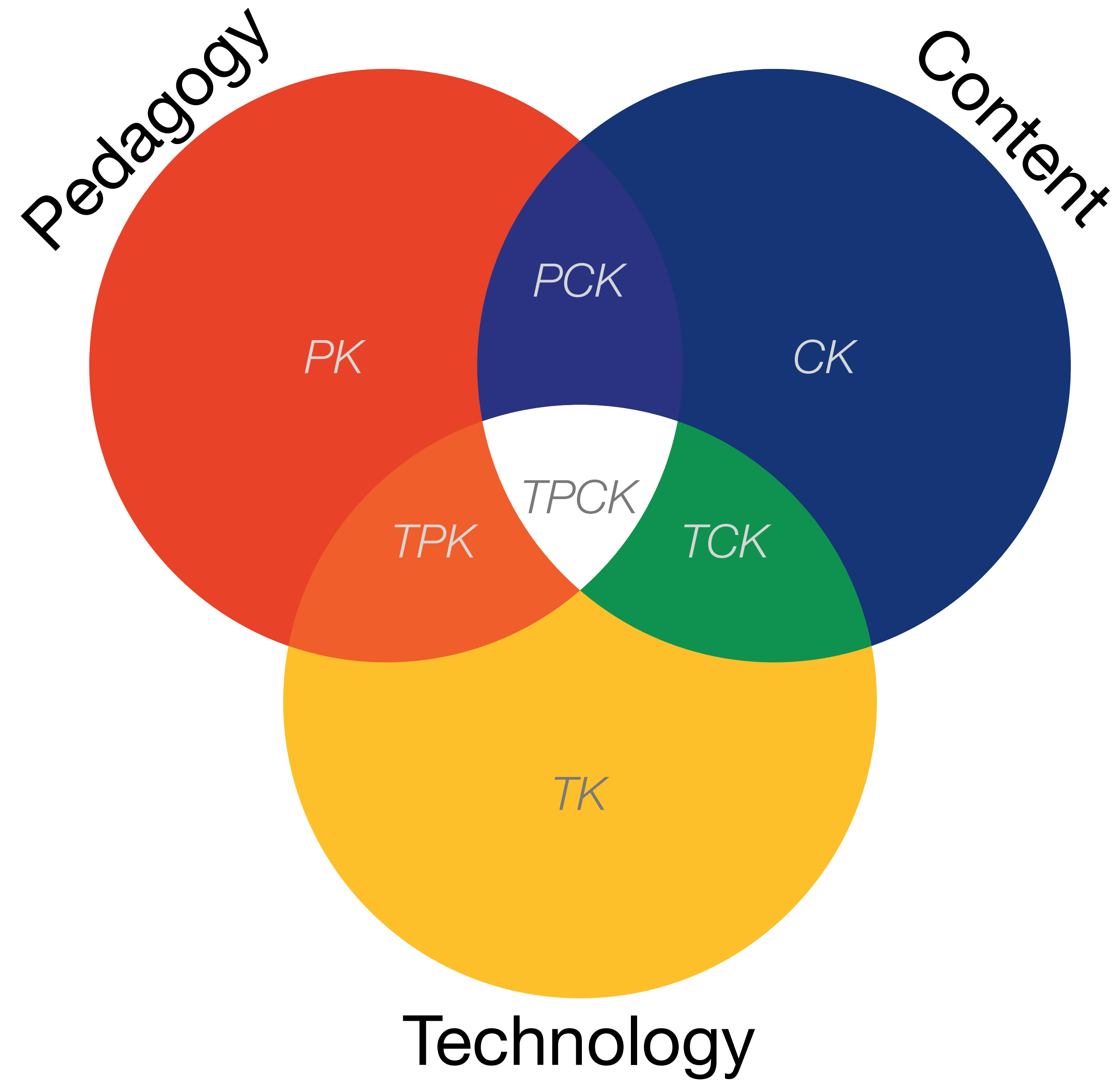
Analyze

Apply

Understand

Remember

Lorin W. Anderson and David R. Krathwohl (Eds.), *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives, Complete Edition*. Longman. (2000)

	Recall & Reproduction	Skills & Concepts	Strategic Thinking	Extended Thinking
Remember	S	A	M	R
Understand	S/A	A	M	R
Apply	A	A	M	R
Analyze	M	M	M	R
Evaluate	M/R	M/R	M/R	R
Create	R	R	R	R

3. Interweaving Content, Pedagogy, and Technology

Punya Mishra & Matthew J. Koehler, "Technological pedagogical content knowledge: A framework for teacher knowledge". *Teachers College Record, 108*(6). (2006)

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
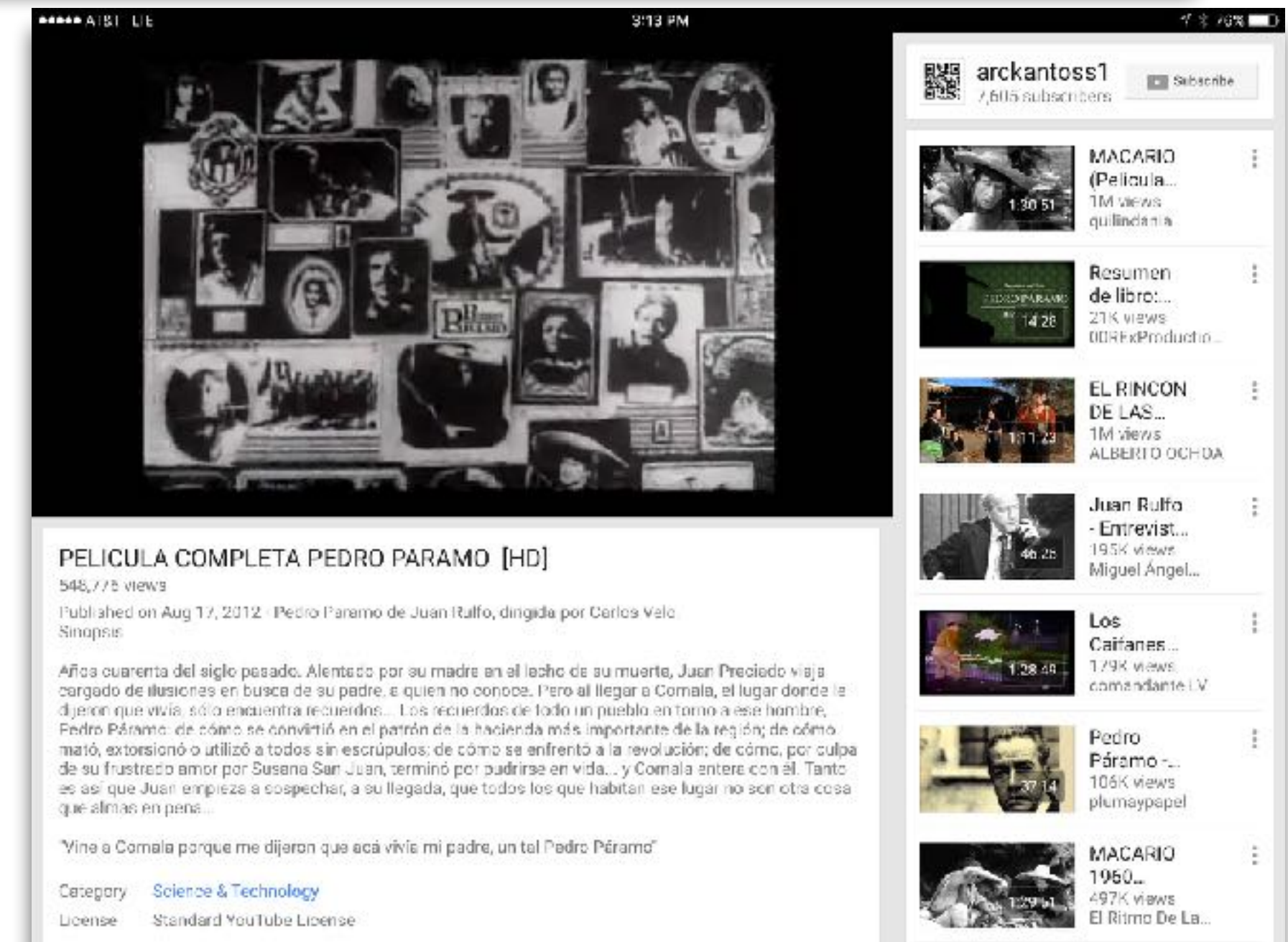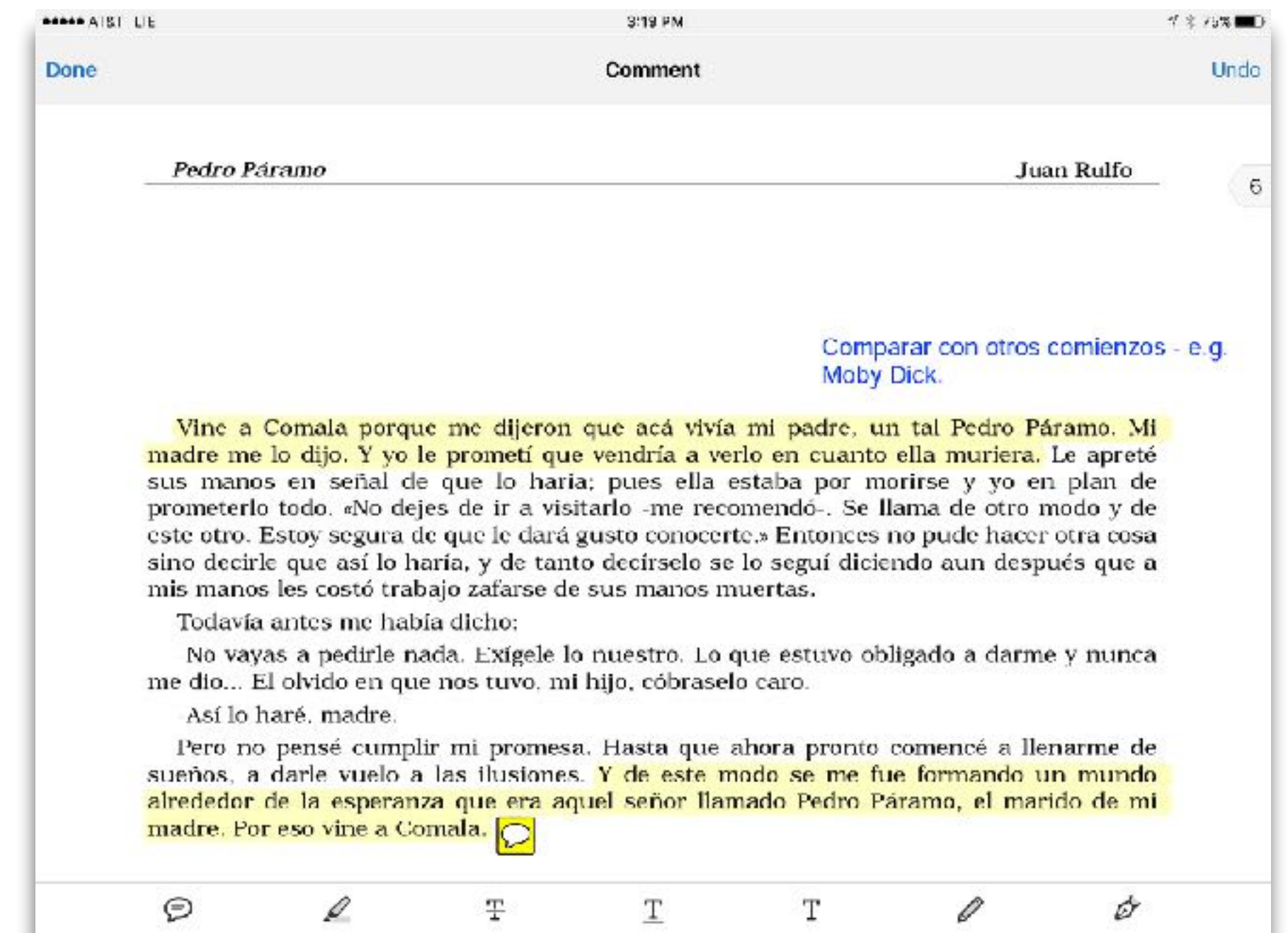
Modification
Tech allows for significant task redesign

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

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

Pedagogy

Content

PK

PCK

CK

TPK

TPCK

TCK

TK

Technology

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
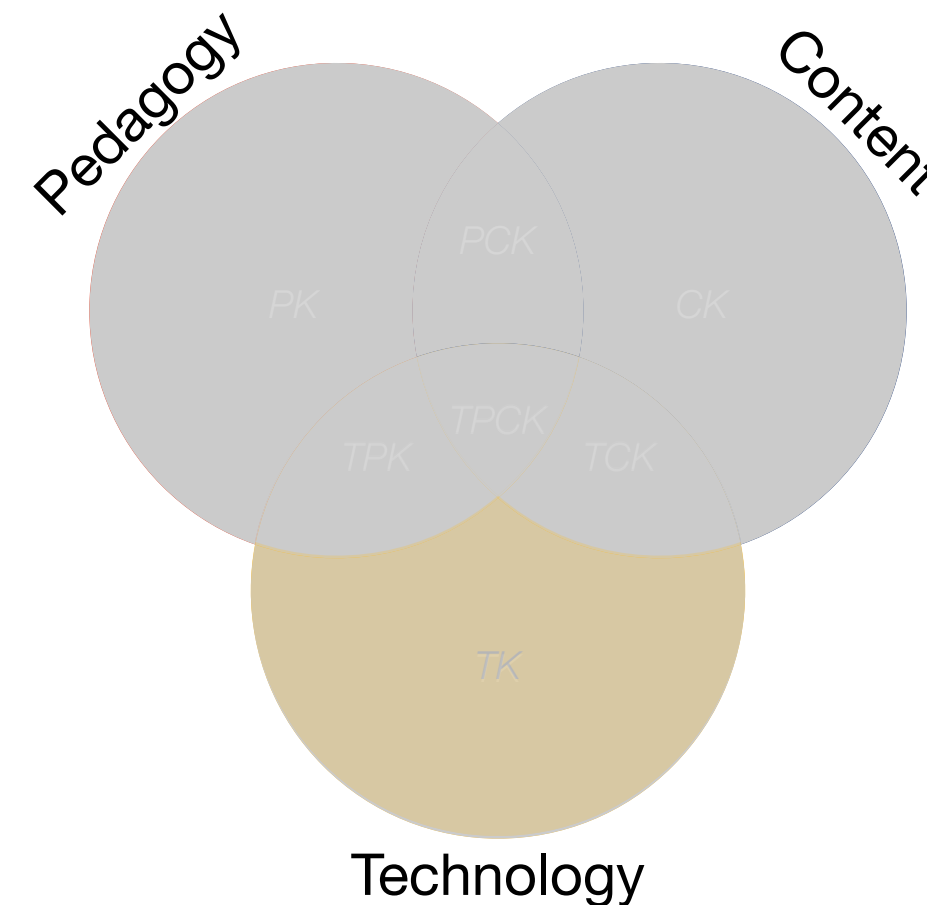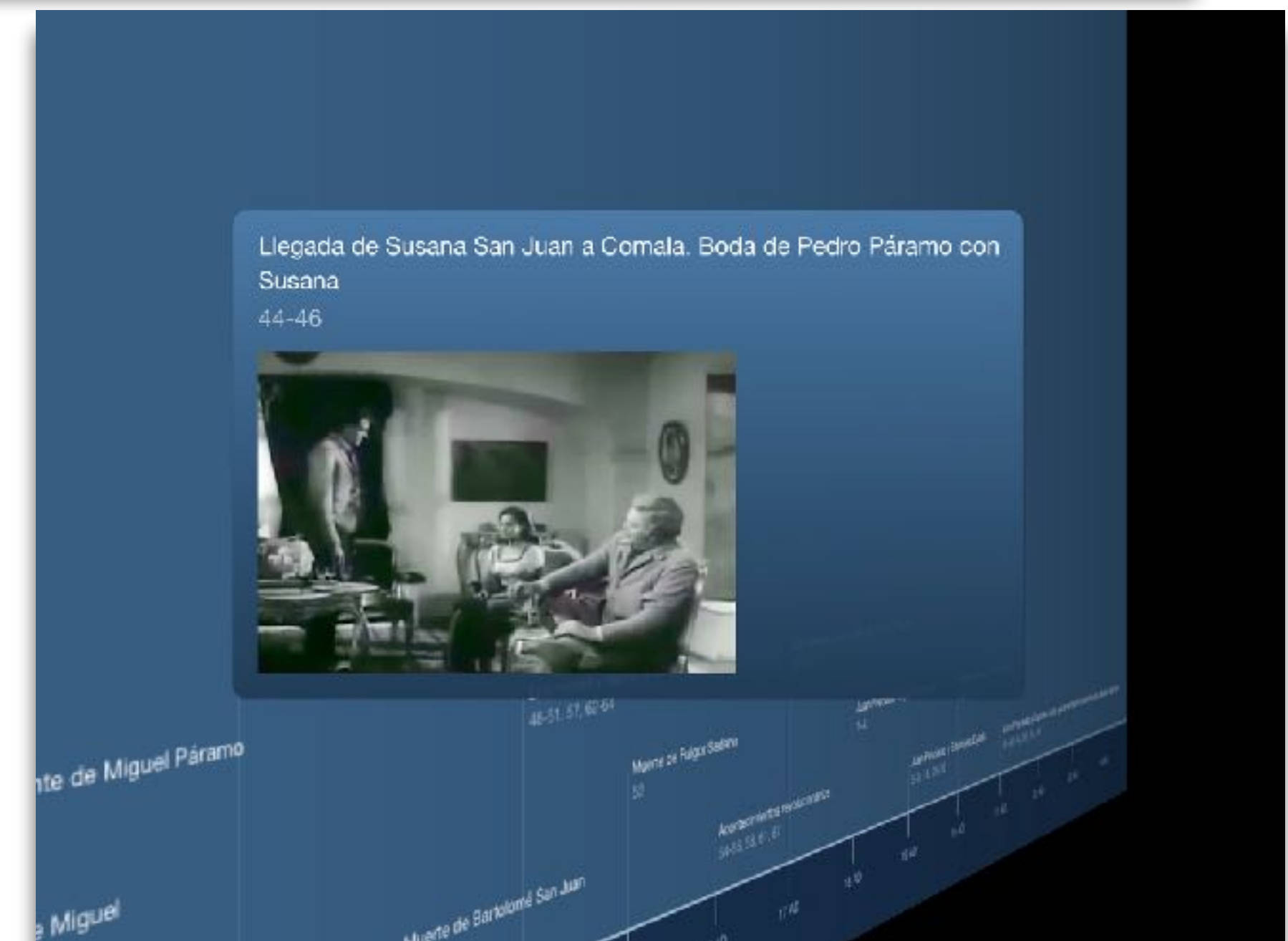
Modification
Tech allows for significant task redesign

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

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

Pedagogy

Content

Technology

PK

CK

TK

PCK

TPK

TCK

TPCK

Pedro Páramo

Juan Preciado

Dolores Preciado

Dolores Preciado

Miguel Páramo

Recuerdos 1-8

Salidas 9-10

Muertes 11-13

Pedro Páramo

Susana San Juan

Susana San Juan

Lucas Páramo

Llegada de Susana San Juan a Comala. Boda de Pedro Páramo con Susana
44-46

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
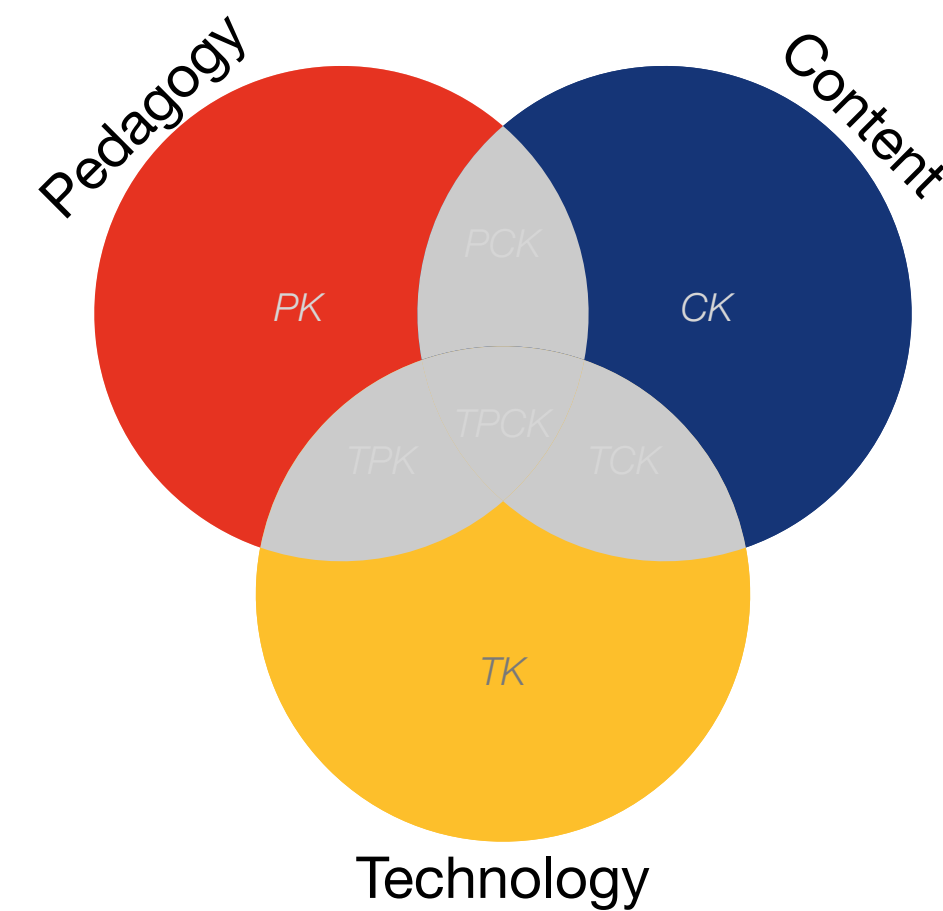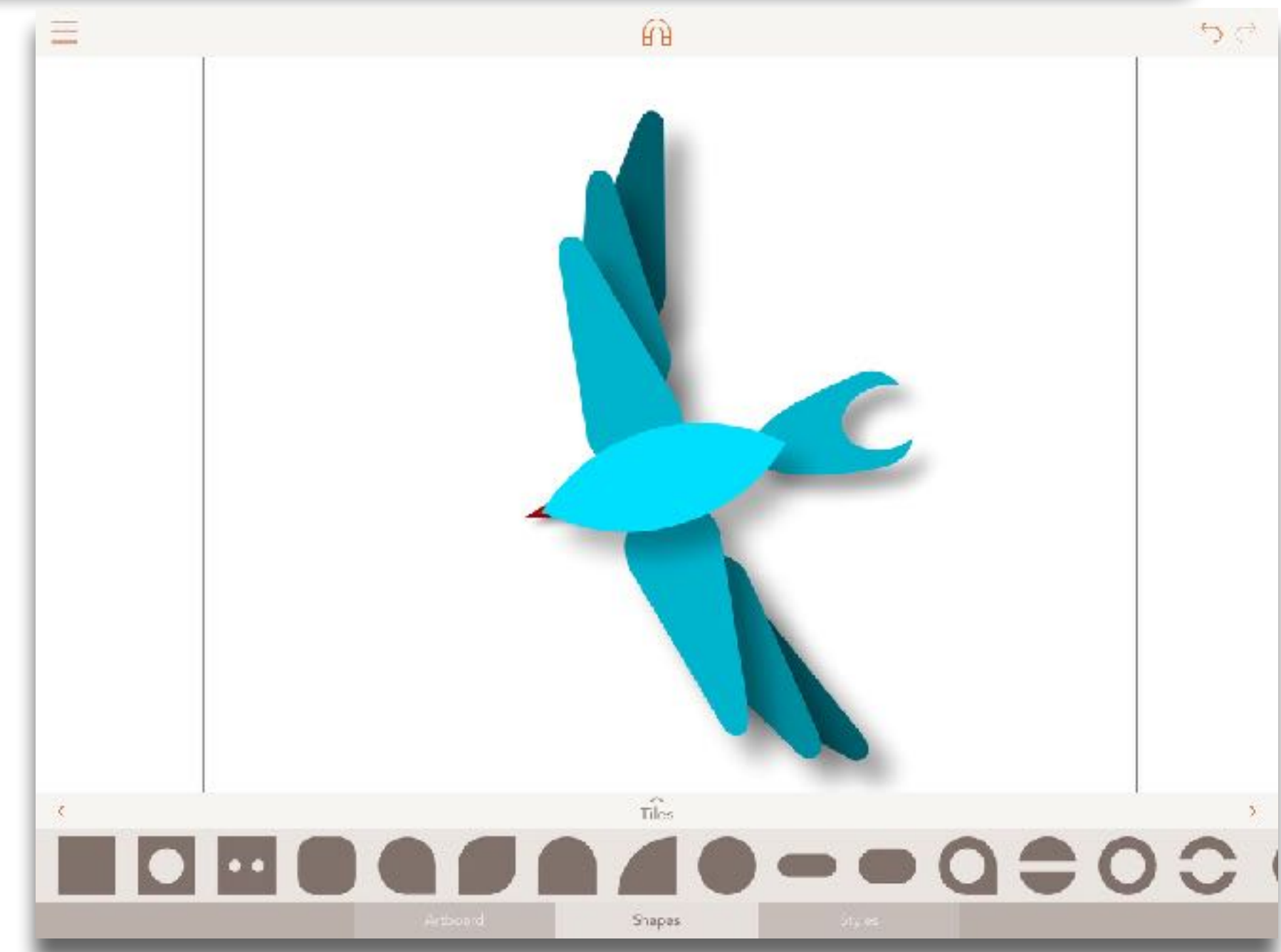
Modification
Tech allows for significant task redesign

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

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

Pedagogy

Content

PCK

TPK

TPCK

TCK

PK

CK

TK

Technology

Literatura en Contexto

Pedro Páramo y el Cubismo Mejicano

Post

HTML

B I U

Q W E R T Y U I O P

A S D F G H J K L return

Z X C V B N M ! ?

123 123

Tilos

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
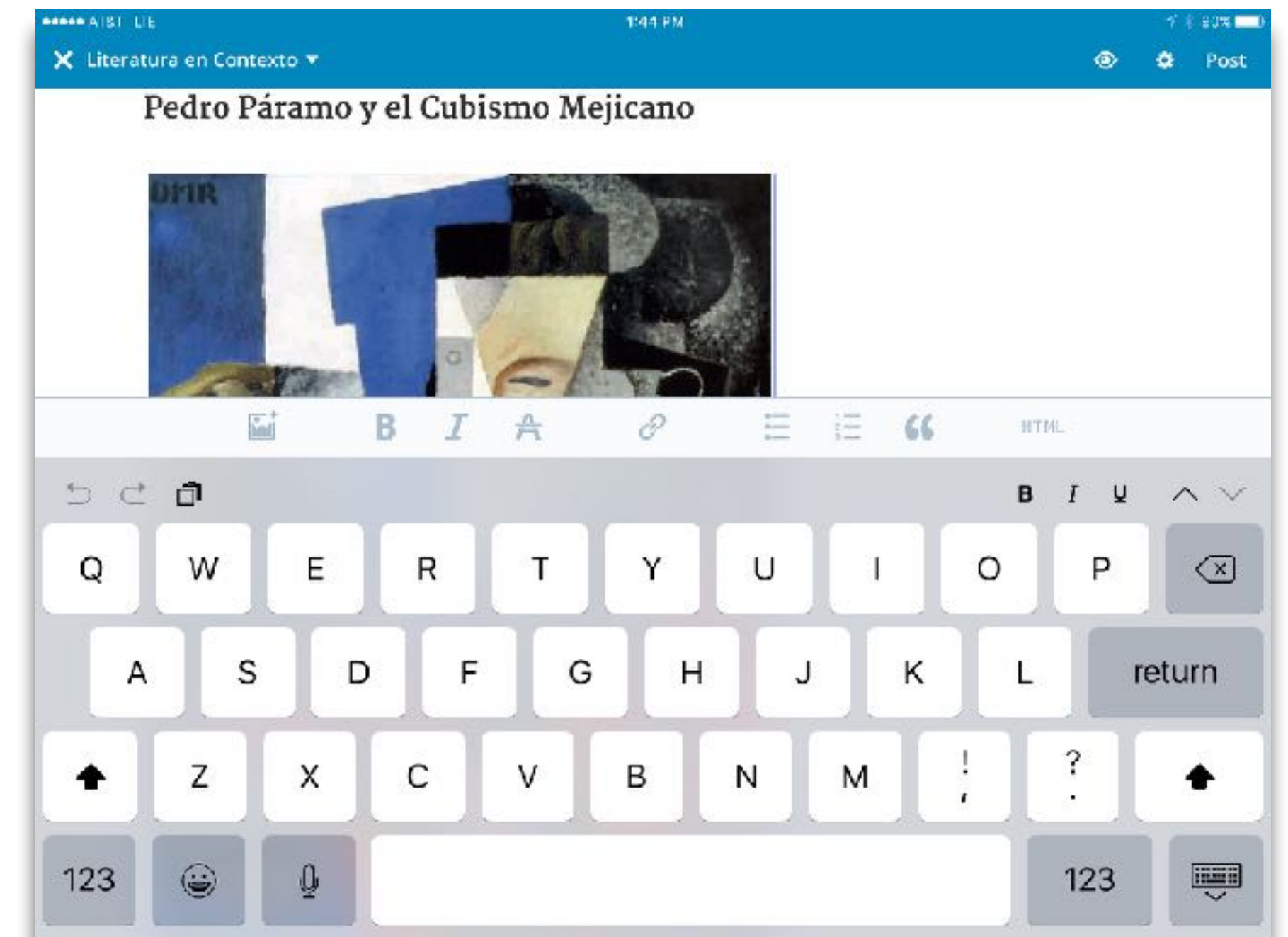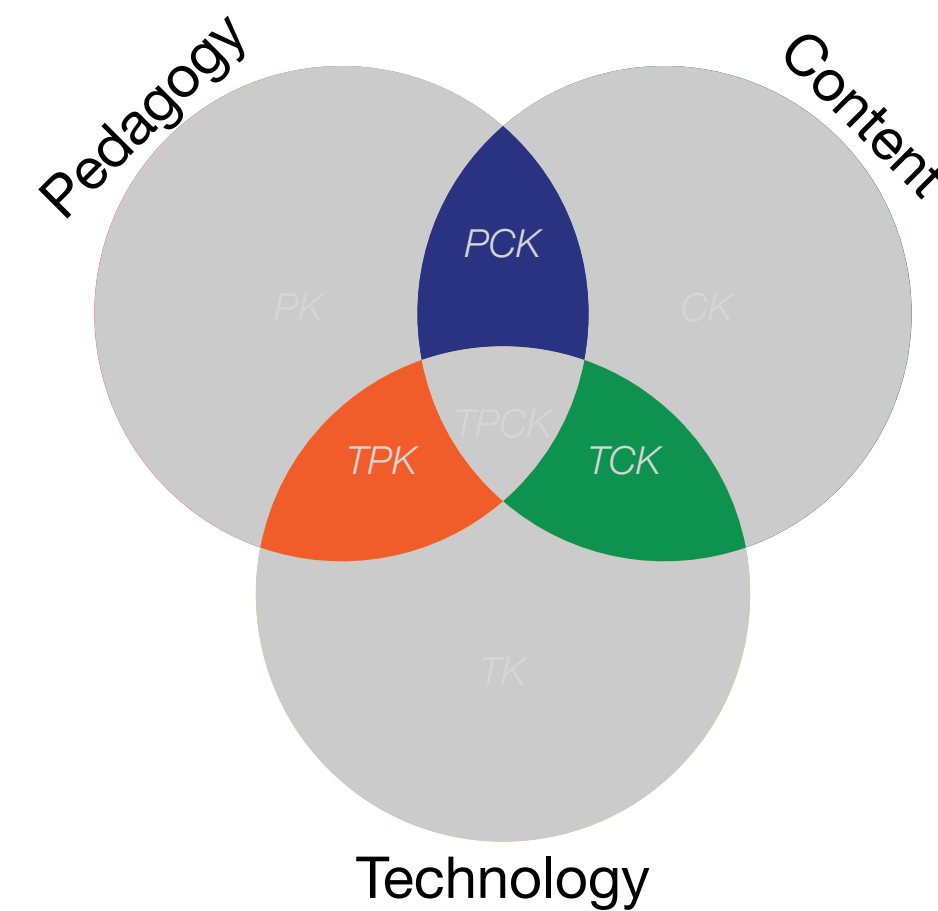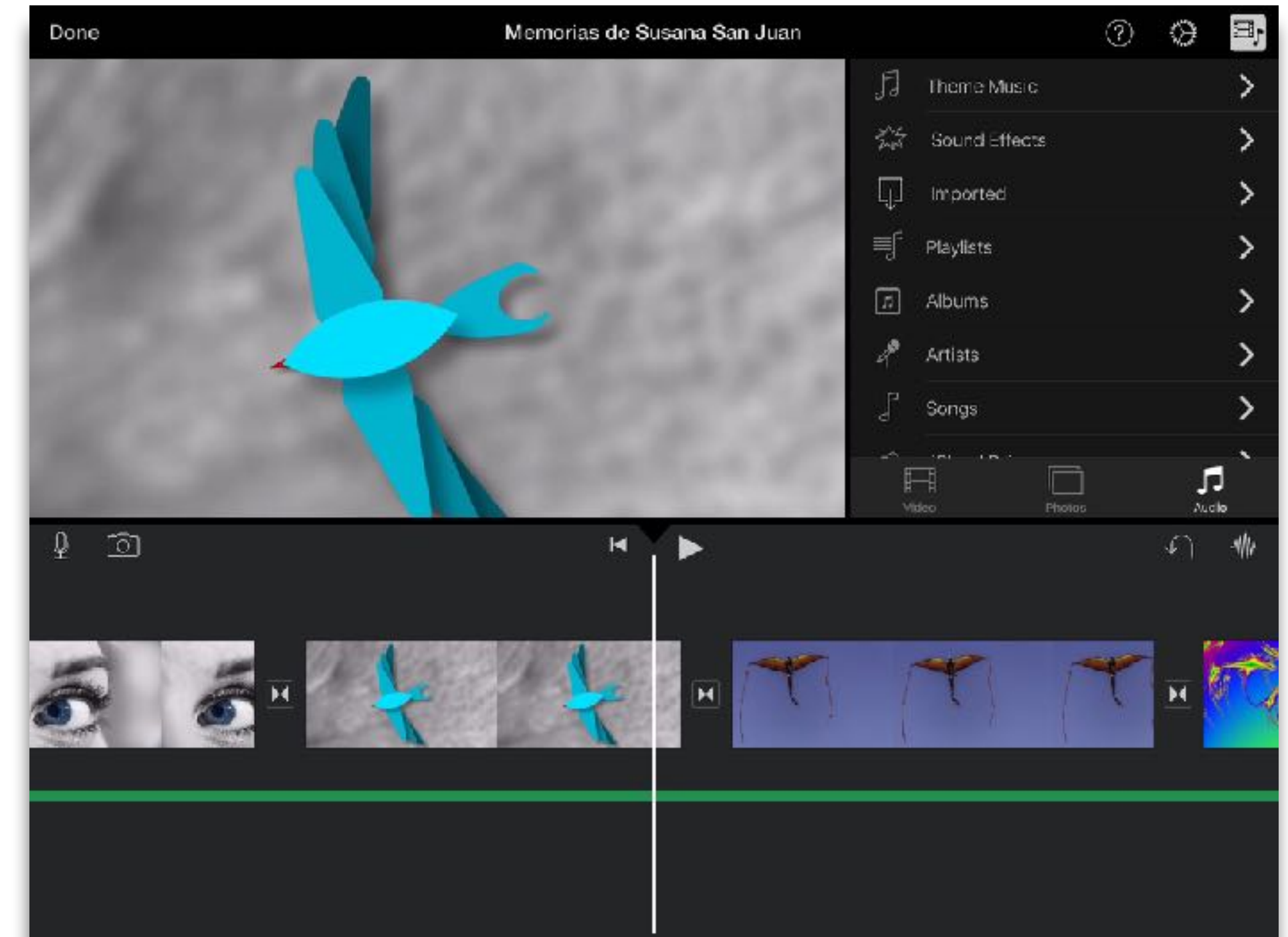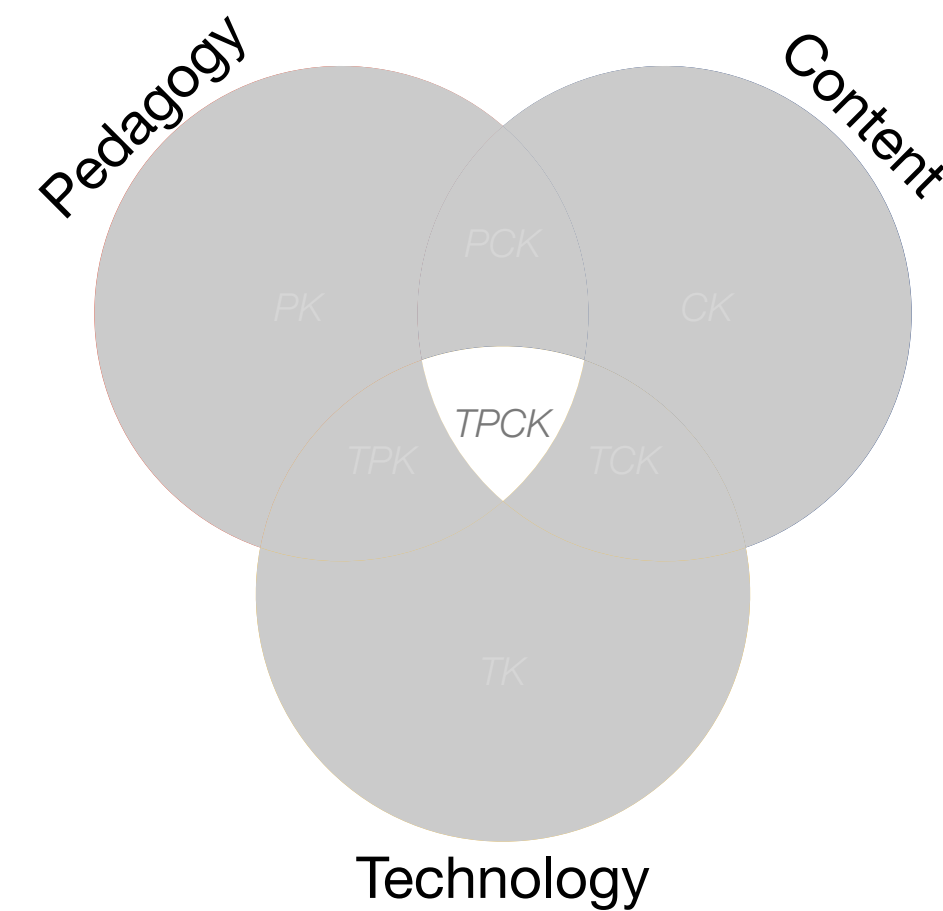
Modification
Tech allows for significant task redesign

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

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

Pedagogy

Content

PCK

PK

CK

TPCK

TPK

TCK

TK

Technology

Cross-Disciplinary Knowledge/ Synthesis

Core Content Knowledge

Information Literacy

Foundational Knowledge

21st Century Learning

Creativity & Innovation

Cultural Competence

Meta Knowledge

Humanistic Knowledge

Problem Solving & Critical Thinking

Communication & Collaboration

Life & Job Skills

Ethical & Emotional Awareness

Refraction

- Pick:

  - A Content Area

  - A 21C Learning Skill

  - A Shared Practice

- Create a SAMR Ladder that looks at a topic in 1. through the lens of 2., focused into actual practice by 3.

Competency / Concept	Evaluate Historical Accounts	Interpret Primary Sources	Apply Chronological Reasoning	Contextualize	Construct Acceptable Historical Accounts
History as an Interpretive Account					
The Relationship of Past and Present					
Historical Evidence					
Complex Causality					
Significance					

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

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
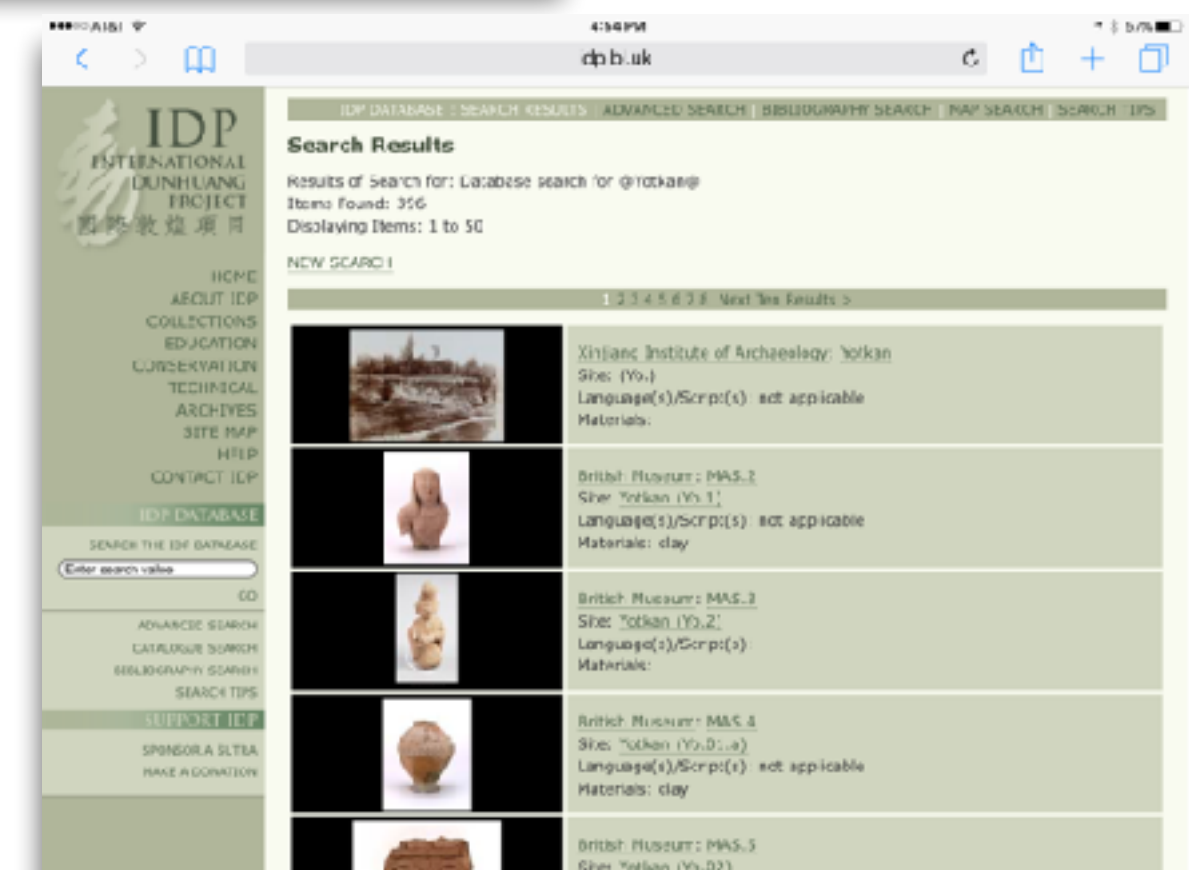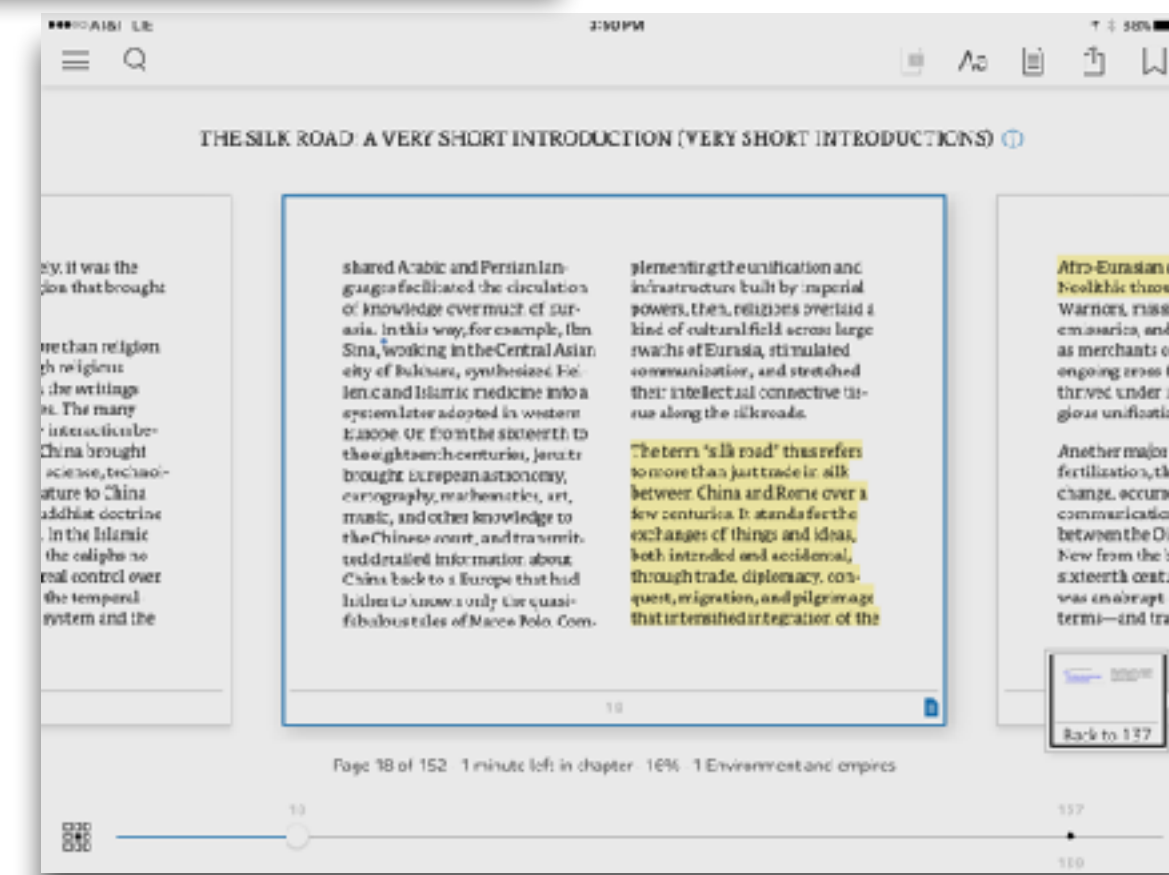
Modification
Tech allows for significant task redesign

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

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

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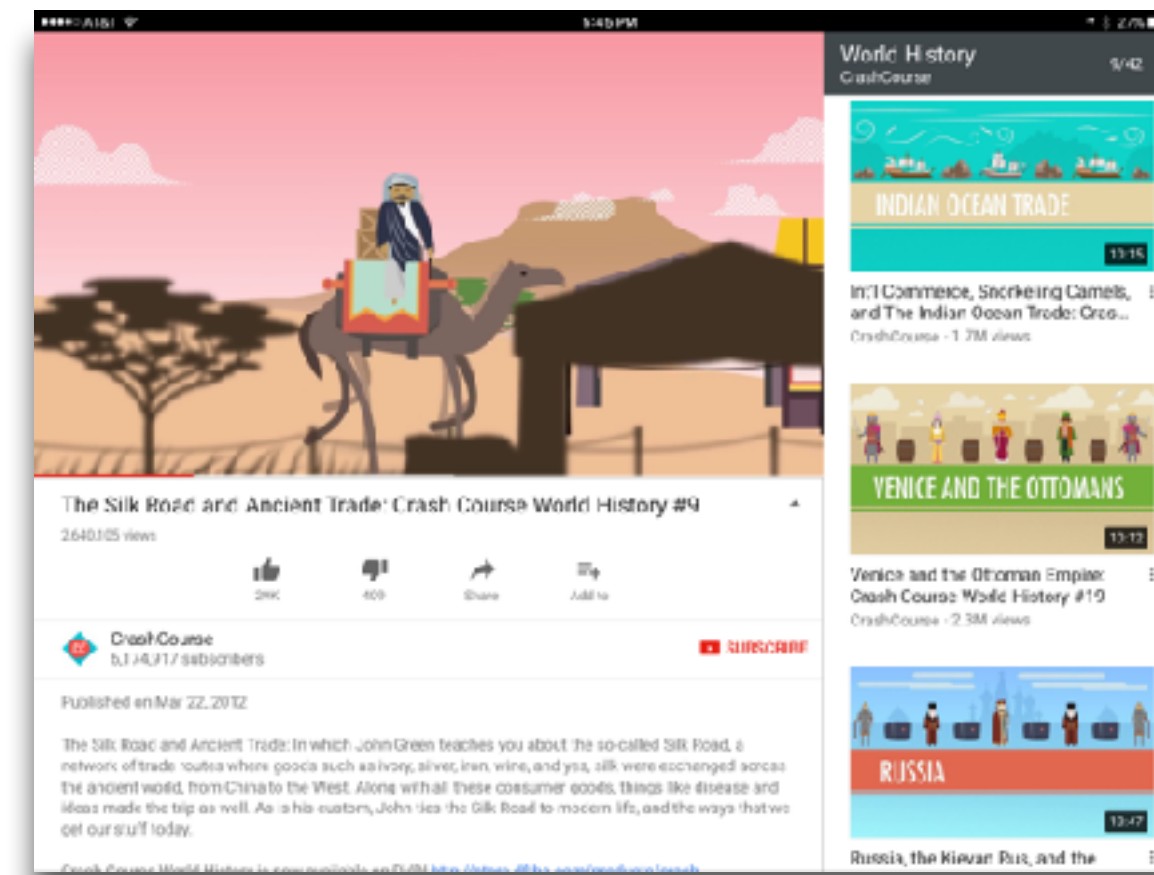previously inconceivable*

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*

Redefinition
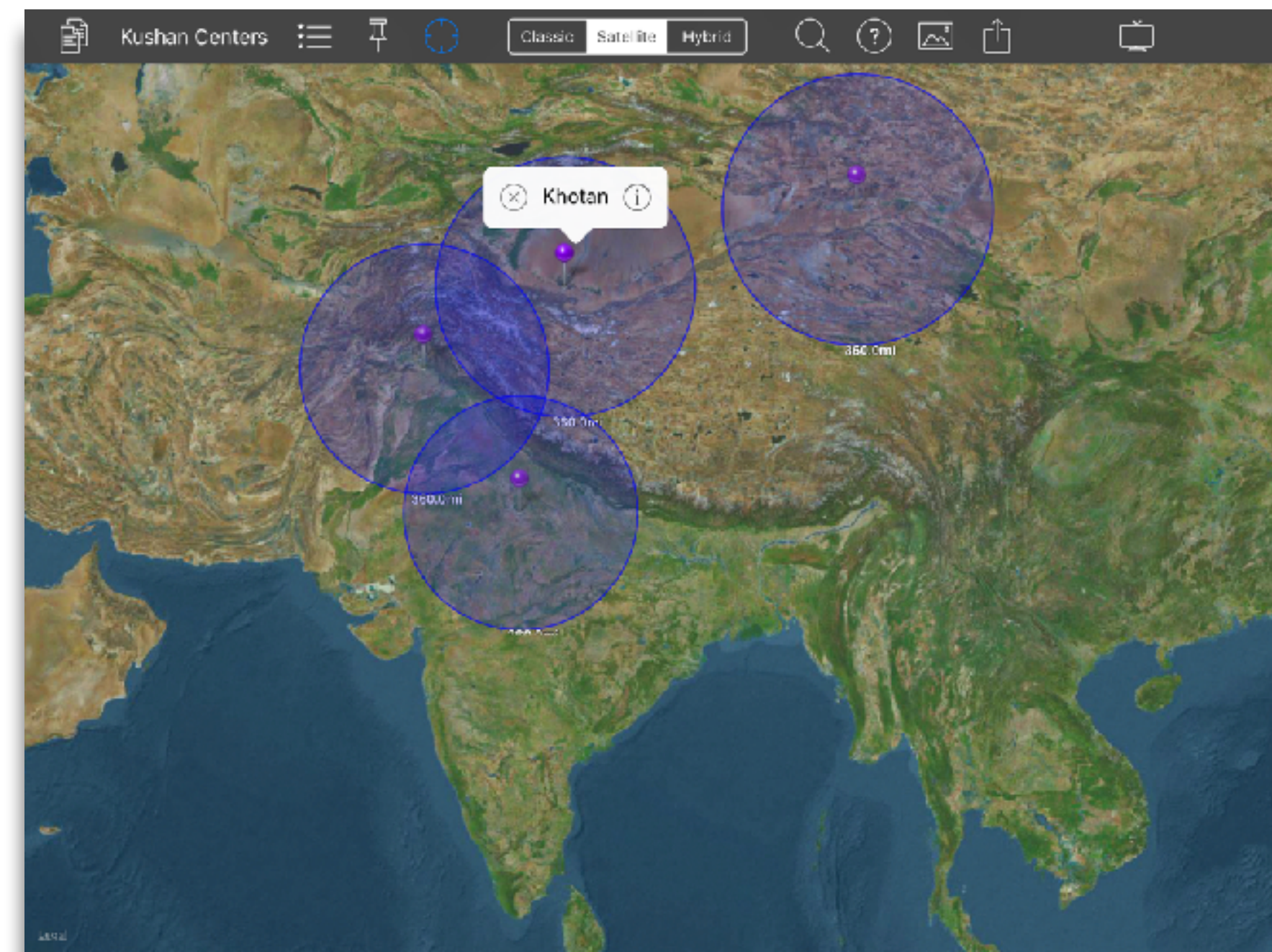*Tech allows for the creation of new tasks, previously inconceivable*
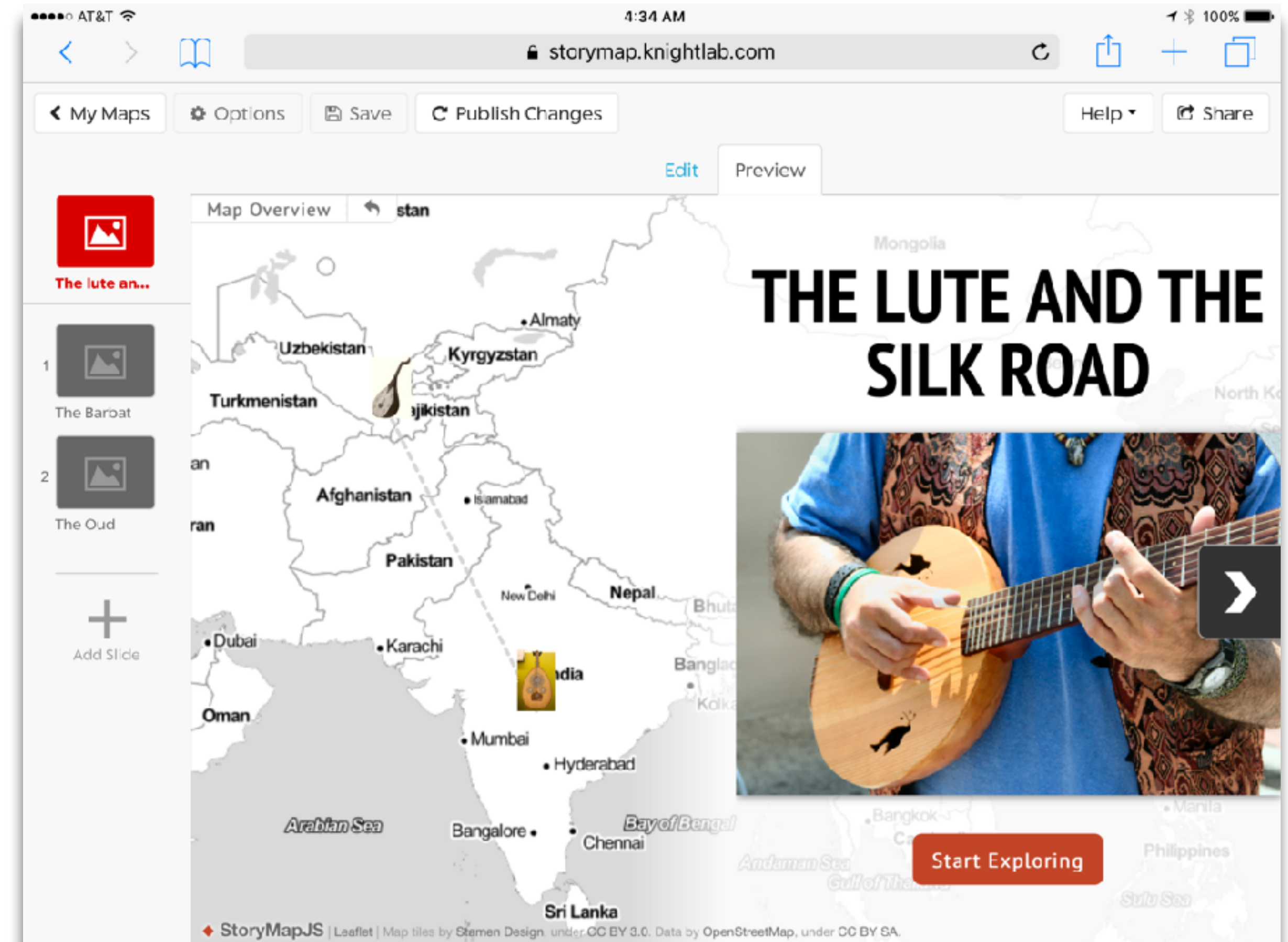
Modification
Tech allows for significant task redesign

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

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

4. Integrating Formative Assessment

Black and Wiliam: Defining Formative Assessment

"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."

Black, P. and Wiliam D. "Developing the theory of formative assessment." *Educational Assessment, Evaluation and Accountability*. 21:5-31 (2009)

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	

Dylan Wiliam, *Embedded Formative Assessment*. Solution Tree (2011)

Clarifying, Sharing, and Understanding Learning Intentions and Criteria for Success

- 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
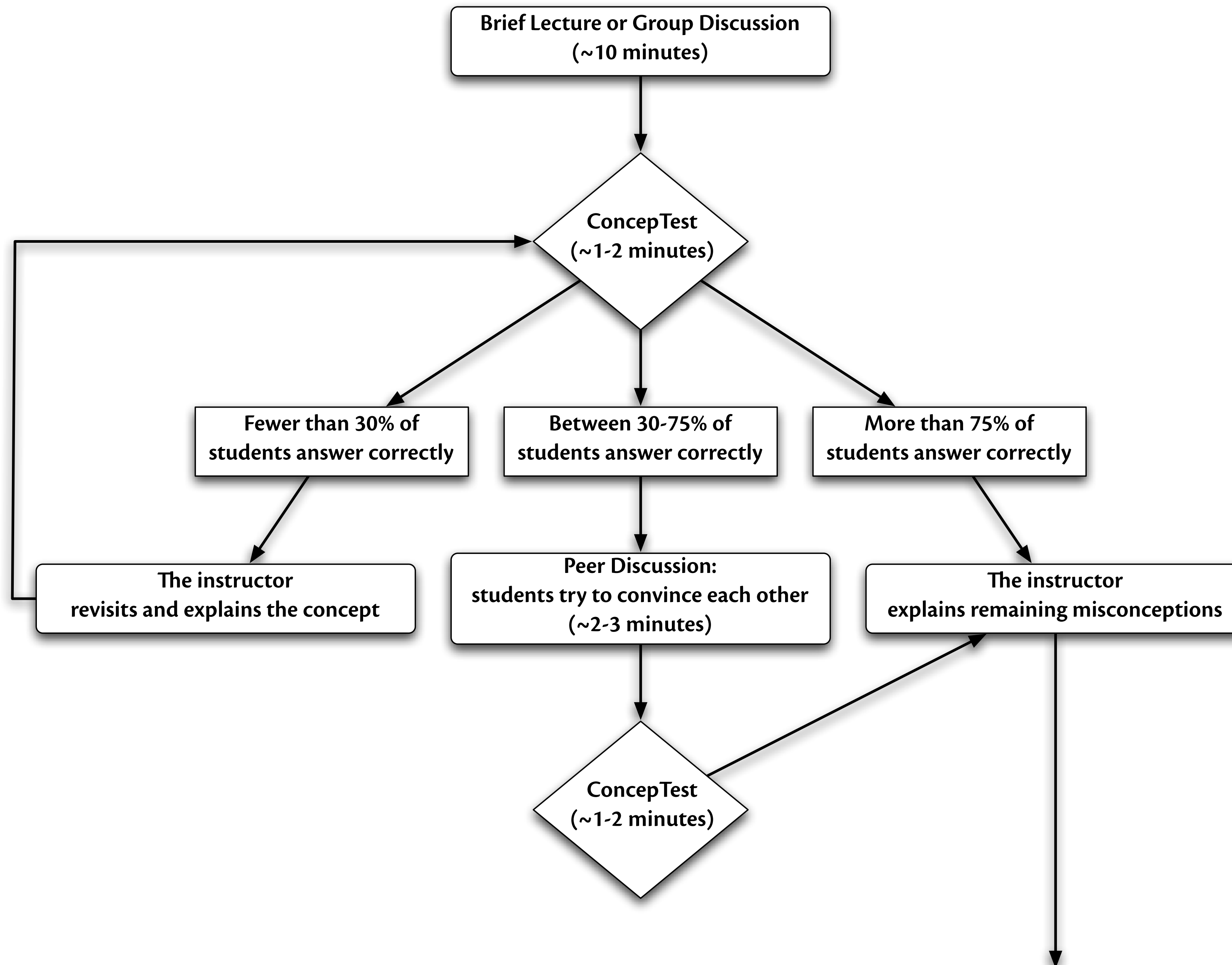 - Have students design test items, rubrics

Rubric Example #1: A Classical Rubric for Concept Maps (M. Besterfield-Sacre et al., 2004)

	1	2	3
Comprehensiveness – 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).
Organization – 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.
Correctness - 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.

Table 4. Concept Map scoring rubric (Understanding of Engineering Field).

Besterfield-Sacre, Mary, et al. "Scoring concept maps: An integrated rubric for assessing engineering education." *Journal of Engineering Education* 93.2 (2004): 105-115.

Rubric Example #2: A Rubric for Sociology Online Discussion (S. Evans, 2010)

	4 Points	2 Point	0 Points
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 *significantly* 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.
	2 Points	**1 Point**	**0 Points**
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.

Brief Lecture or Group Discussion
(~10 minutes)

ConcepTest
(~1-2 minutes)

Fewer than 30% of students answer correctly

Between 30-75% of students answer correctly

More than 75% of students answer correctly

The instructor revisits and explains the concept

Peer Discussion: students try to convince each other (~2-3 minutes)

The instructor explains remaining misconceptions

ConcepTest
(~1-2 minutes)

Mazur, E. *Peer Instruction - A User's Manual*. Prentice Hall (1997)

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
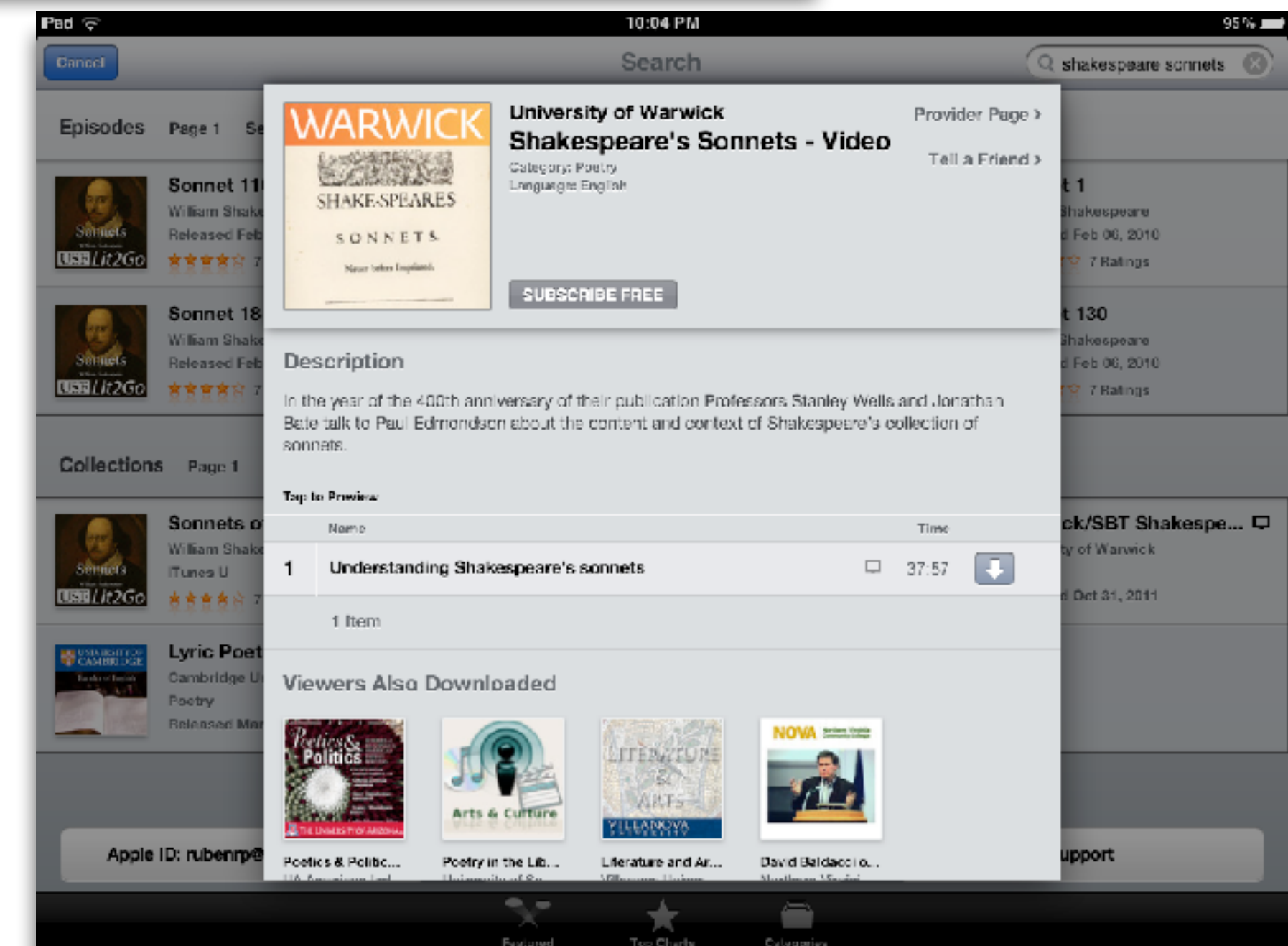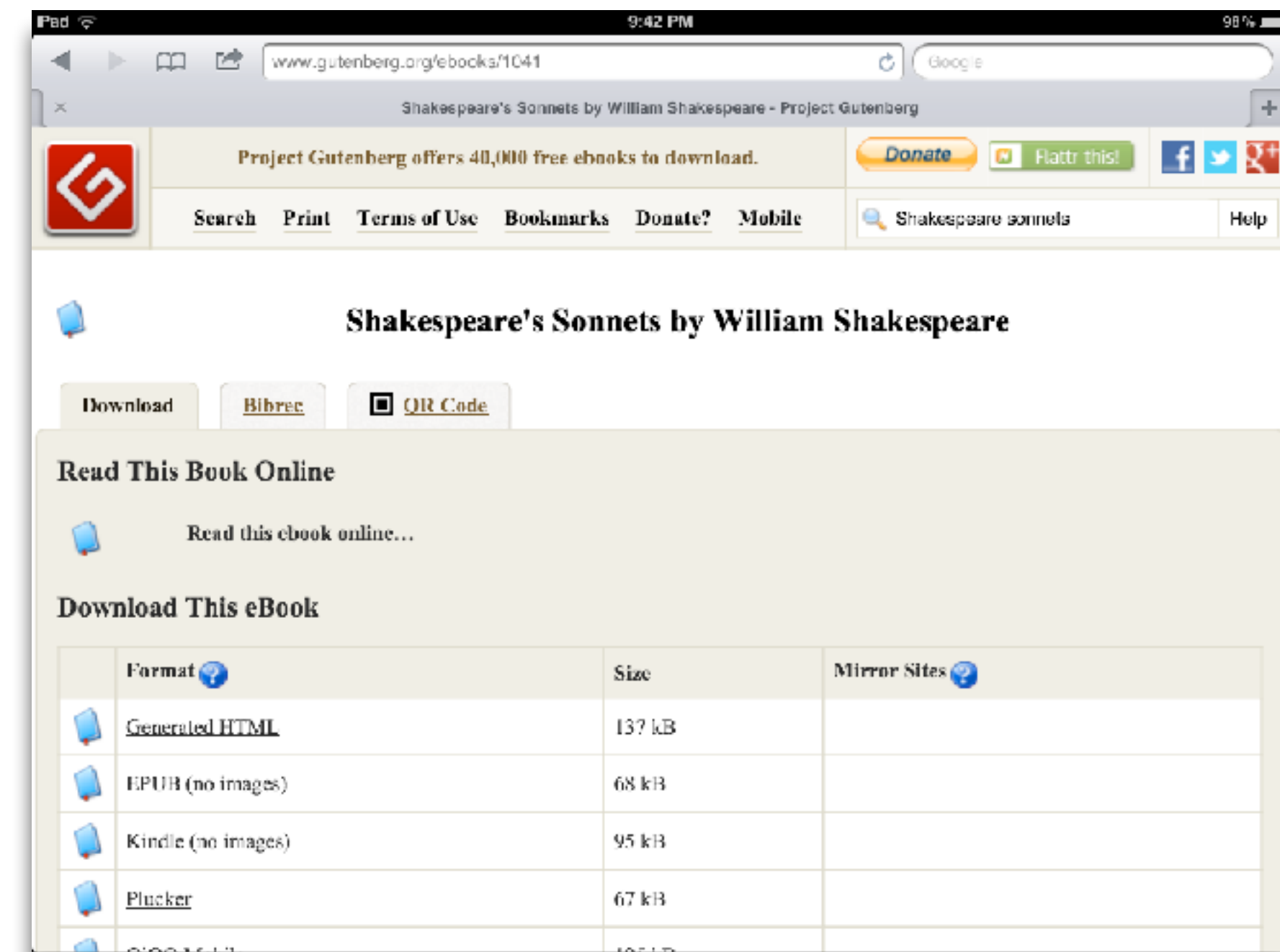
Modification
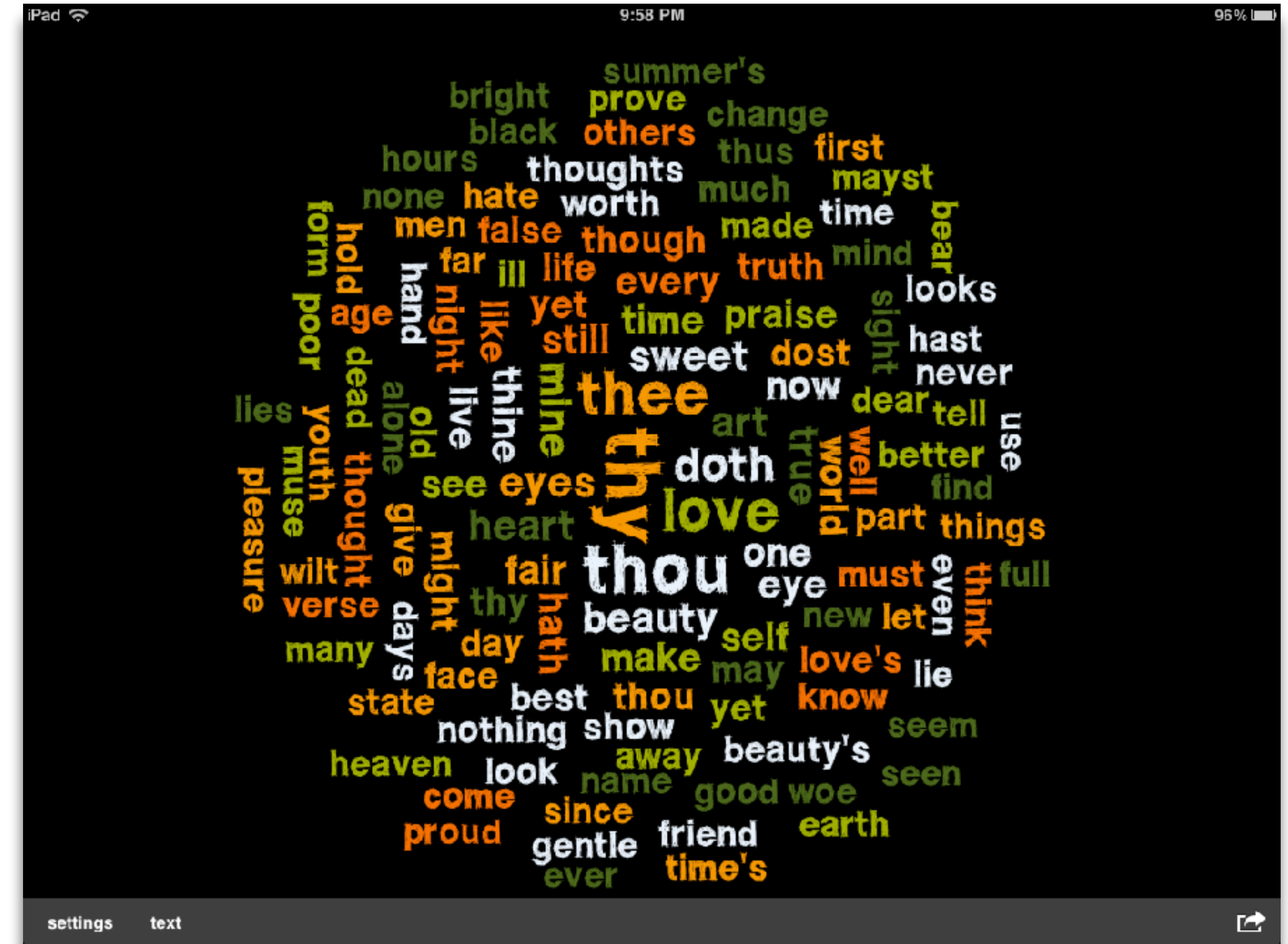*Tech allows for significant task redesign*

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

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

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

Redefinition
Tech allows for the creation of new tasks, previously inconceivable
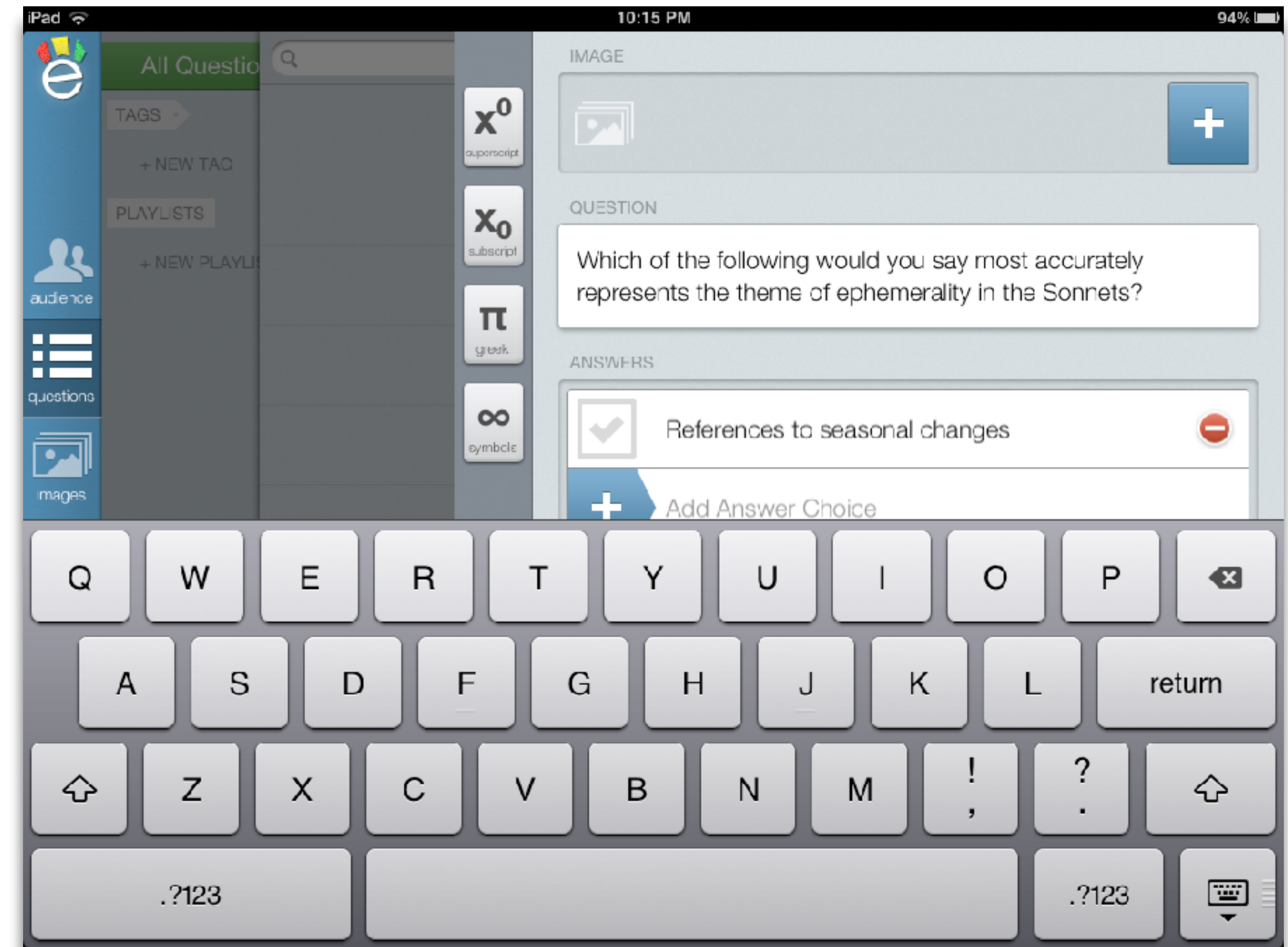
Modification
Tech allows for significant task redesign

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

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

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

5. Incorporating Action Research

Thick *vs*. Thin Approaches to Research

- **Thick Approaches:** *detailed knowledge of a few cases*
  - Consider multiple intertwined causes
  - Try to explain multifaceted outcomes
  - Rely on elaborate theoretical assumptions
  - Suitable for rich understanding of specific events
  - Frequently associated with qualitative analysis

- **Thin Approaches:** *partial knowledge of many cases*
  - Look at simple causes and outcomes
  - Rely on theoretically neutral propositions
  - Suitable for hypothesis testing and generalization
  - Frequently associated with quantitative analysis

- It is possible to thicken thin approaches by e.g. triangulation, developing quantitative indicators of qualitative concepts, nested analysis

Four Defining Characteristics of Action Research

- Practical Nature

- Change-Oriented

- Part of a Cyclical Process

- Teachers are Active Researchers and Participants

Martyn Denscombe. *The Good Research Guide: For small-scale social research projects (6th Edition).* McGraw-Hill Education (UK). (2017).

Three Approaches to Action Research

Technical Action Research	Improve the effectiveness or efficiency of educational practice
Practical Action Research	Improve the teacher's understanding and professional development
Emancipatory Action Research	Improve the educational organization or system and remove obstacles to change

Wilfred Carr and Stephen Kemmis. *Becoming Critical: Education, Knowledge, and Action Research.* Deakin University Press. (1986).

Using SAMR to Guide Teacher Professional Development

Just as SAMR can be used to guide classroom uses of technology, so it can be used to guide the use of technology in teacher PD. In the example illustrated in the slides that follow:

- **S:** PD specialist lectures are recorded and archived for future use; online materials such as eBooks are likewise added to this PD library.

- **A:** Classroom observations are recorded and annotated by the visiting teacher coach, in order to inform PD conversations, and provide an archival record of evolving teacher practice.

- **M:** Teachers engage in practical action research within the context of their classroom practice, using student observations and learning artifacts to support thick, thin, or combined research approaches.

- **R:** Teachers share the results of their action research with their fellow faculty, as well as with a wider audience, acting as mentors to both groups.

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

Modification
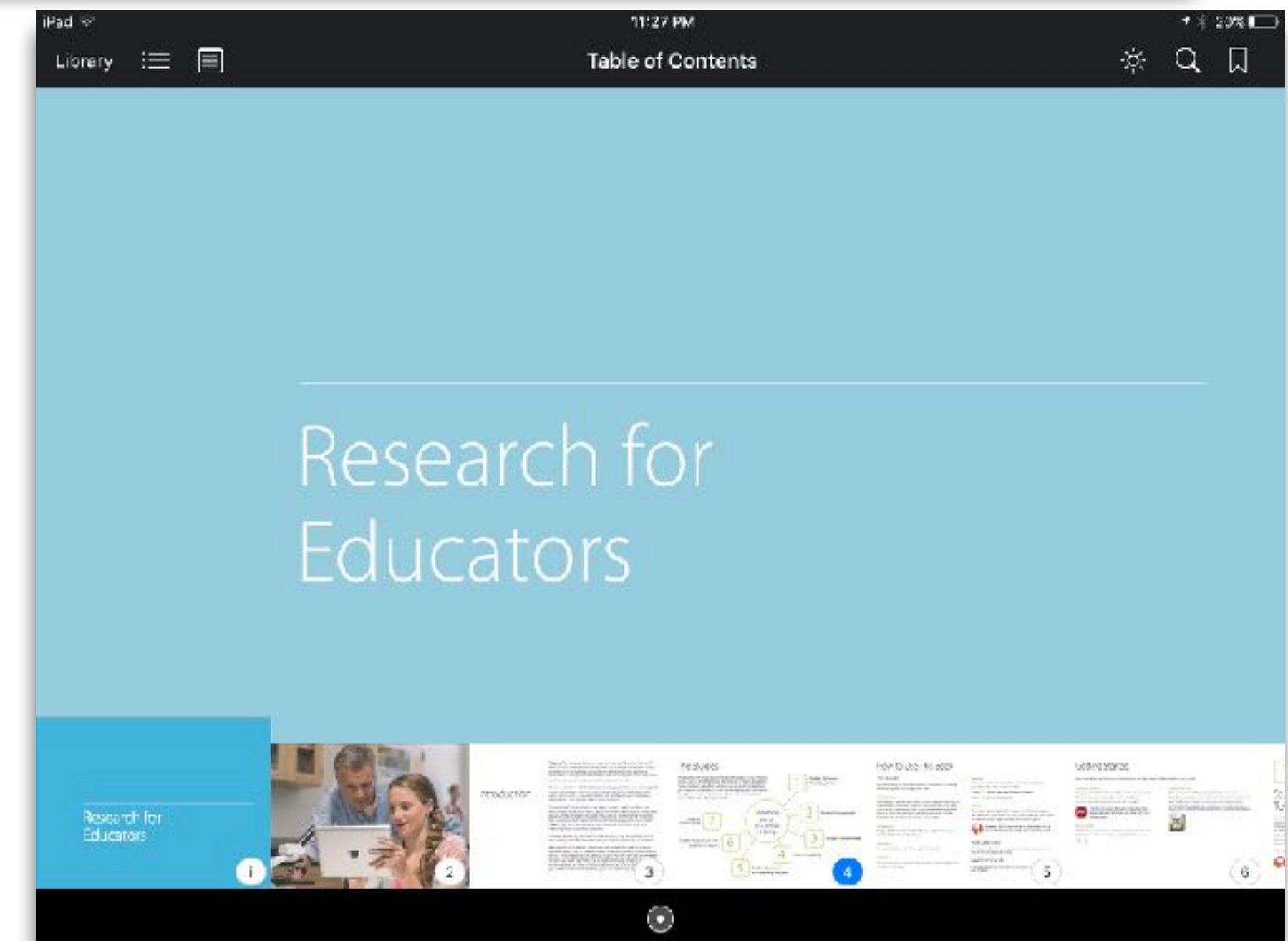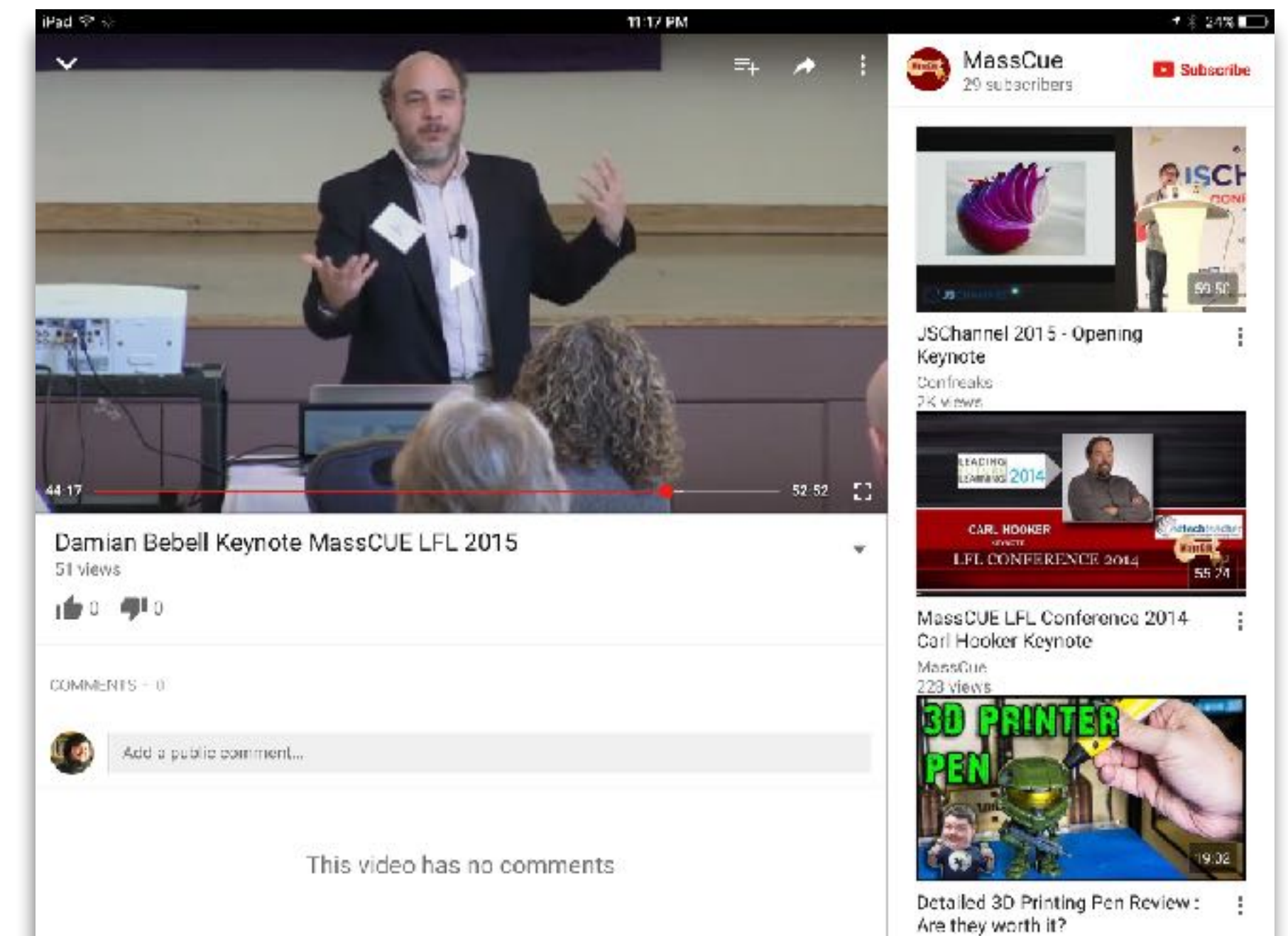*Tech allows for significant task redesign*

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

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

Extending
Traditional PD

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

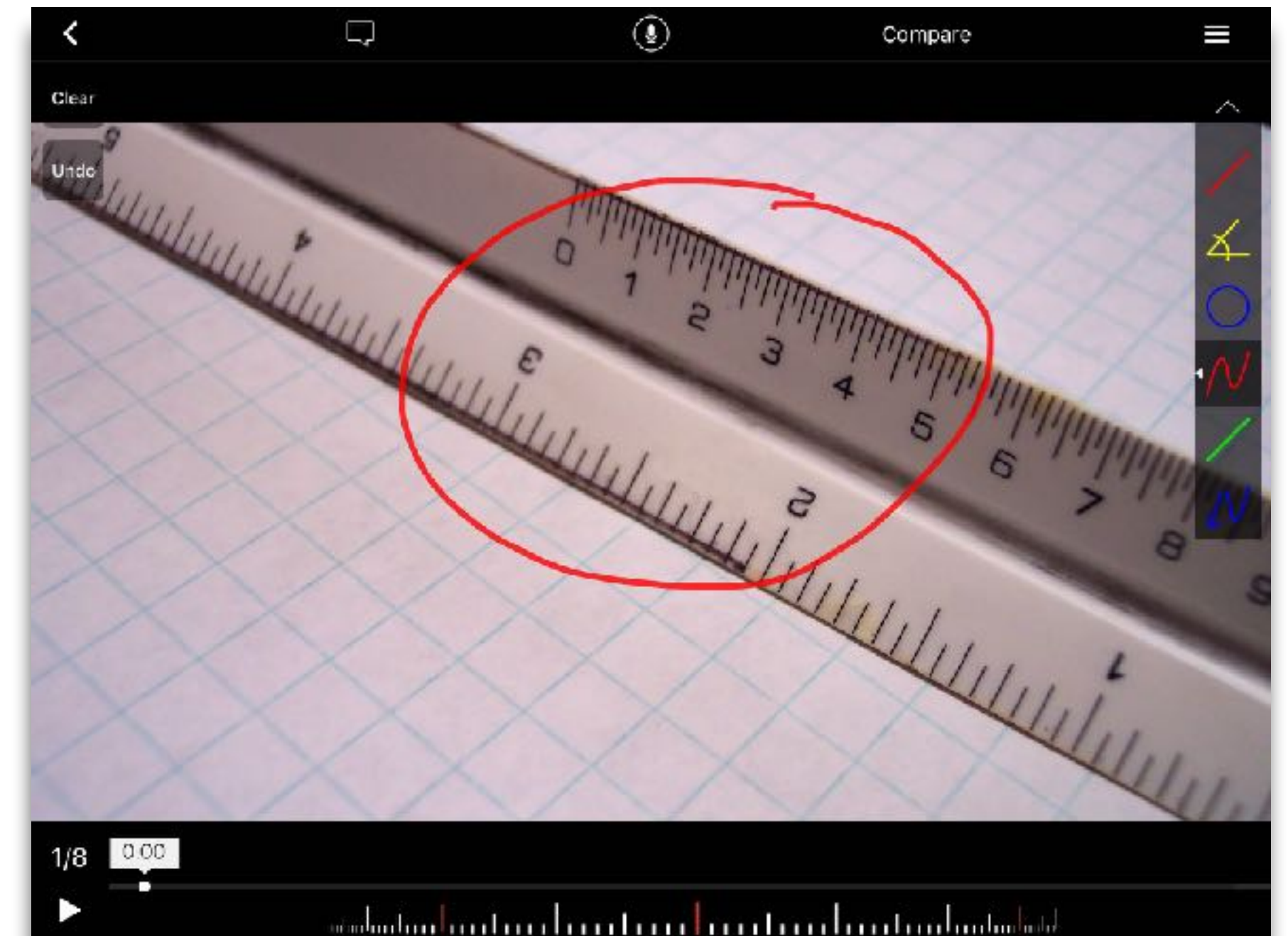# Modification
Tech allows for significant task redesign

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

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

Peer Coaching
as PD

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

Modification
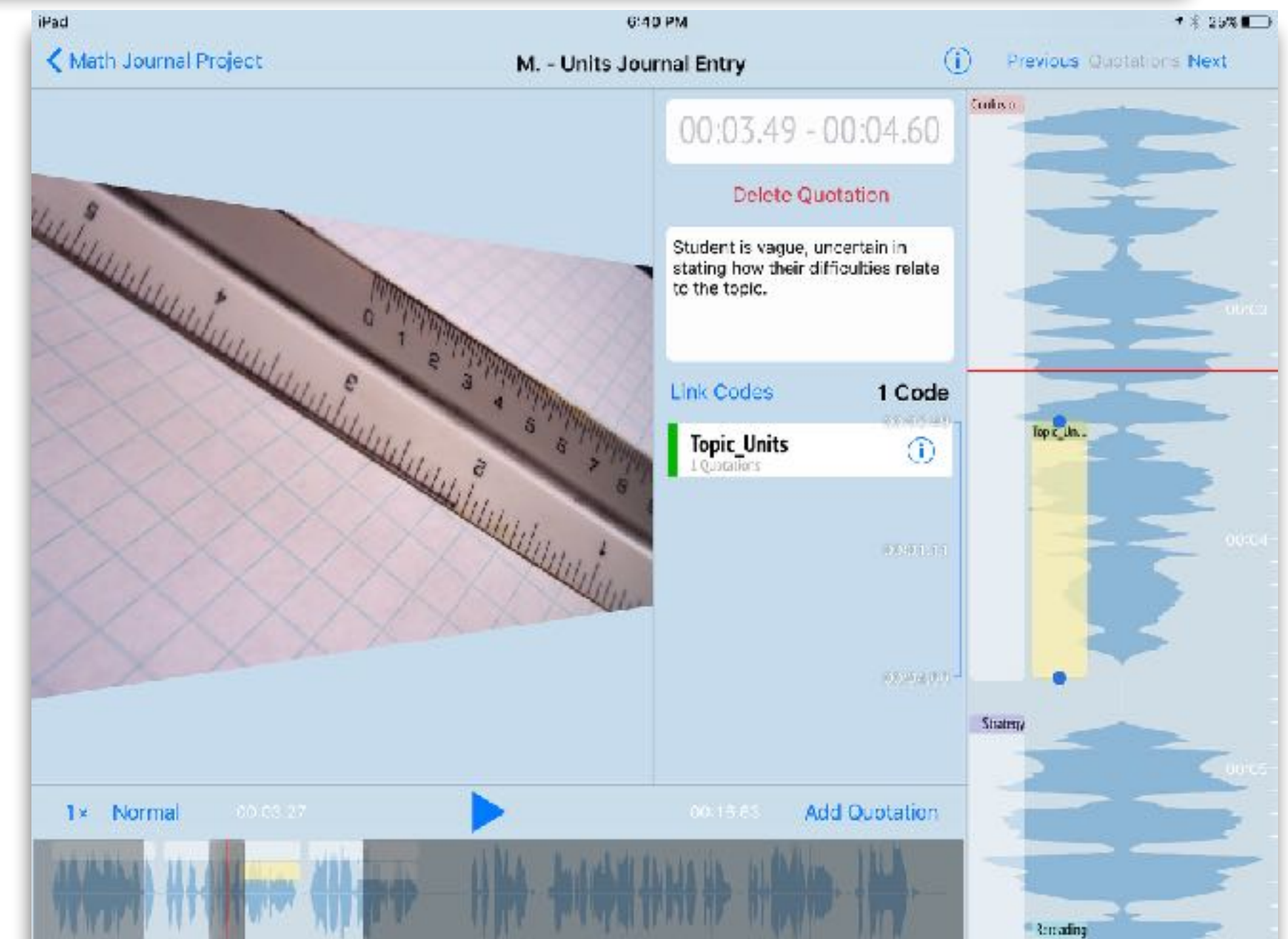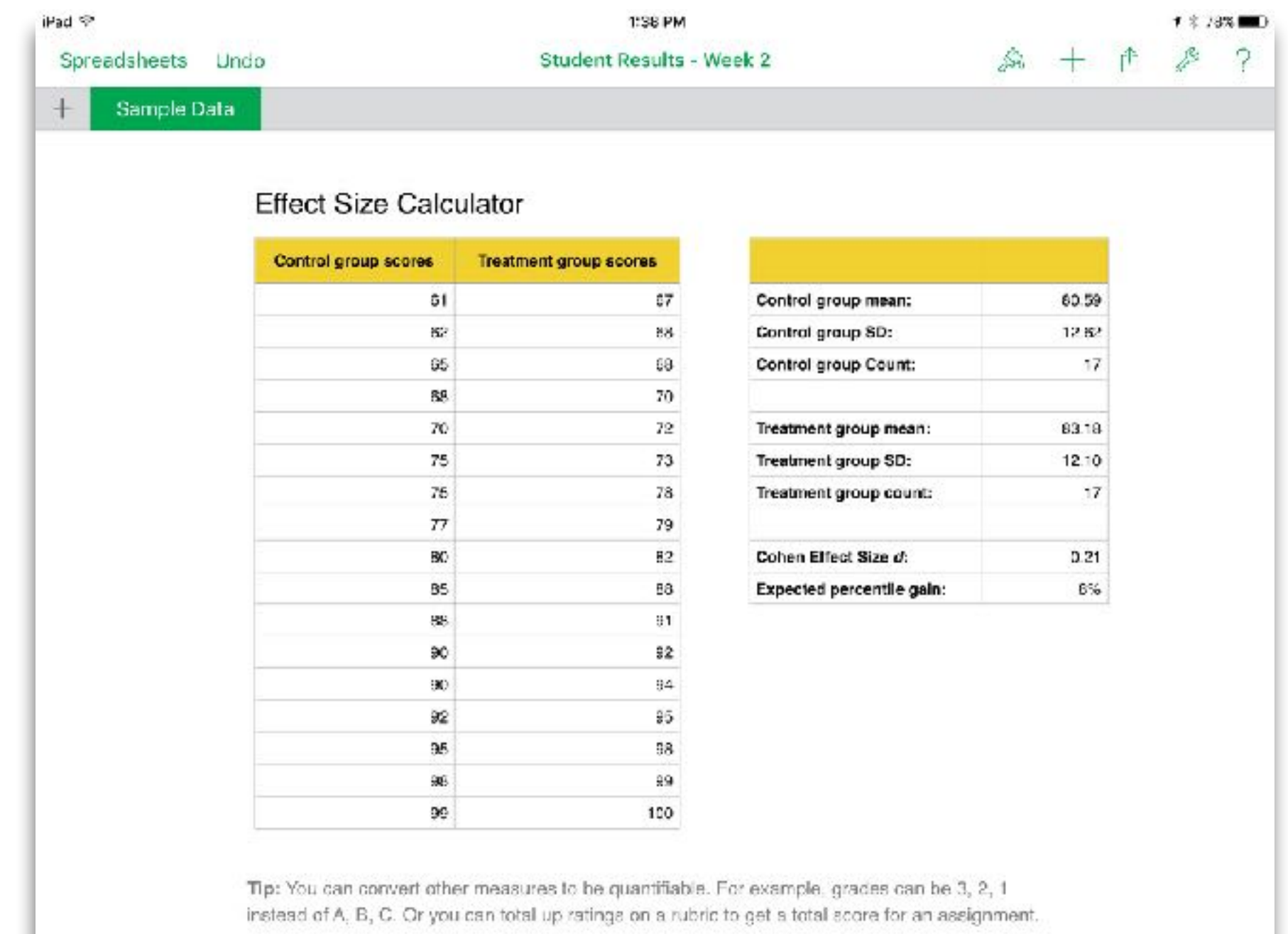*Tech allows for significant task redesign*

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

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

Action Research as PD

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

Modification
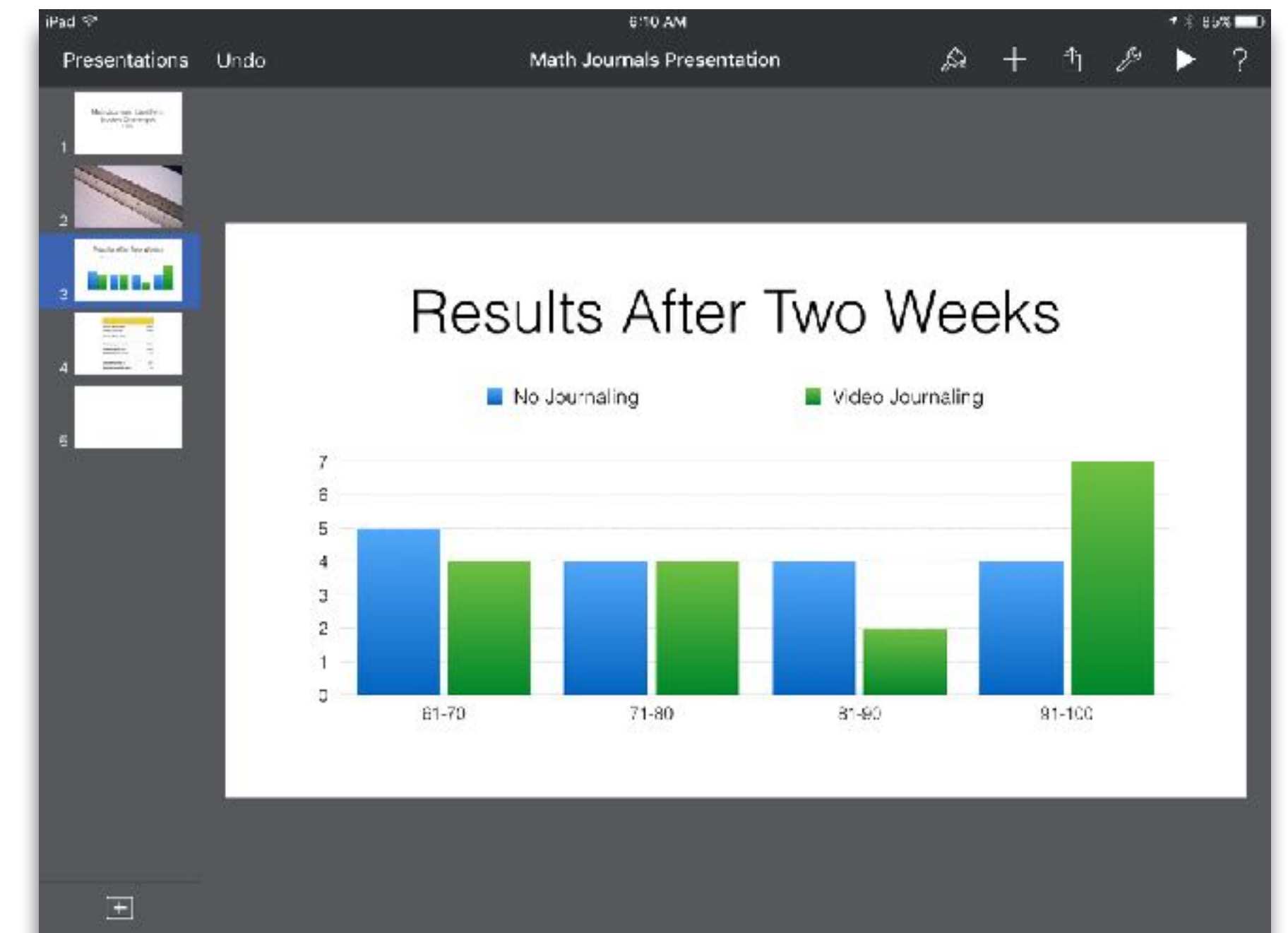*Tech allows for significant task redesign*

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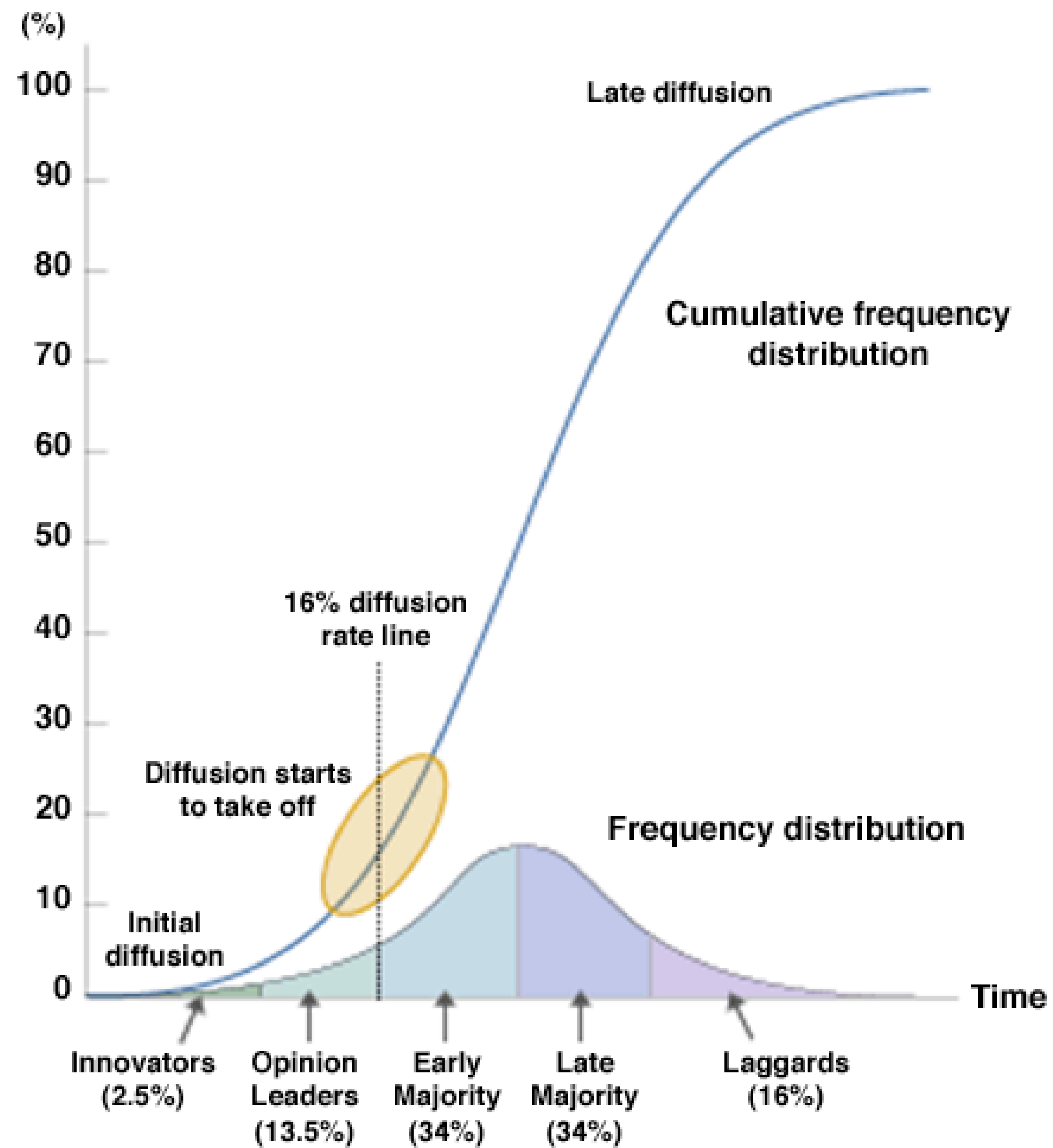*Tech acts as a direct tool substitute, with functional improvement*

Substitution
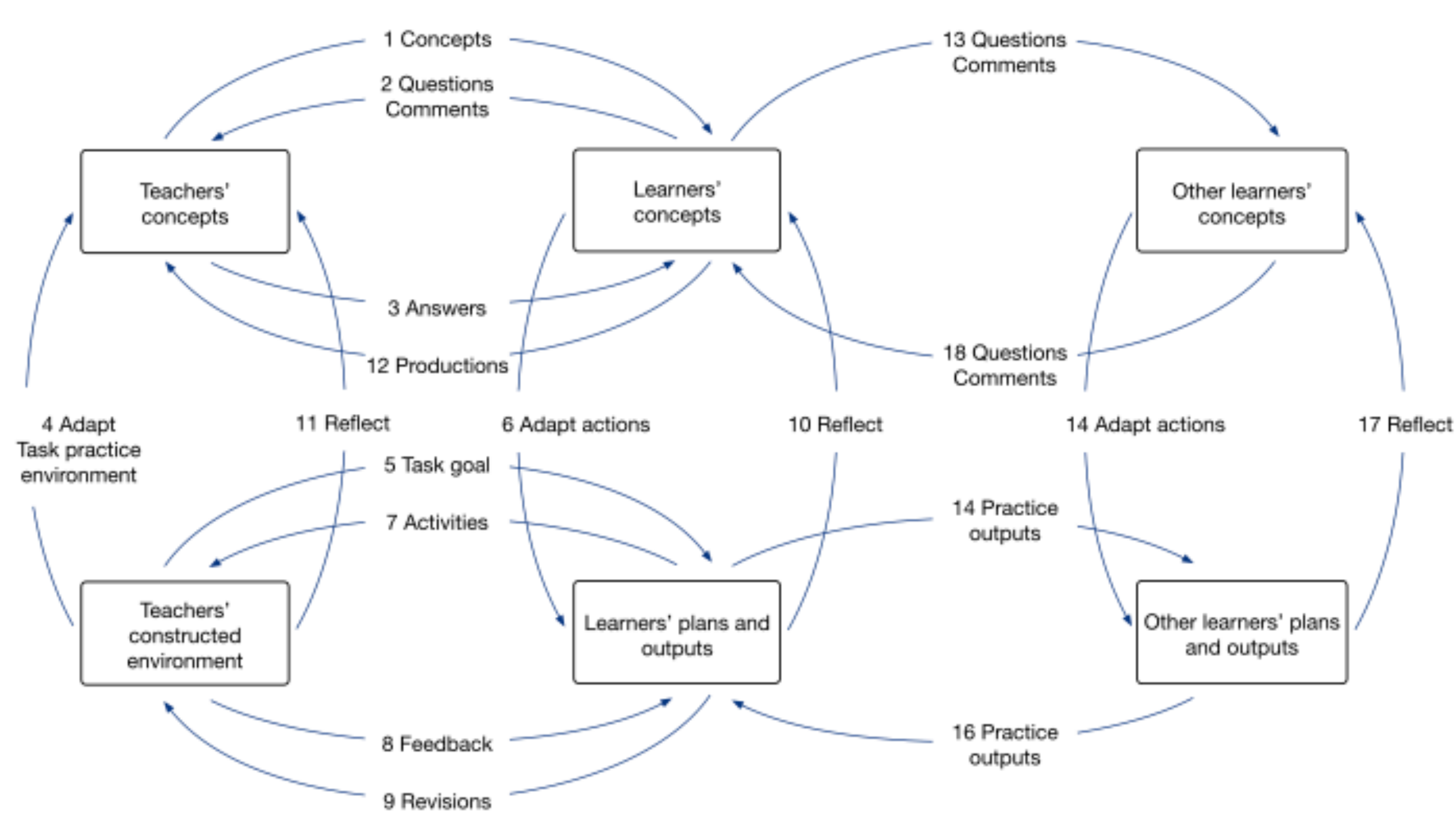*Tech acts as a direct tool substitute, with no functional change*
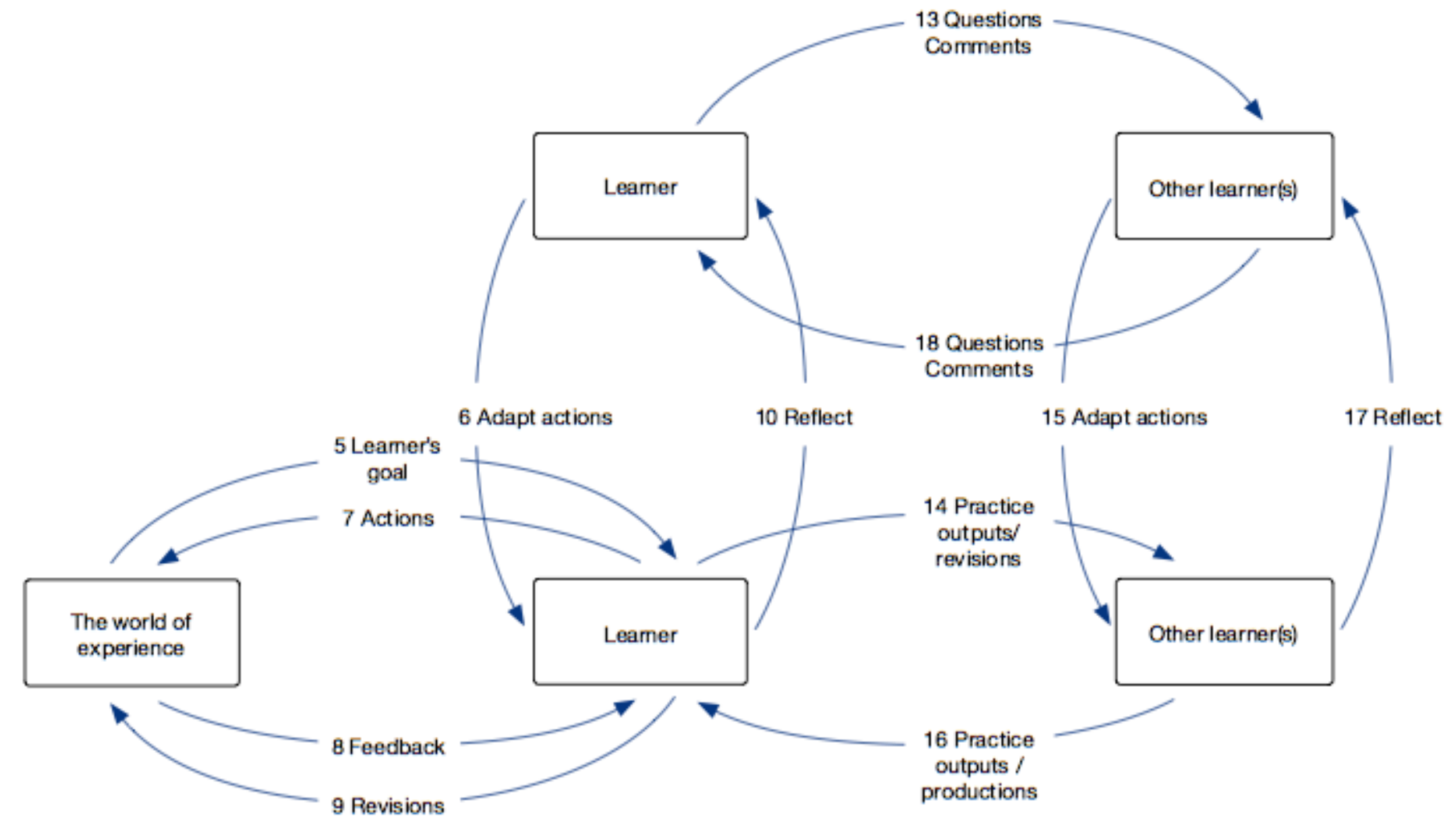
Digital Storytelling as PD

6. Building Community

Everett M. Rogers. *Diffusion of Innovations, 5th Edition*. New York:Free Press, 2003.
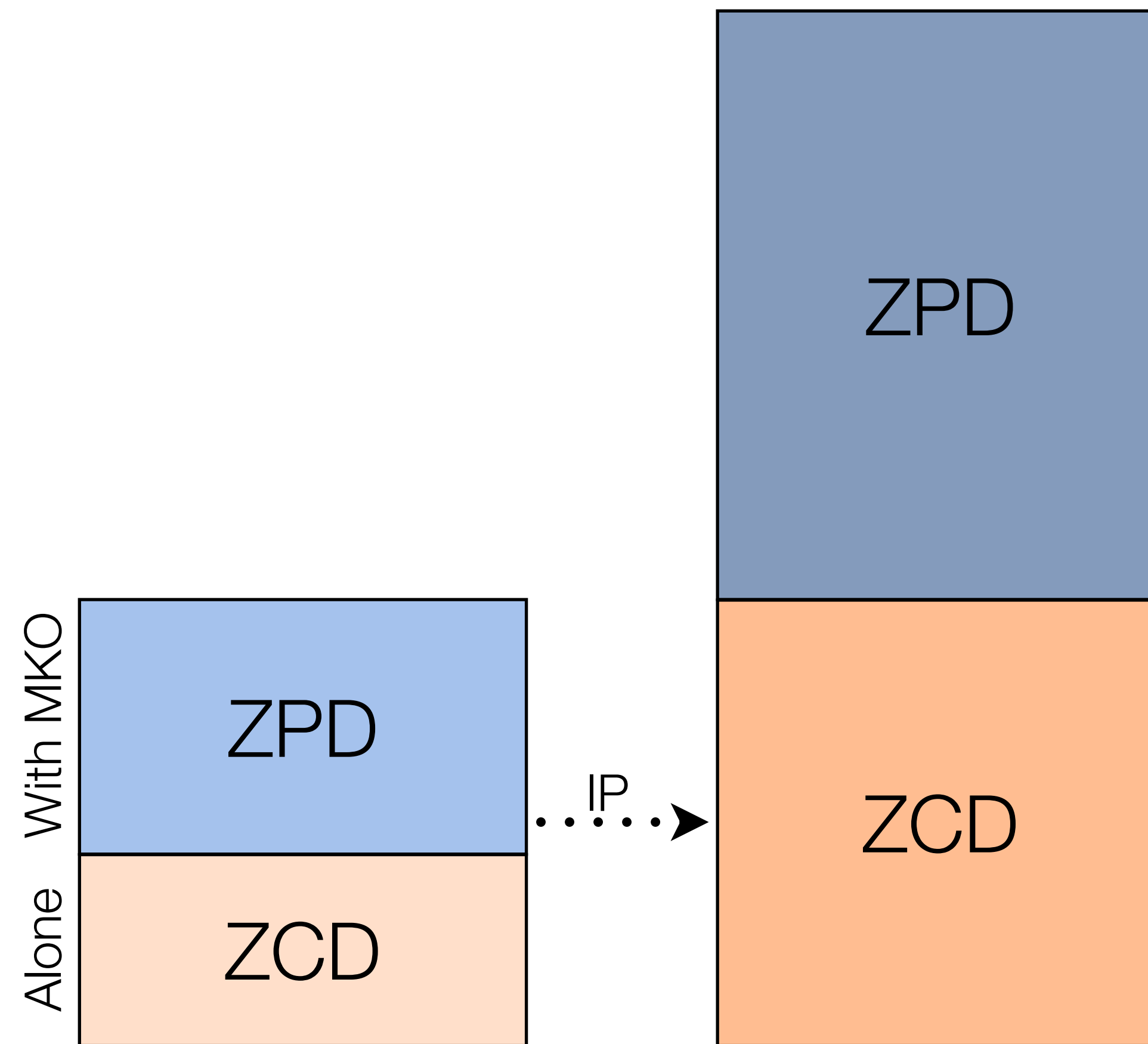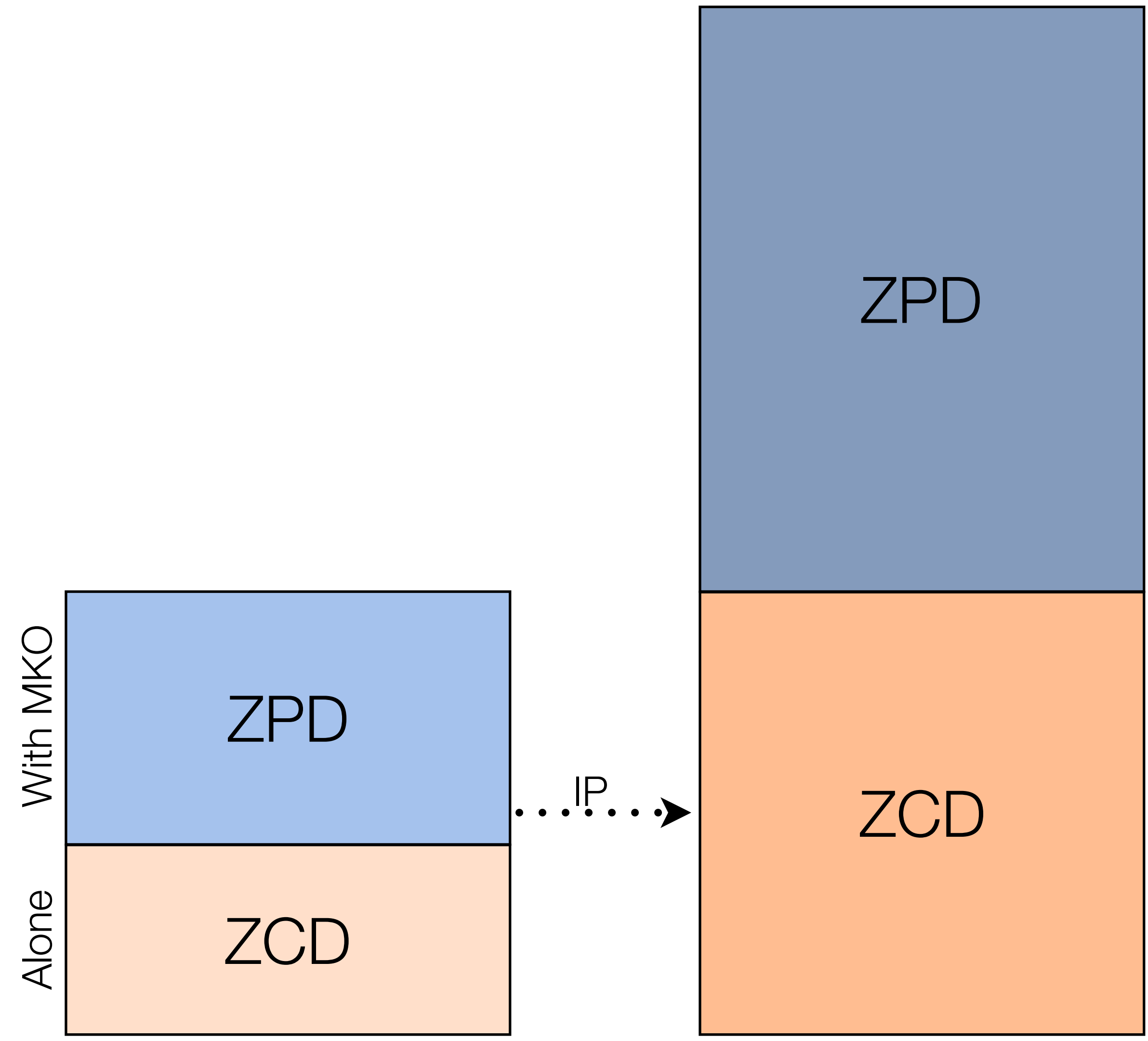
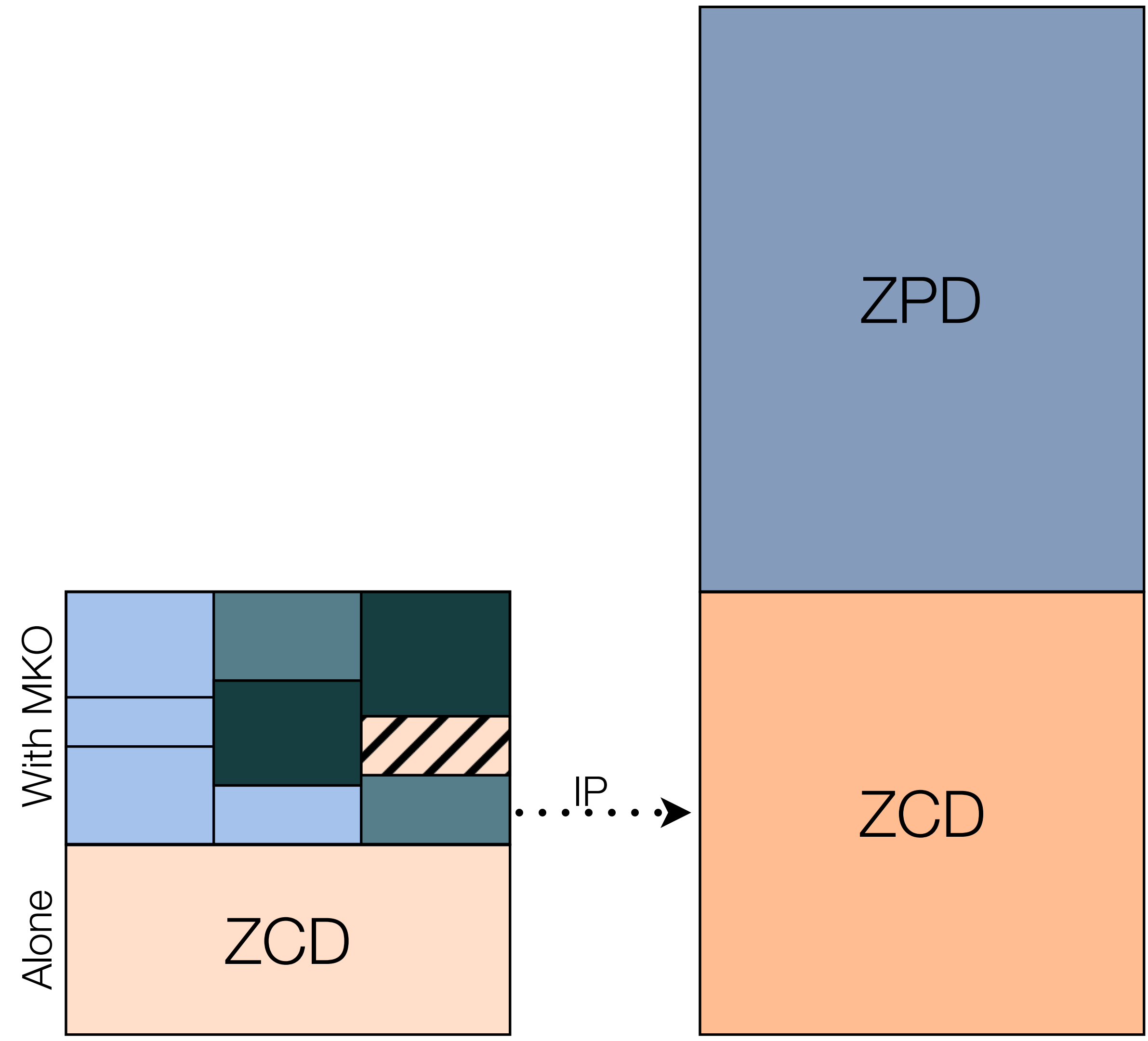**Formal Learning**

Informal Learning

Communities of Practice and Personal Learning Networks

- Internally: *School as Community of Practice*

  - A **domain** of shared interest, commitment, and competence;

  - A **community** where joint activities, discussions, information sharing, and help processes are focused around and by the domain;

  - A **practice** with a shared repertoire of resources, such as experiences, stories, tools, and problem-solving approaches.

- Externally: *Individual Personal Learning Networks*

  - Loosely structured around a range of tools, individually chosen - no two PLNs are the same;

  - Usually online, but may involve face-to-face components (e.g. meetups);

  - Resources may range from professional websites, to blogs, to Facebook groups, to Twitter feeds;

  - Involvement may range from primarily reading sources, to participating in discussions, to authoring new materials.

Etienne and Beverly Wenger-Trayner. *Introduction to communities of practice: A brief overview of the concept and its uses*. (2015) Online at: http://wenger-trayner.com/introduction-to-communities-of-practice/

Will Richardson and Rob Mancabelli. *Personal Learning Networks: Using the Power of Connections to Transform Education*. Solution Tree. (2012)

- Zone of Proximal Development (ZPD):
  - Region between:
    - what a learner can accomplish independently (the Zone of Current Development, ZCD)
    - what they can accomplish with assistance from a "more knowledgeable other" (MKO)

- *"…what a child can do with assistance today she will be able to do by herself tomorrow."*

- This is an iterative process:
  - The ZCD and ZPD change over time;
  - Independent practice (IP) is required to close the loop.

Lev Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press. (1978)

Alone · With MKO · ZCD · ZPD · ZCD · IP

Galperin, P.Ia. "Stage by Stage formation as a method of psychological investigation". *Journal of Russian and East European Psychology, 30*(4), 61-80 (1992)

Van Geert, Paul. "Vygotsky's dynamic systems." *Lev Vygotsky: Critical assessments* 4 (1997): 3-21.

Ann Pendleton-Julian and John Seely Brown. *Pragmatic Imagination: Single from Design Unbound* (2016).

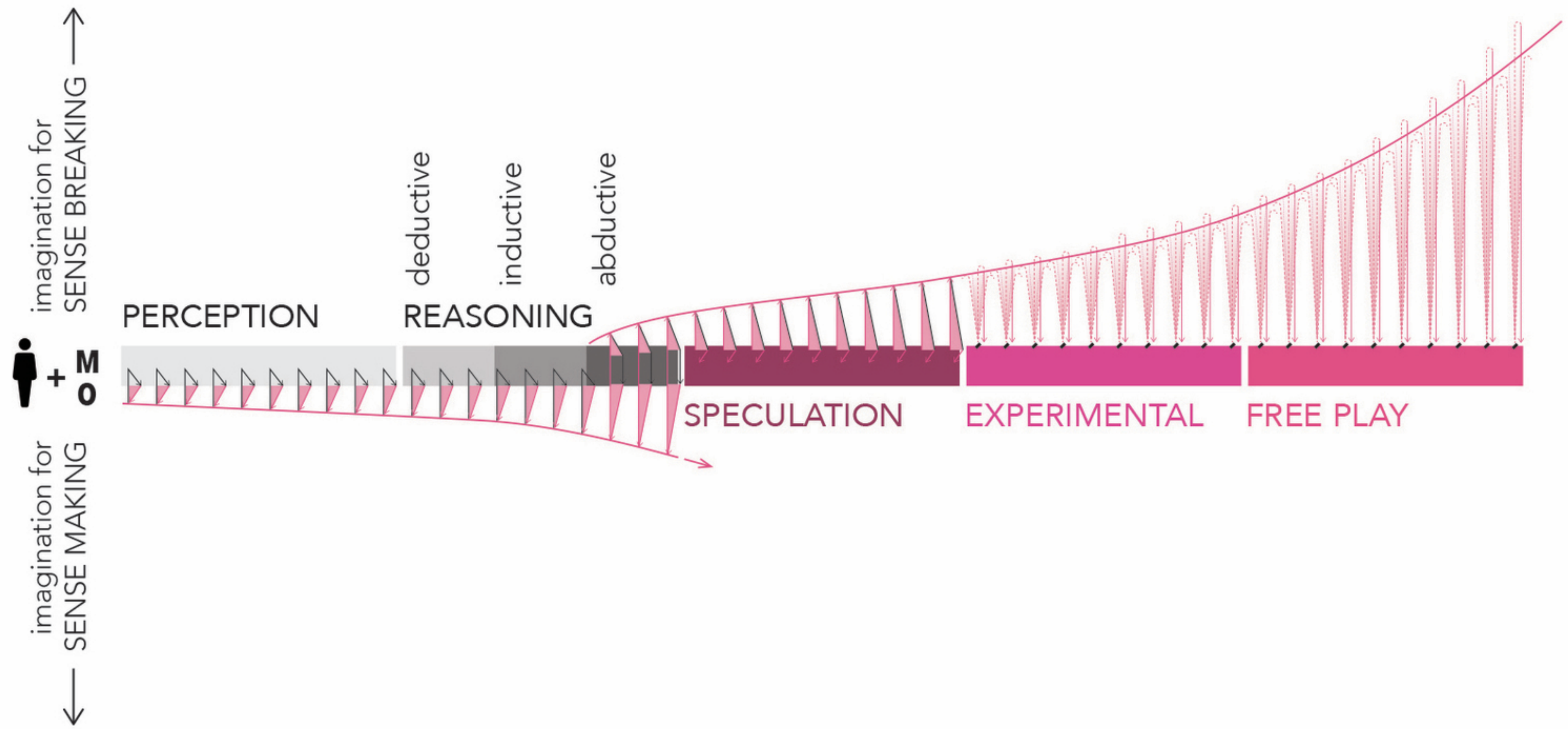| The EdTech Quintet – Associated Practices	
Social	Communication, Collaboration, Sharing
Mobility	Anytime, Anyplace Learning and Creation
Visualization	Making Abstract Concepts Tangible
Storytelling	Knowledge Integration and Transmission
Gaming	Feedback Loops and Formative Assessment

The EdTech Quintet – Associated Practices	
Social	Provides diversity to the ZPD
Mobility	Creates the context for the process
Visualization	Aids in segmenting ZPD, bridging gaps
Storytelling	Aids in the integration of the ZPD
Gaming	Provides frameworks for independent practice

M
(artifact)

St_n

O_n

St_{n+1}
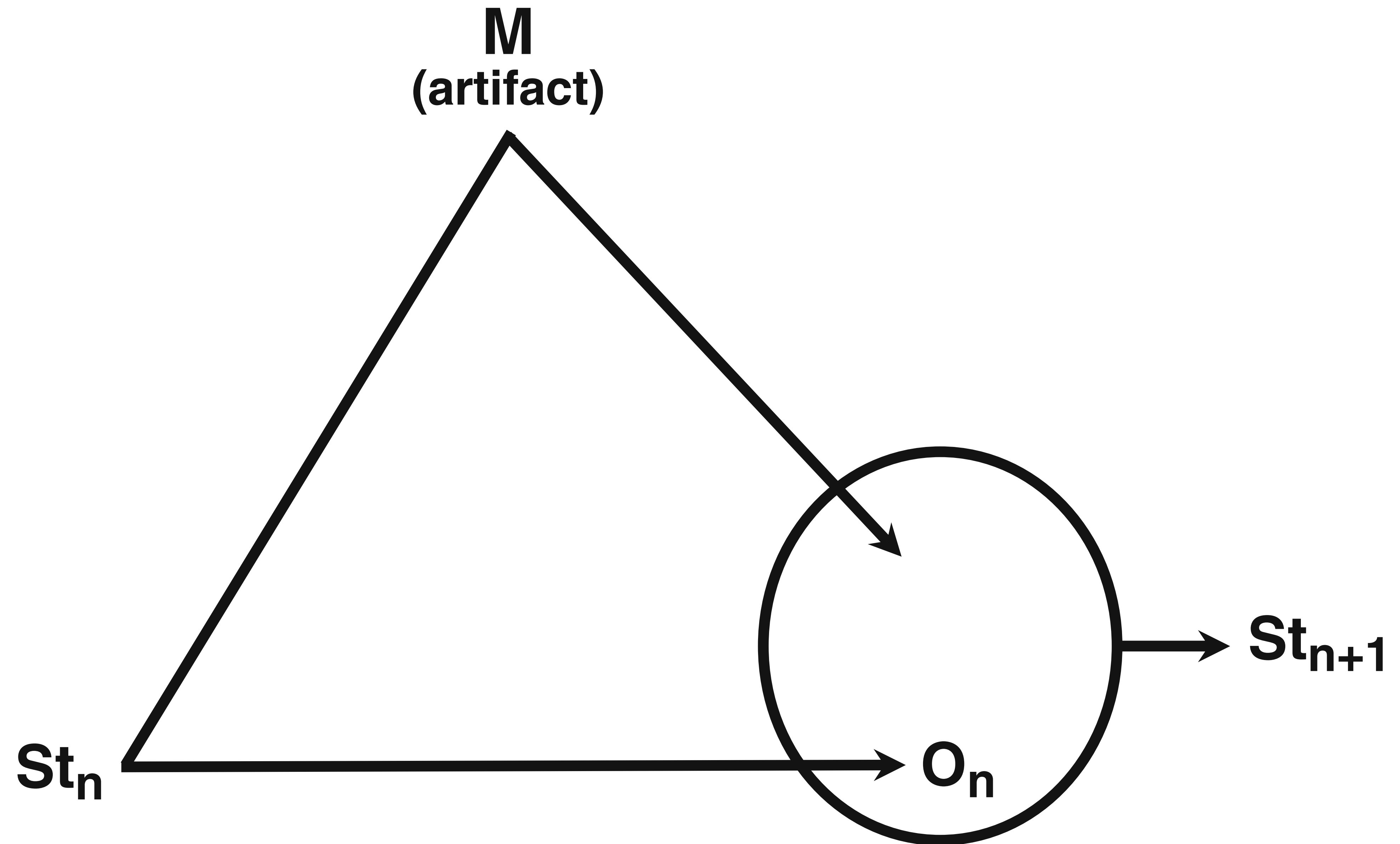
Ann Pendleton-Jullian & John Seely Brown:
The Pragmatic Imagination

Six Principles:

1. The imagination serves diverse cognitive processes as an entire spectrum of activity.

2. The imagination both resolves and widens the gap between what is unfamiliar and what is known.

3. The Pragmatic Imagination pro-actively imagines the actual in light of meaningful purposeful possibilities.

4. The Pragmatic Imagination sees thought and action as indivisible and reciprocal.

5. The imagination must be instrumentalized to turn ideas into action - the entire spectrum of the imagination.

6. Because the imagination is not under conscious control, we need to understand, find, and design ways to set it in motion and scaffold it for play and purpose.

imagination for SENSE BREAKING →

imagination for SENSE MAKING →

PERCEPTION

REASONING

deductive

inductive

abductive

SPECULATION

EXPERIMENTAL

FREE PLAY

👤 + M O

Hippasus

Blog: http://hippasus.com/blog/
Email: rubenrp@hippasus.com
Twitter: @rubenrp