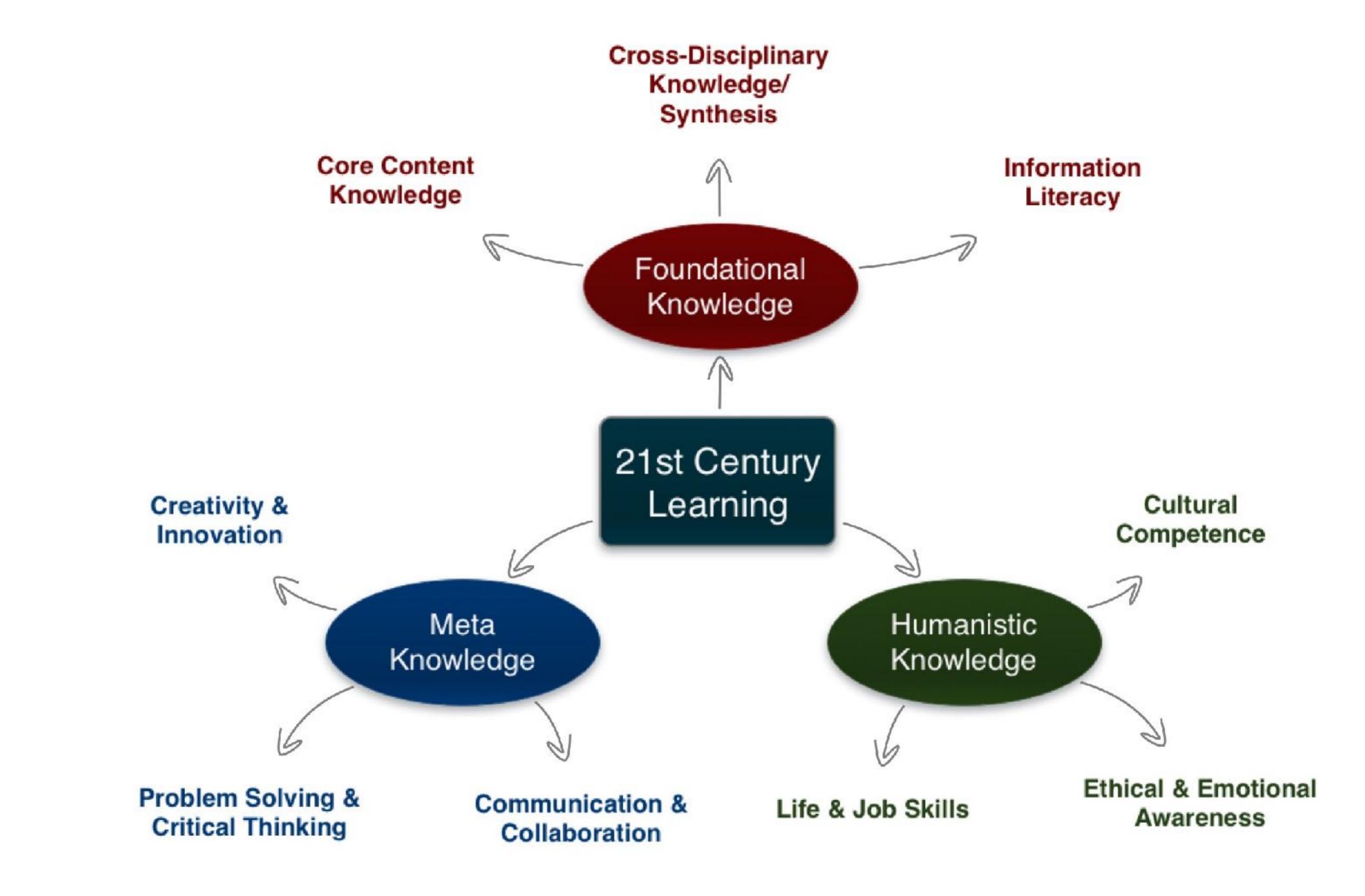
The Future Arrived Early: Notes for Learning Design, Today

Ruben R. Puentedura, Ph.D.



•Computing Power Machine Learning

• Mobile Devices •Social Media

Work & Leisure Space Design

•Blended Spaces • Digital Integration





Computational Thinking

•Maker Culture

• Digital Citizenship

Work & Leisure Space Design

•Blended Learning

Active Learning Design

Insight Report

Towards a **Reskilling Revolution**

A Future of Jobs for All

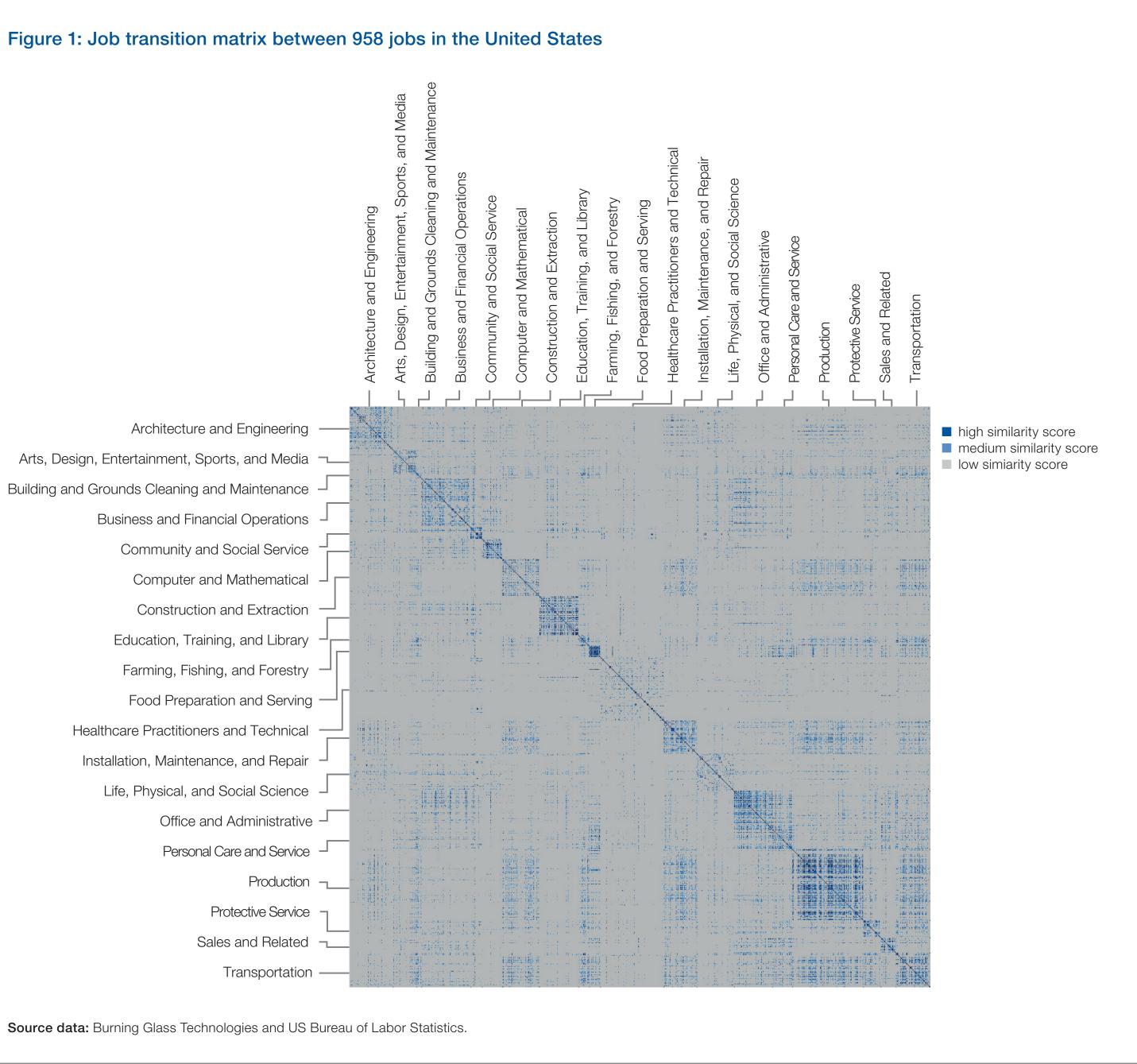
In collaboration with The Boston Consulting Group

January 2018





COMMITTED TO IMPROVING THE STATE OF THE WORLD



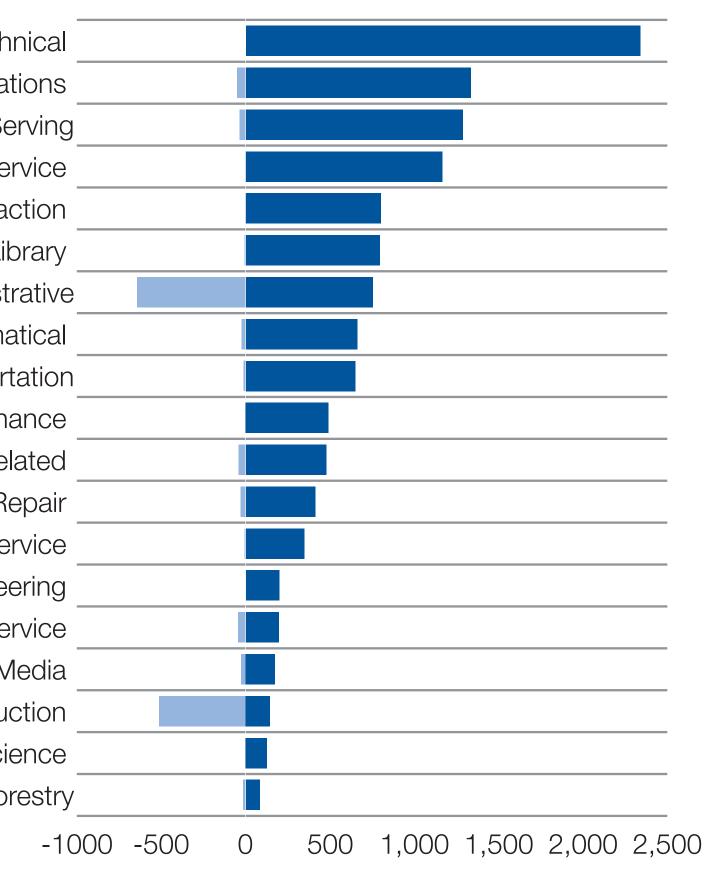
by 2026

Healthcare Practitioners and Technical

- **Business and Financial Operations**
 - Food Preparation and Serving
 - Personal Care and Service
 - Construction and Extraction
 - Education, Training and Library
 - Office and Administrative
 - Computer and Mathematical
 - Transportation
- Building and Grounds Cleaning and Maintenance
 - Sales and Related
 - Installation, Maintenance and Repair
 - Community and Social Service
 - Architecture and Engineering
 - **Protective Service**
- Arts, Design, Entertainment, Sports and Media
 - Production
 - Life, Physical and Social Science
 - Farming, Fishing and Forestry

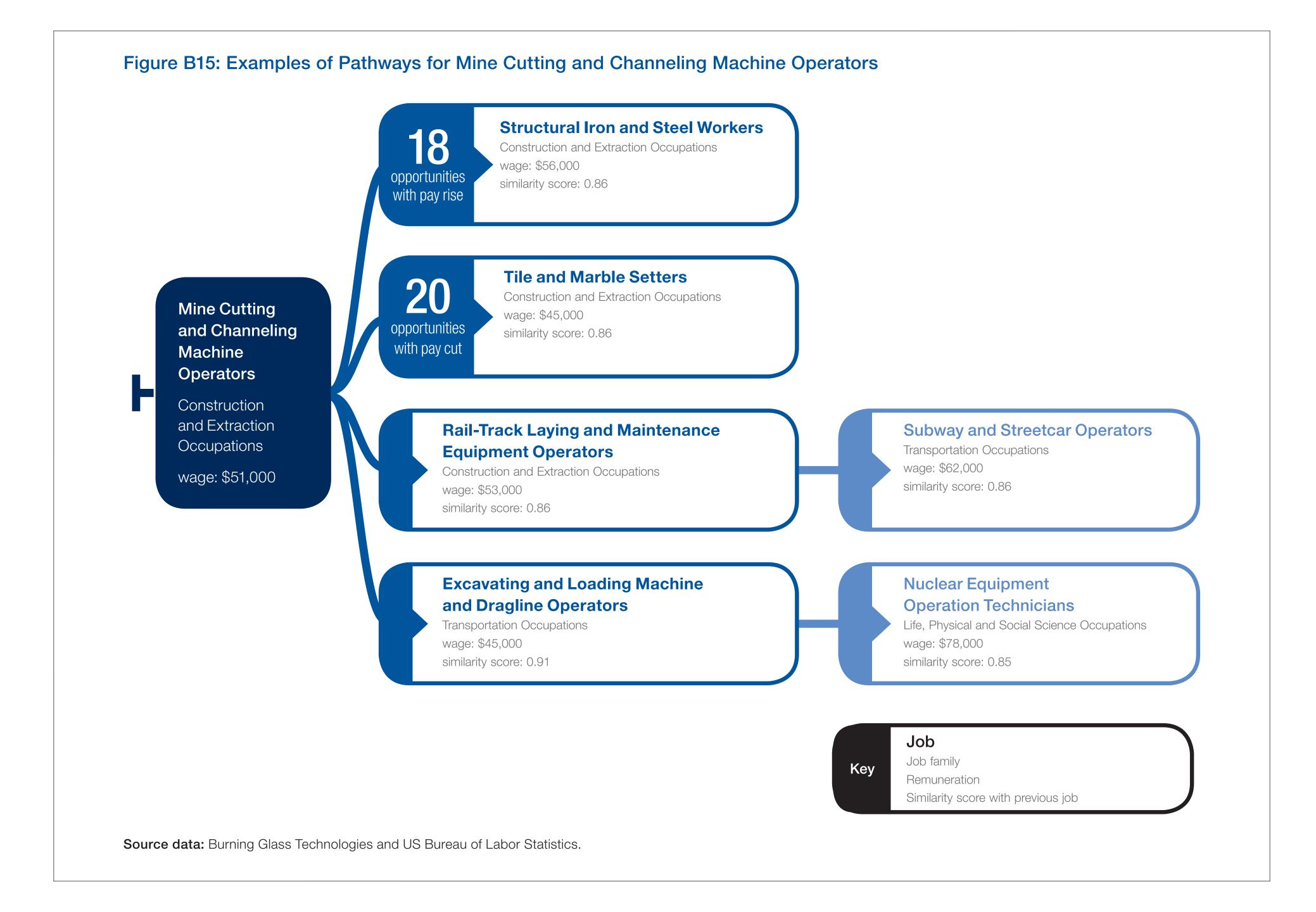
O*NET job categorization.





Job gain/decline (thousands)

- Source data: Burning Glass Technologies and US Bureau of Labor Statistics.
- Note: The figures above exclude 4% of US employment, due to differences in SOC and



"Gakushiryoku - ability required for university graduates for an unpredictable era including the education, knowledge and experience to make correct decisions in the face of unexpected difficulties."

MEXT - Summary of Report: Towards a Qualitative Transformation of University Education for Building a New Future - Universities Fostering Lifelong Learning and the Ability to Think Independently (2012)

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 Transformation

Augmentation

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

Tech allows for the creation of new tasks, previously inconceivable

Modification

Tech allows for significant task redesign

Augmentation

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Extended Thinking

Strategic Thinking

Skills and Concepts

Recall and Reproduction

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









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



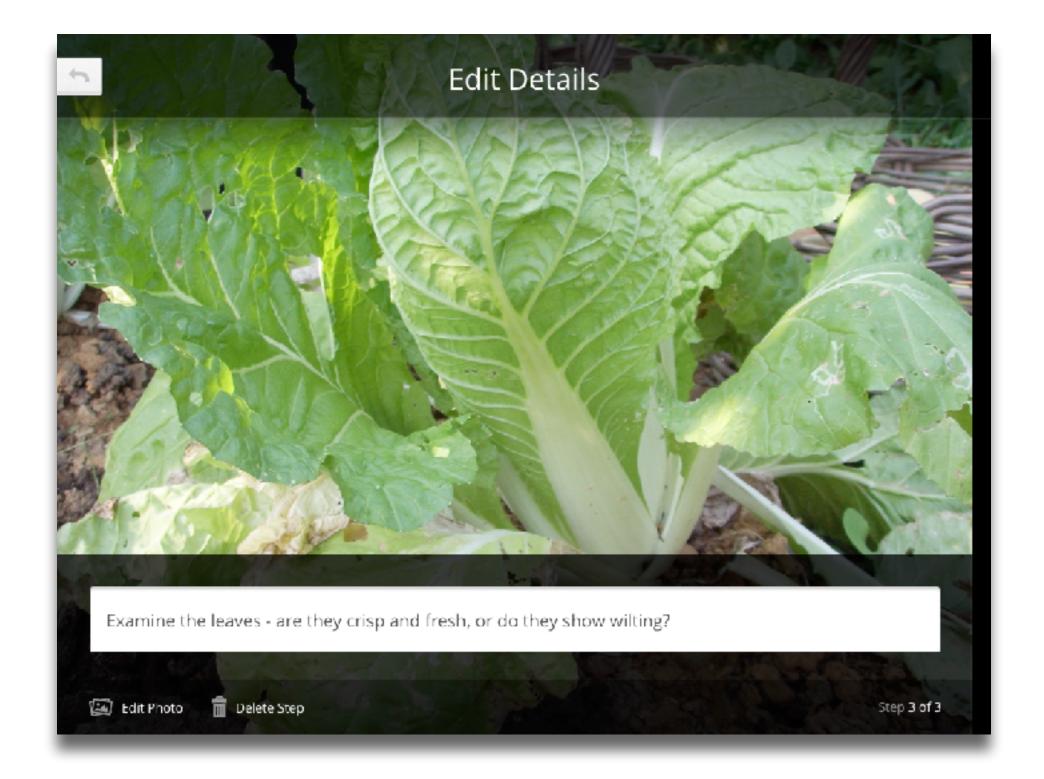


Modification

Augmentation

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Skills and Concepts

Modification

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Strategic Thinking





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Extended Thinking

Spreadsheets Undo					Cordon A	nolucie			-
					arden A	narysis			,¢
Shee	#1	V	+						
	Lettuce	Beets	Tomatoes	Carrots	Total				
May	\$25.00	\$0.00	\$0.00	\$10.00	\$35.00				
June	\$25.00	\$0.00	\$0.00	\$20.00	\$45.00				
July	\$25.00	\$0.00	\$10.00	\$20.00	\$55.00				
August	\$20.00	\$10.00	\$20.00	\$10.00	\$60.00				
September	\$10.00	\$20.00	\$30.00	\$5.00	\$65.00				
October	\$0.00	\$40.00	\$0.00	\$5.00	\$45.00				
					Lettuce	Beets	Tomatoes	Carrots	
							Projected Inco	me	
			\$7	0.00					
			85	2.50			_		
						_			
									2
			20	5.00					

June

July

\$17.50



September

August

Tech allows for the creation of new tasks, previously inconceivable

Modification

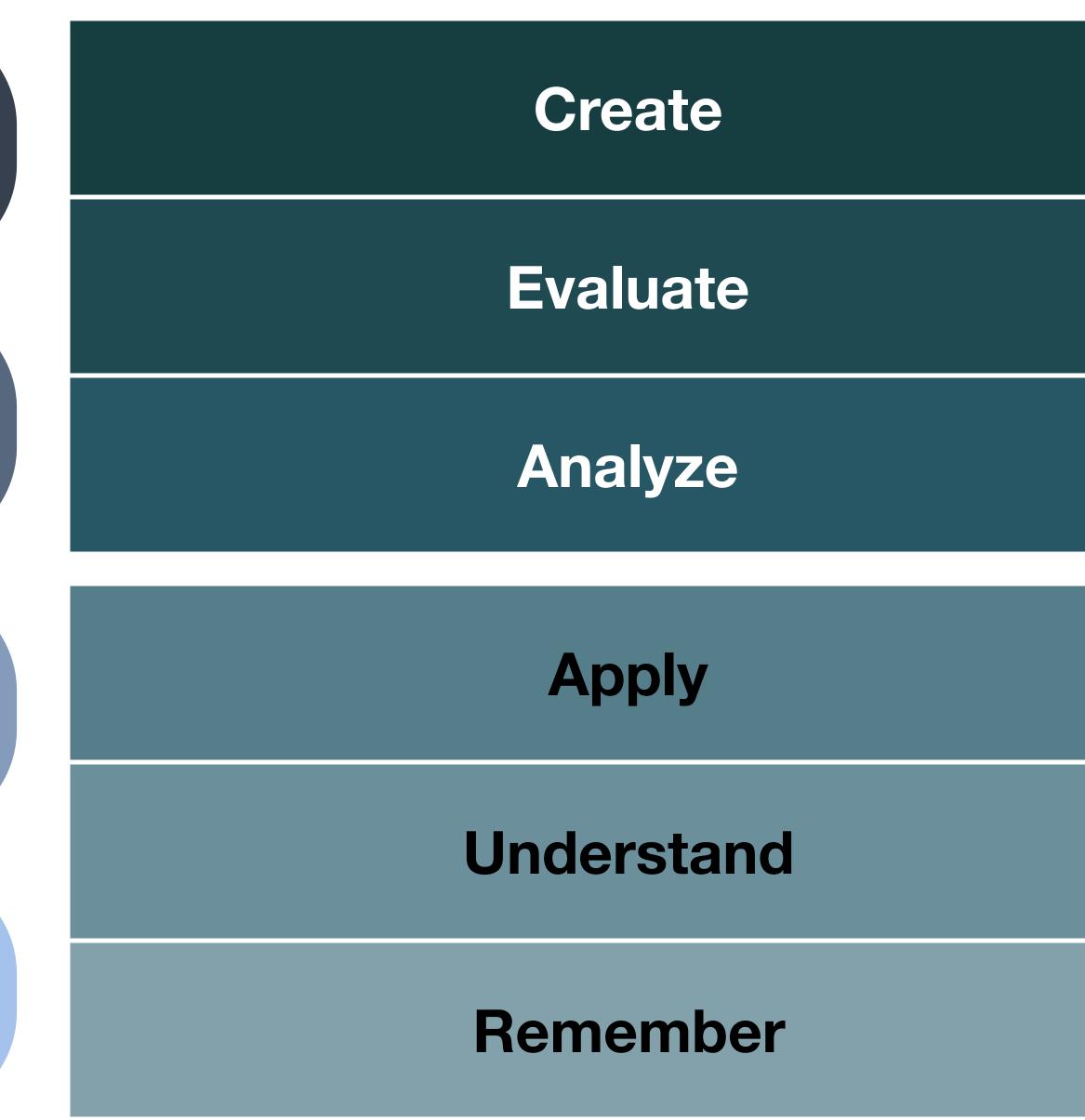
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Lorin W. Anderson and David R. Krathwohl (Eds.), A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives, Complete Edition. Longman. (2000)



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

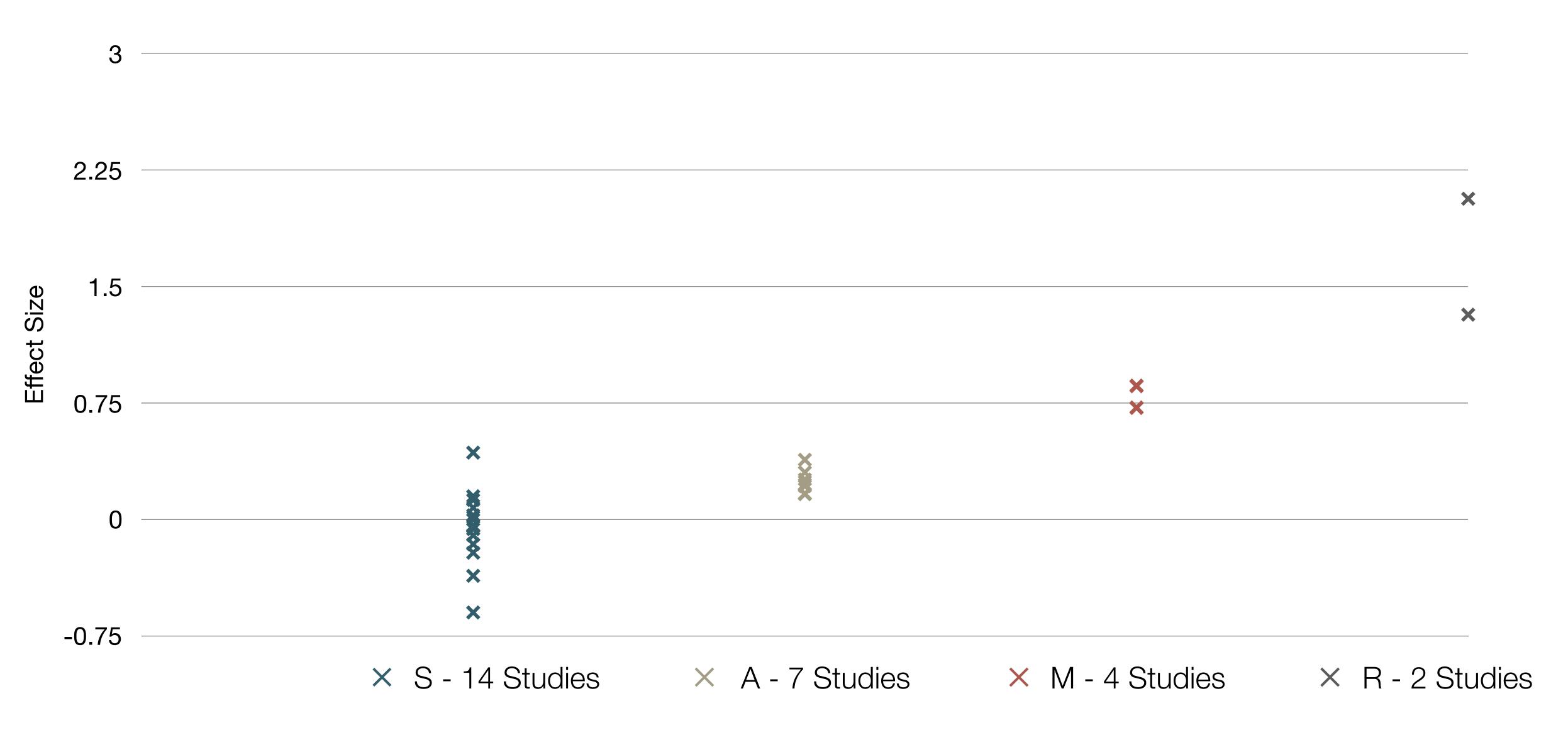
Meta-analysis	Number of studies	ES type	Mean ES	SE
Bangert-Drowns (1993)	19	Missing	0.27	0.11
Bayraktar (2000)	42	Cohen's d	0.27	0.05
Blok, Oostdam, Otter, and Overmaat (2002)	25	Hedges's g	0.25	0.06
Christmann and Badgett (2000)	16	Missing	0.13	0.05
Fletcher-Flinn and Gravatt (1995)	120	Glass's ∆	0.24	0.05
Goldberg, Rus- sell, 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 ∆	0.48	0.05
YI. Liao and Chen (2005)	21	Glass's ∆	0.52	0.05
Y. K. C. Liao (2007)	52	Glass's ∆	0.55	0.05

	Number of		Mean	
Meta-analysis	studies	ES type	ES	SE
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	0.49ª	0.11
Roblyer, Castine, and King (1988)	35	Hedges's g	0.31	0.05
Rosen and Salo- mon (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	0.26ª	0.05
immerman and Kruepke (2006)	114	Pearson's r ^a	0.24	0.03
Forgerson and Elbourne (2002)	5	Cohen's d	0.37	0.16
Waxman, Lin, and Michko (2003)	42	Glass's ∆	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 Tablets in Education



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).

Social	Mobility	Visualization	Storytelling	Gaming
200,000 years	70,000 years	40,000 years	17,000 years	8,000 years
<image/>				
	Ruben R. Puentedura, "Technology In Educati	on: The First 200,000 Years" The NMC Perspective Series: Ideas	that Matter. NMC Summer Conference, 2012.	





Bookmarks

Discussions

Social

Blogging

Telepresence







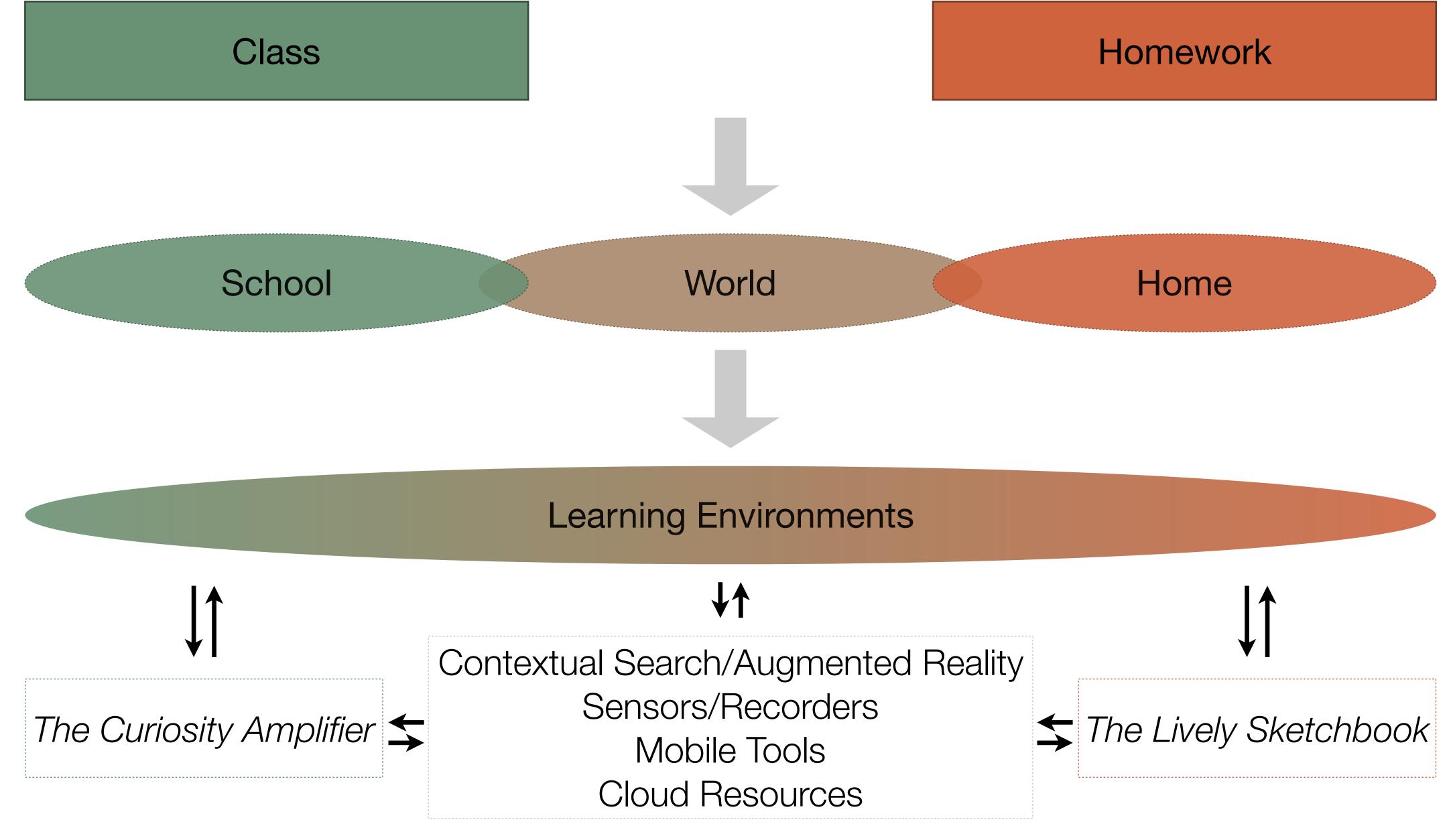




Microblogging

Wikis

File Sharing



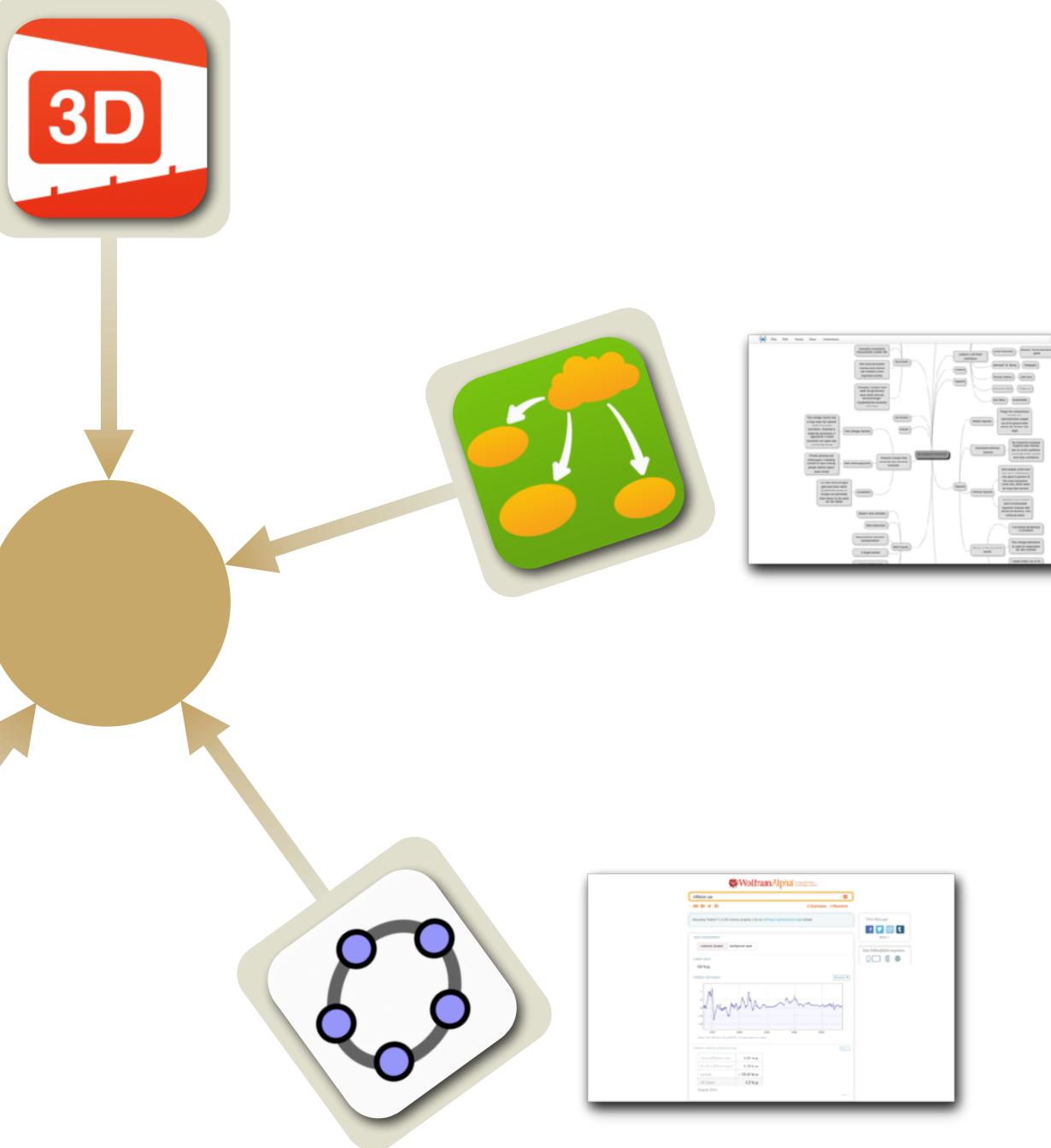




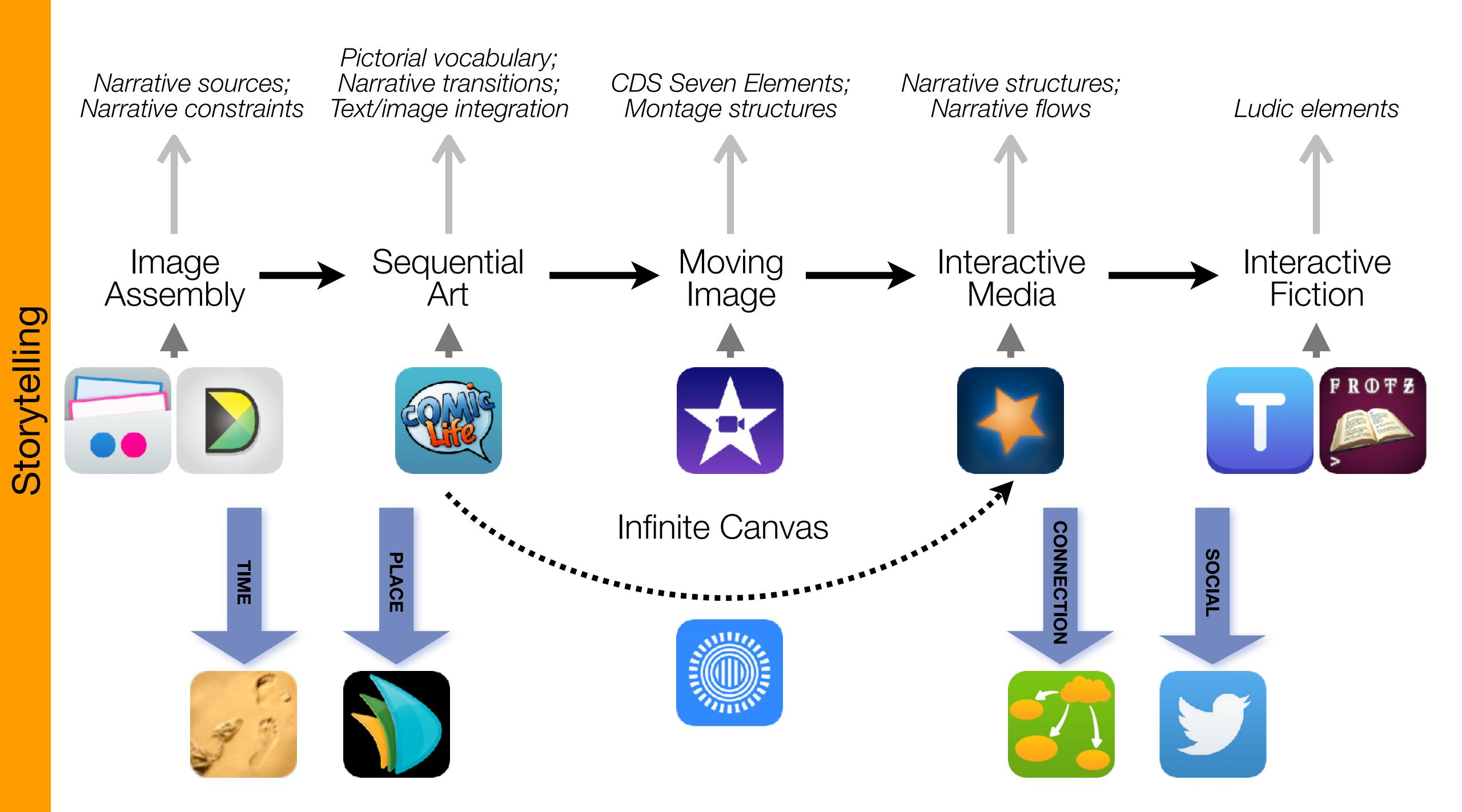












Formal Definition of **Game** (Salen & Zimmerman)

"A game is a system in which players rules, that results in a quantifiable outcome."

engage in an artificial conflict, defined by

The EdTech Quint				
Social	Commur			
Mobility	Anytime, /			
Visualization	Making			
Storytelling	Knowledg			
Gaming	Feedback L			

et – Associated Practices

- nication, Collaboration, Sharing
- Anyplace Learning and Creation
- g Abstract Concepts Tangible
- ge Integration and Transmission
- Loops and Formative Assessment

The Value of Shared Practices

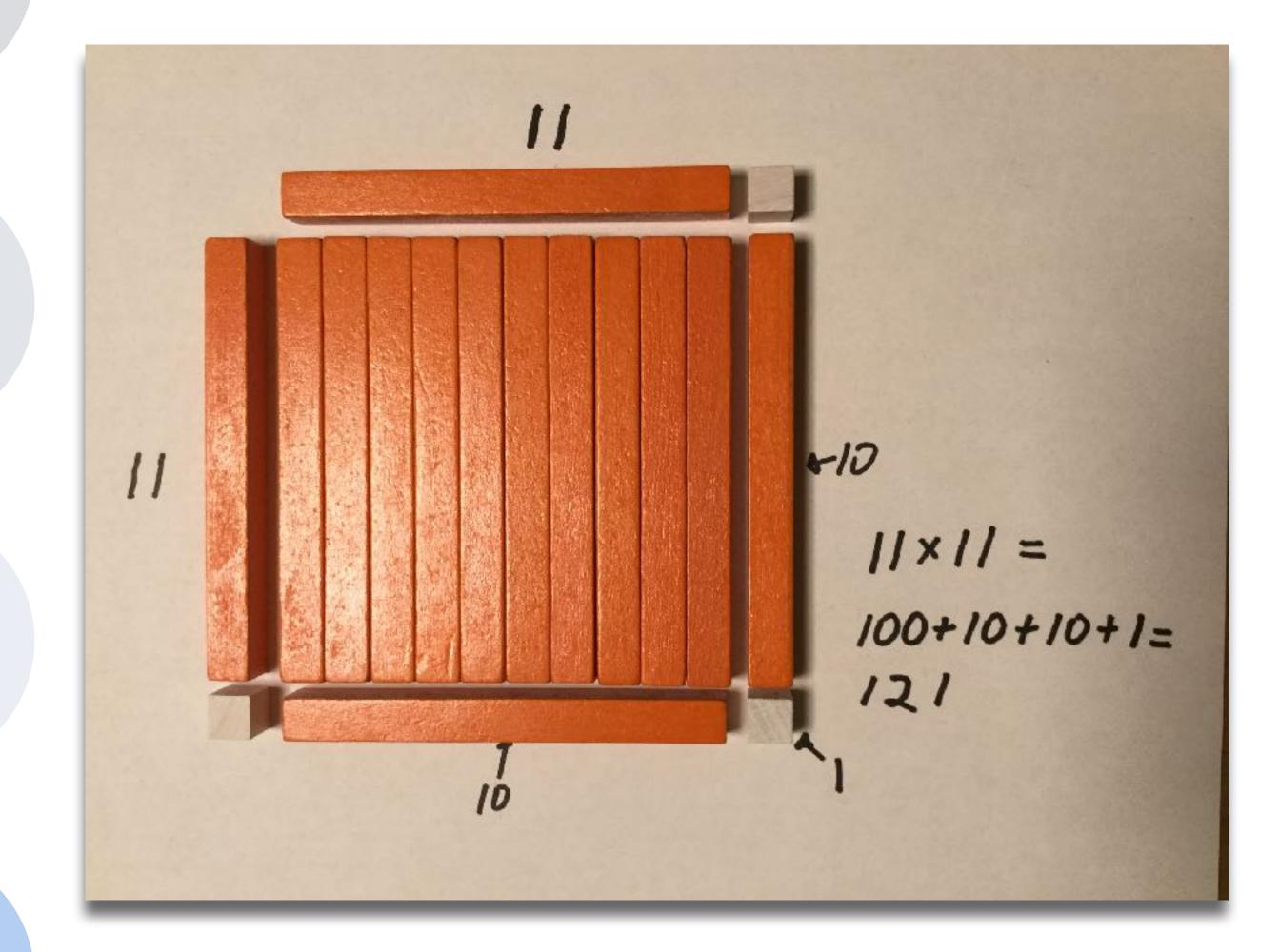
- Augmented Note Taking and Annotation
- Visualization Methods:
 - 5 Primary Domains: Space, Time, Networks, Text, Number
- Simple Blogging
- Simple Digital Storytelling Video •
- Flipped Classroom: •
 - Materials Creation
 - Peer Discussion/Instruction Methods
- Simple Interactive Fiction
- LMS Practices

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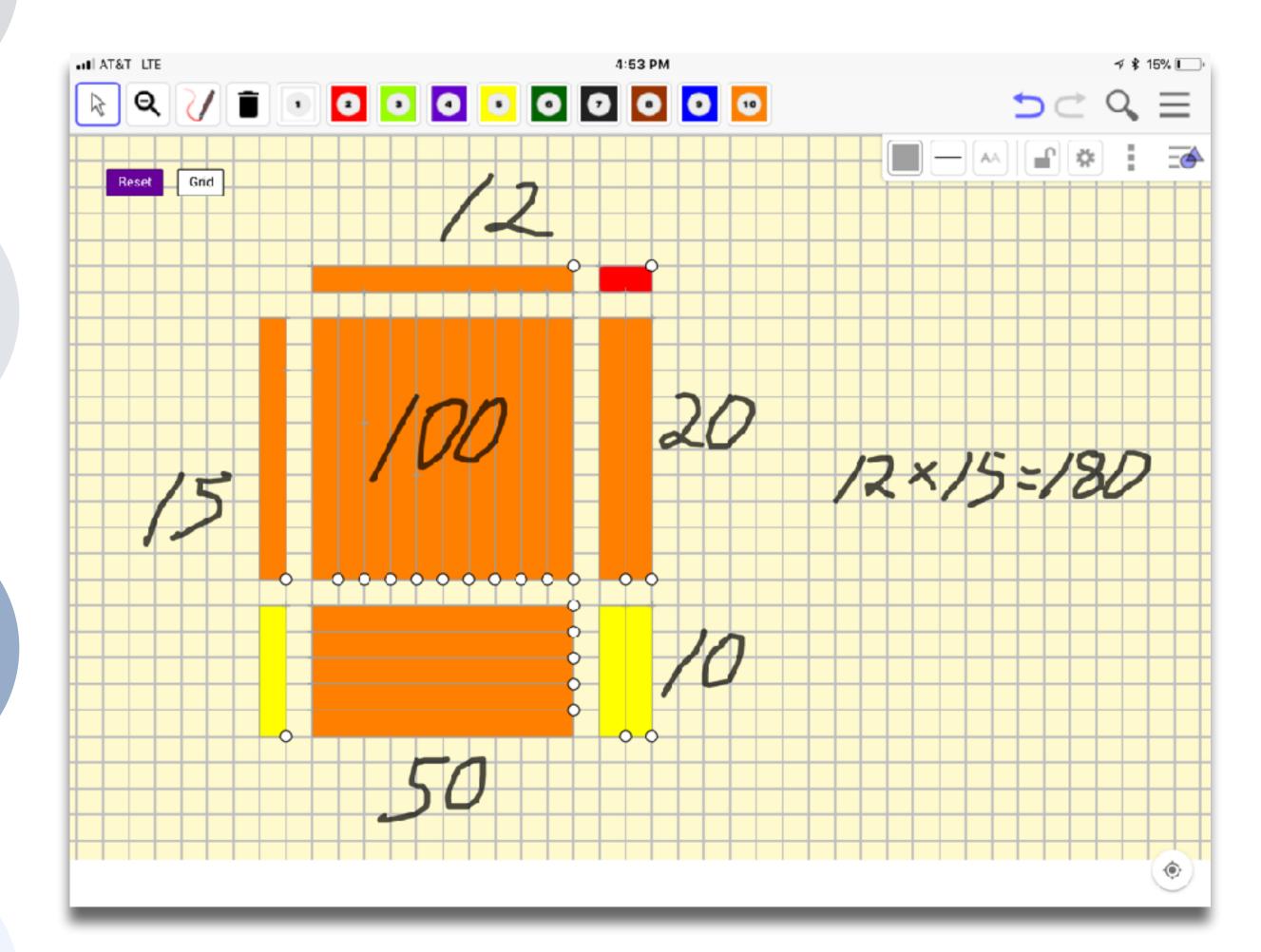


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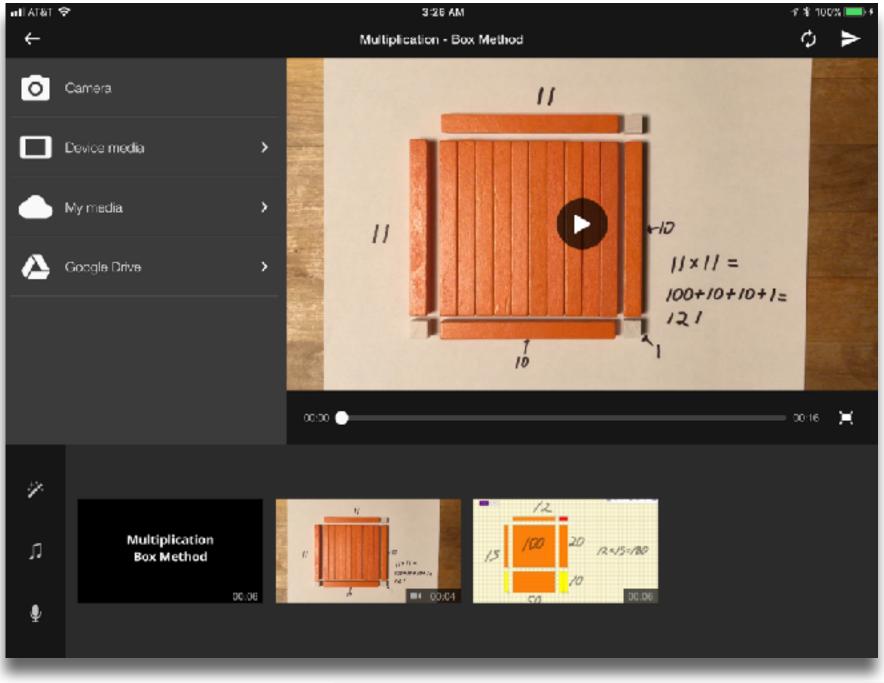


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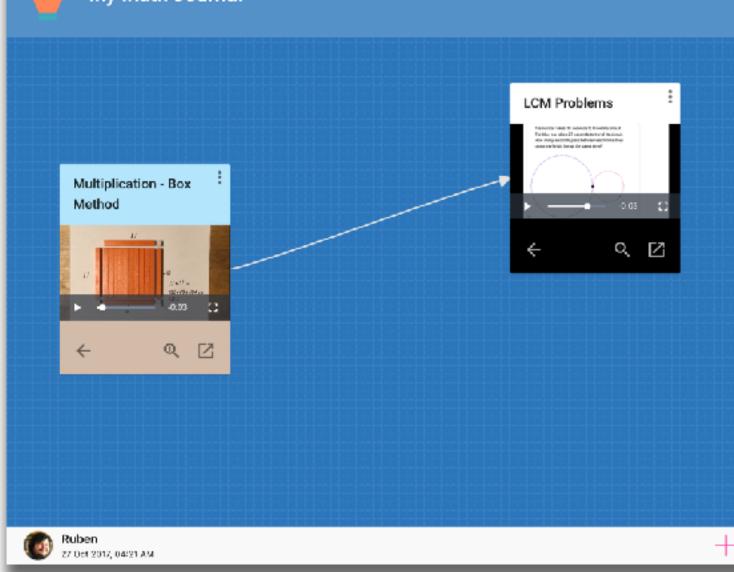
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all AT&T 🗢



My Math Journal

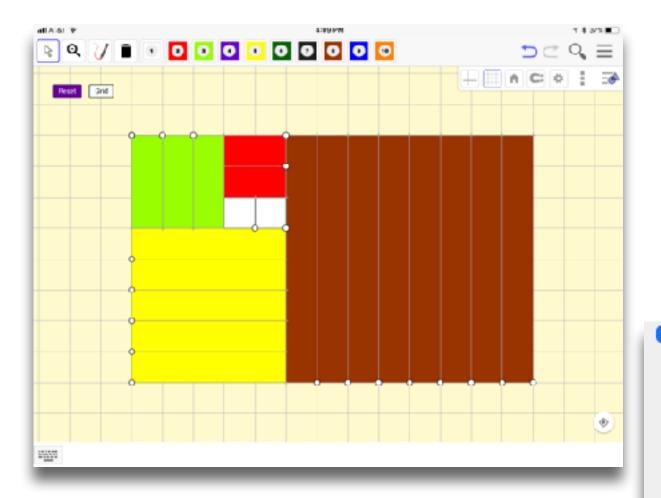


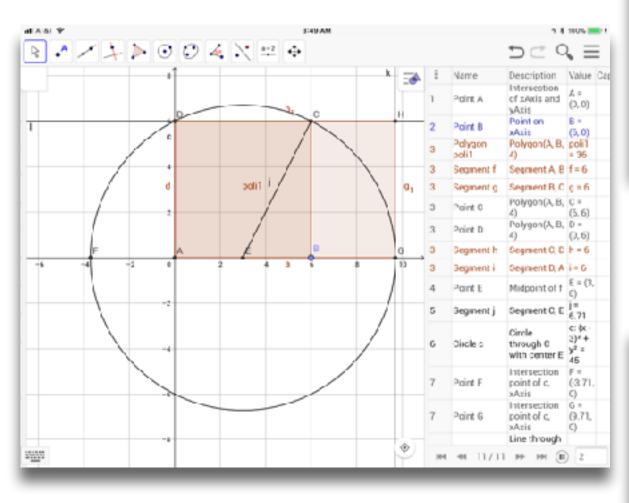


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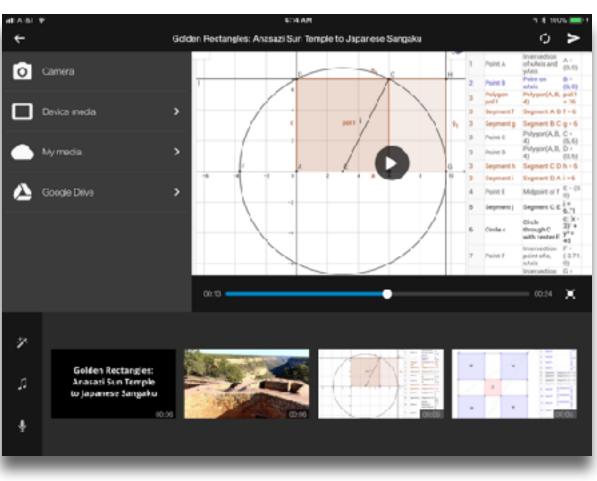
Colorado's ancient cliff dwellers' use of geometry draws new attention McClatchy Washington Bureau, adapted by Newsela staff 04 10 2017

MESA VERDE NATIONAL FARK, Colorado - An ancient structure called the "Sun Temple" still has scientists stumped.

The temple is perched on the tip of a hill that overlocks the famous "Cliff Palace" dwelling at Mesa Verde National Park. But experts are still not sure what it was used for in ancient times. "There are a lot of theories out there, but really, people don't know," said Tim Hovezak, an archaeologist at Mesa Verde National Park.

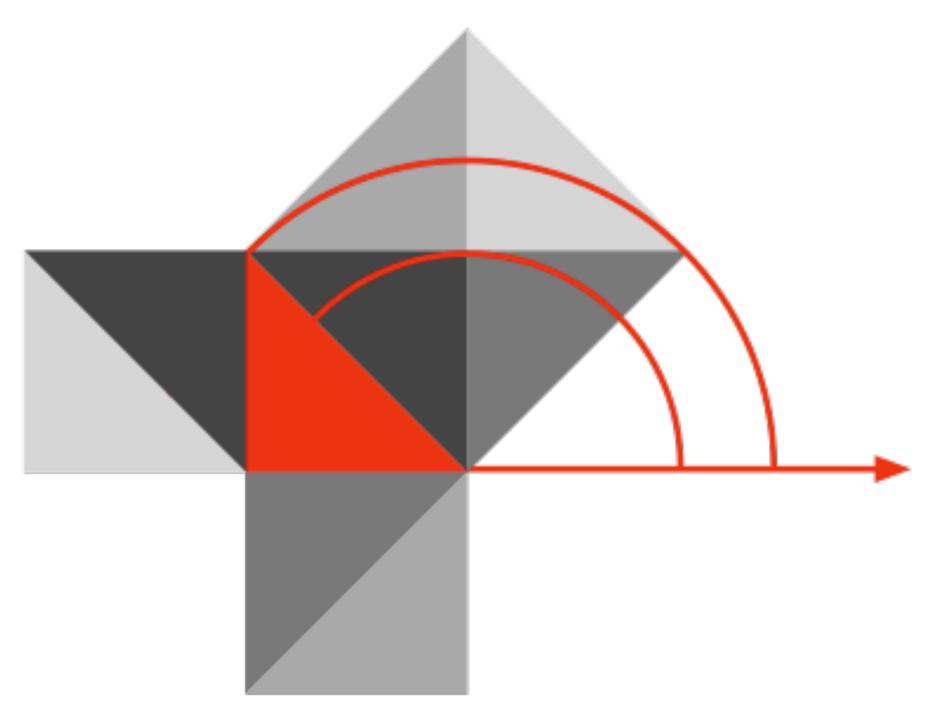
The only people who would know are the Ancestral Fuebleans — also known as the Anasazi. They built structures across the Southwest and then started abandoning them in the 15th century.







Hippasus



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

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