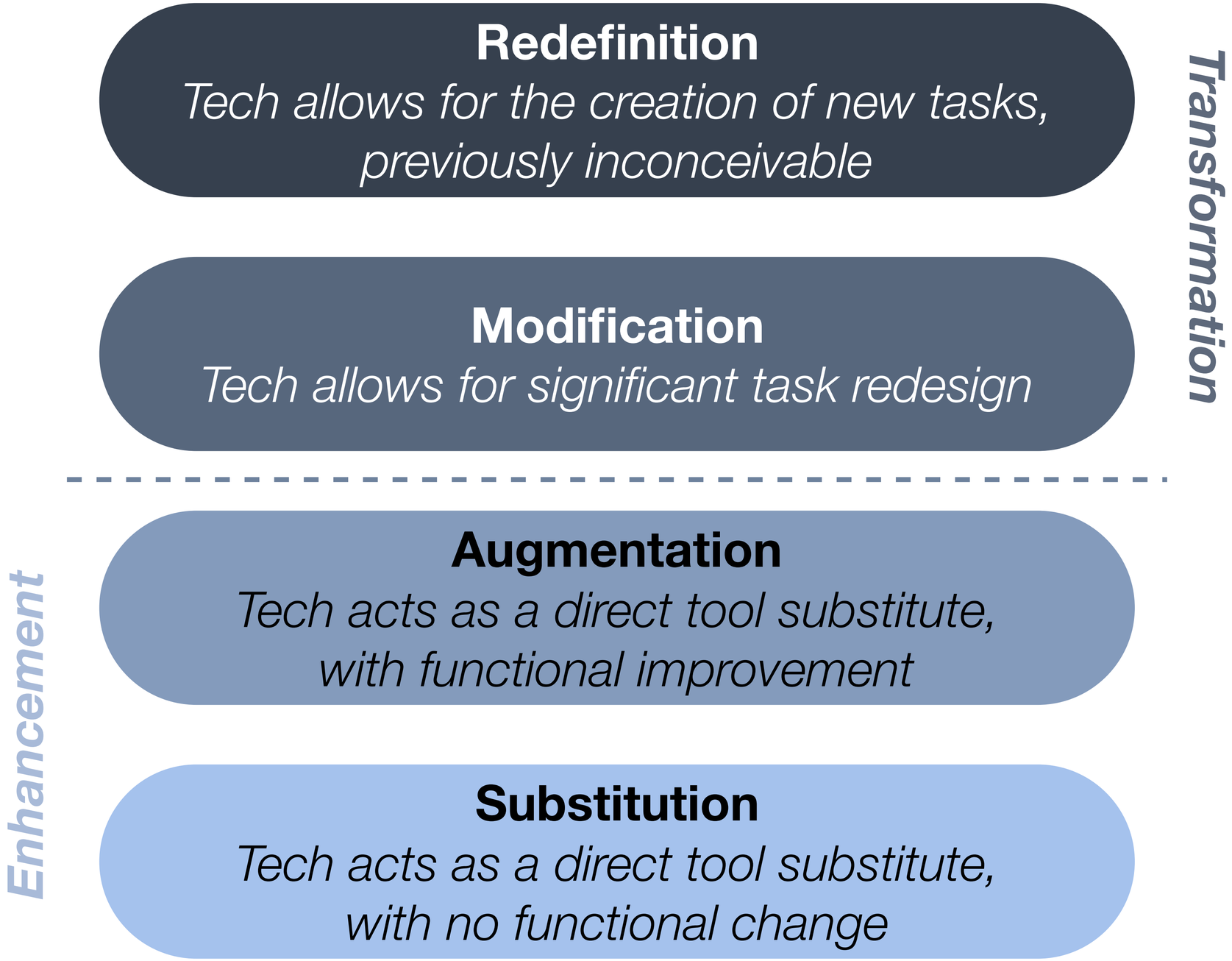
SAMR – A Research Perspective

Ruben R. Puentedura, Ph.D.



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

Redefinition

Tech allows for the creation of new tasks, previously inconceivable

Modification

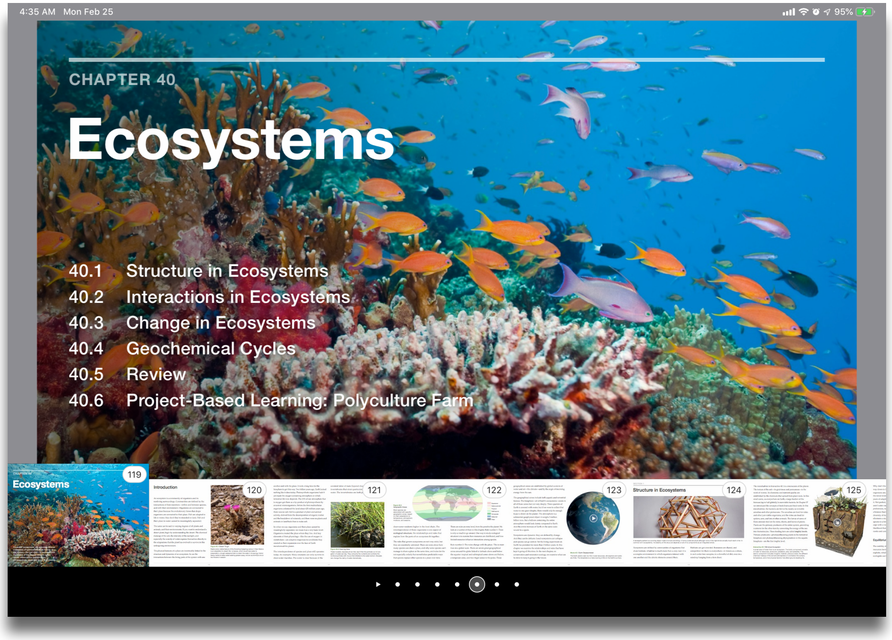
Tech allows for significant task redesign

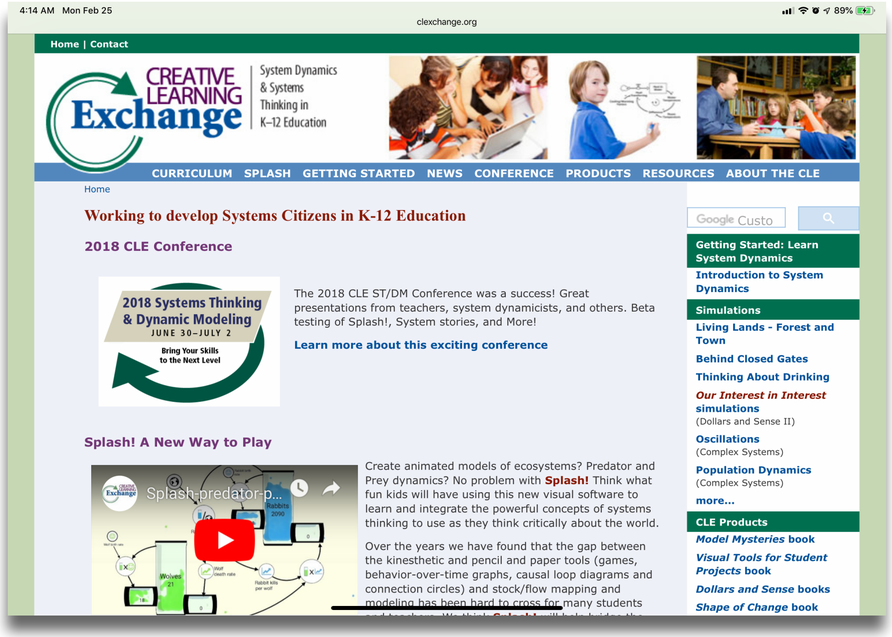
Augmentation

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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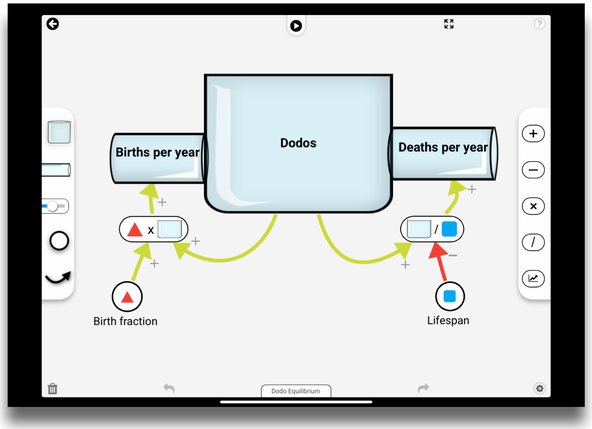

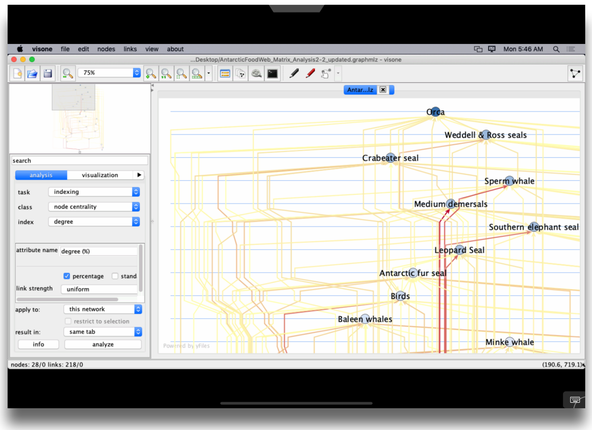

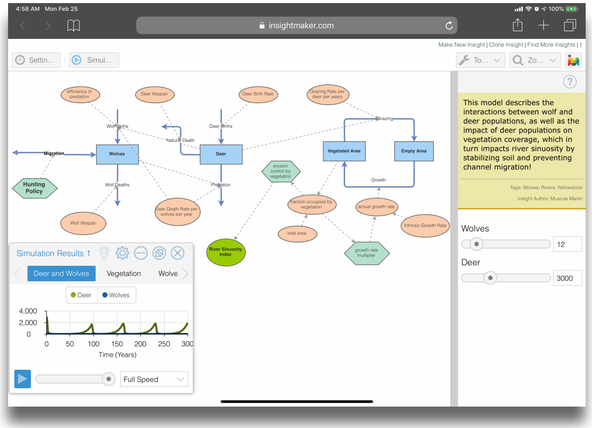

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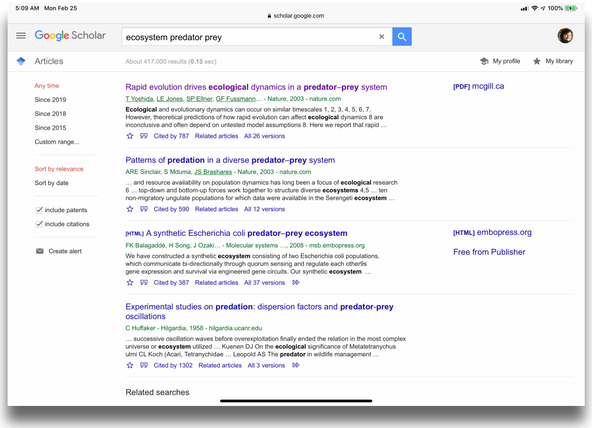

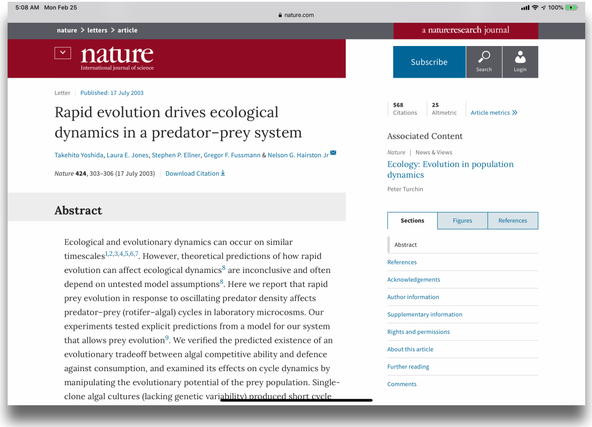

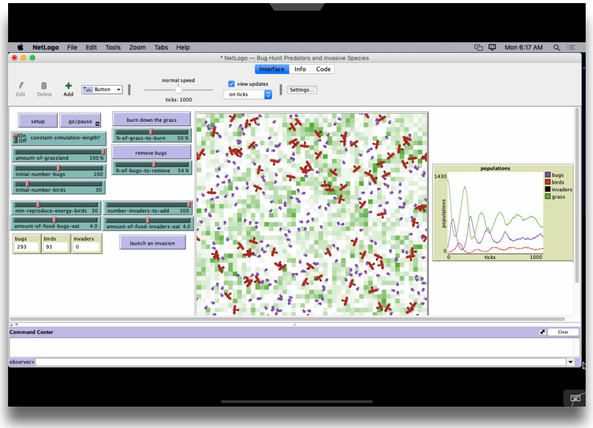

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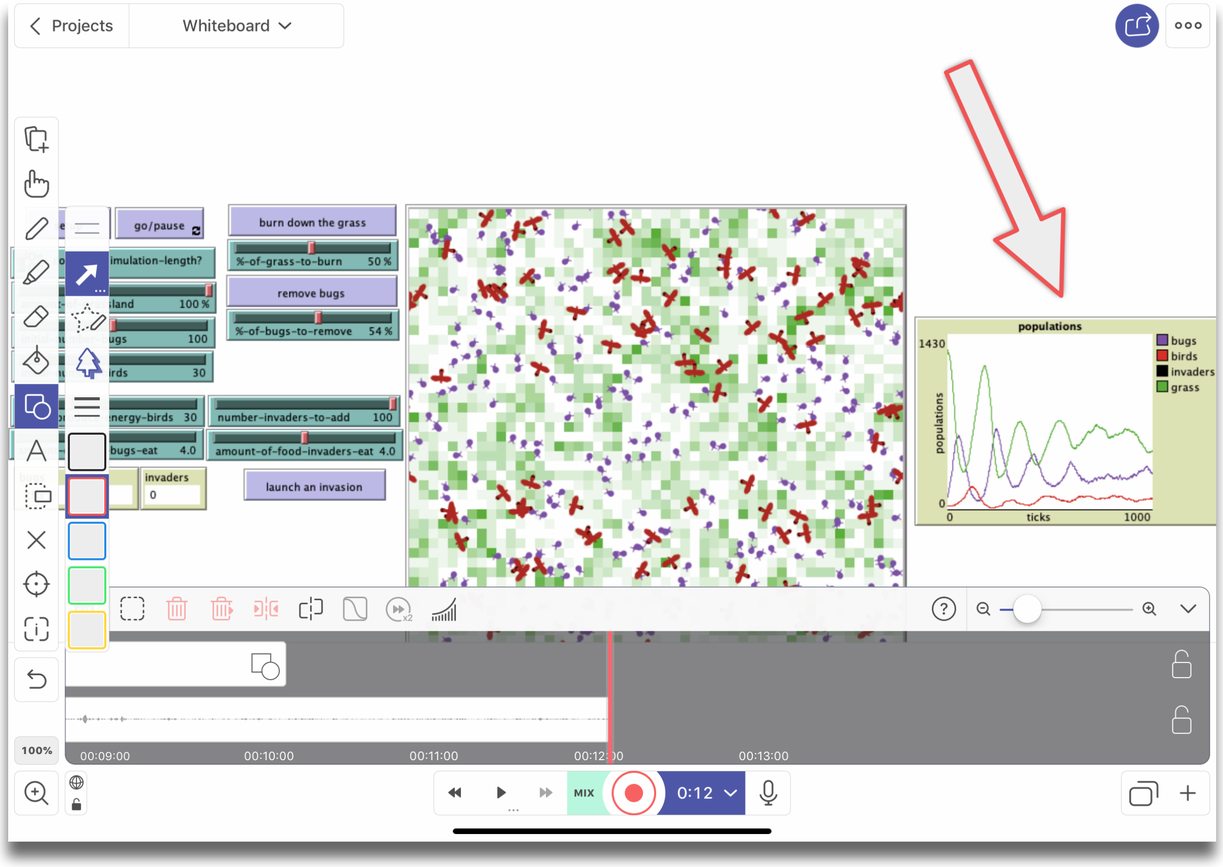


Competency / Concept	Model	Apply quantitative reasoning	Engage in argument from evidence	Engage in scientific inquiry and experimental design	Analyze and evaluate data	Appreciate and apply the interdisciplinary nature of science
Evolution						
Information Flow						
Structure and Function						
Pathways and transformations of matter and energy						
Systems						

Determining SAMR Level: Questions and Transitions

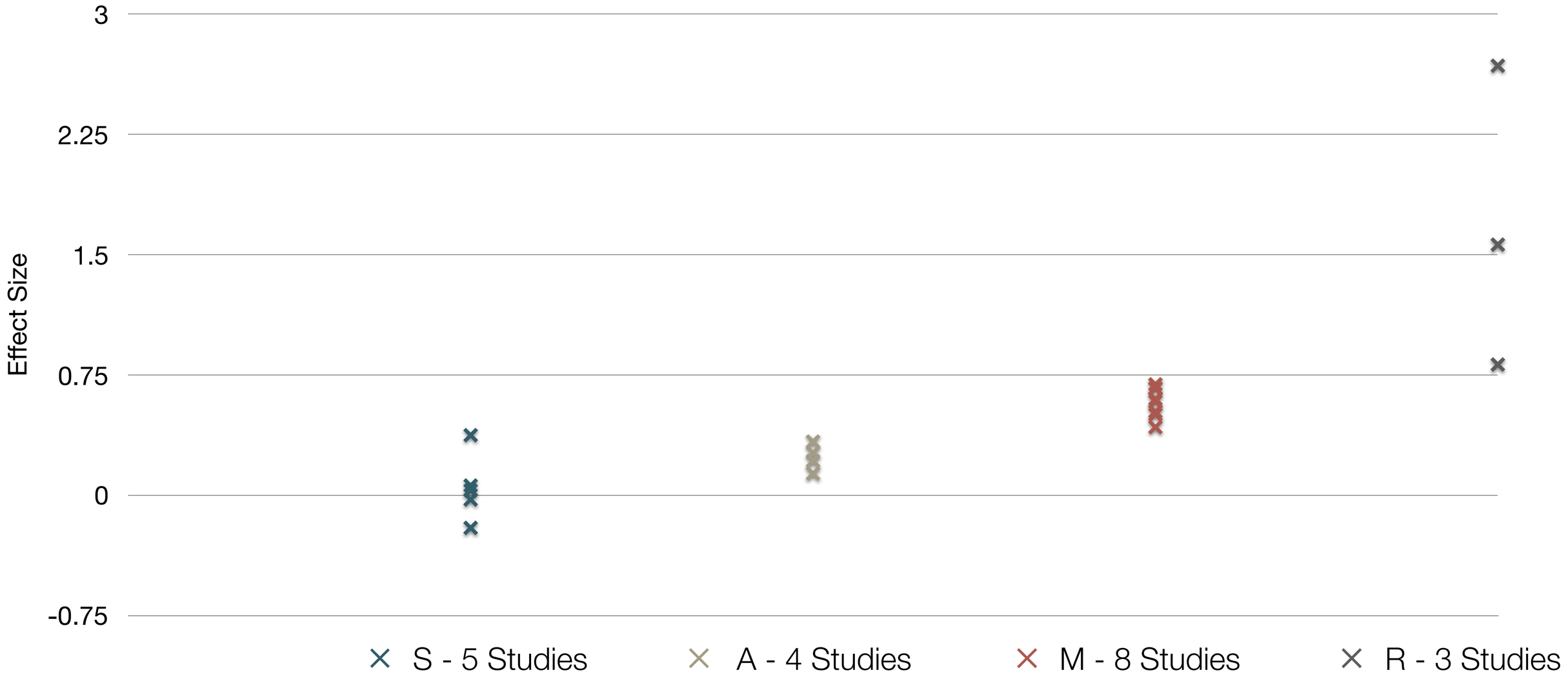
- **Substitution:**
  - What is gained by replacing the older technology with the new technology?
- **Substitution to Augmentation:**
  - Has an improvement been added to the task process that could not be accomplished with the older technology at a fundamental level?
  - How does this feature contribute to the design?
- **Augmentation to Modification:**
  - How is the original task being modified?
  - Does this modification fundamentally depend upon the new technology?
  - How does this modification contribute to the design?
- **Modification to Redefinition:**
  - What is the new task?
  - Is any portion of the original task retained?
  - How is the new task uniquely made possible by the new technology?
  - How does it contribute to the design?

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*.

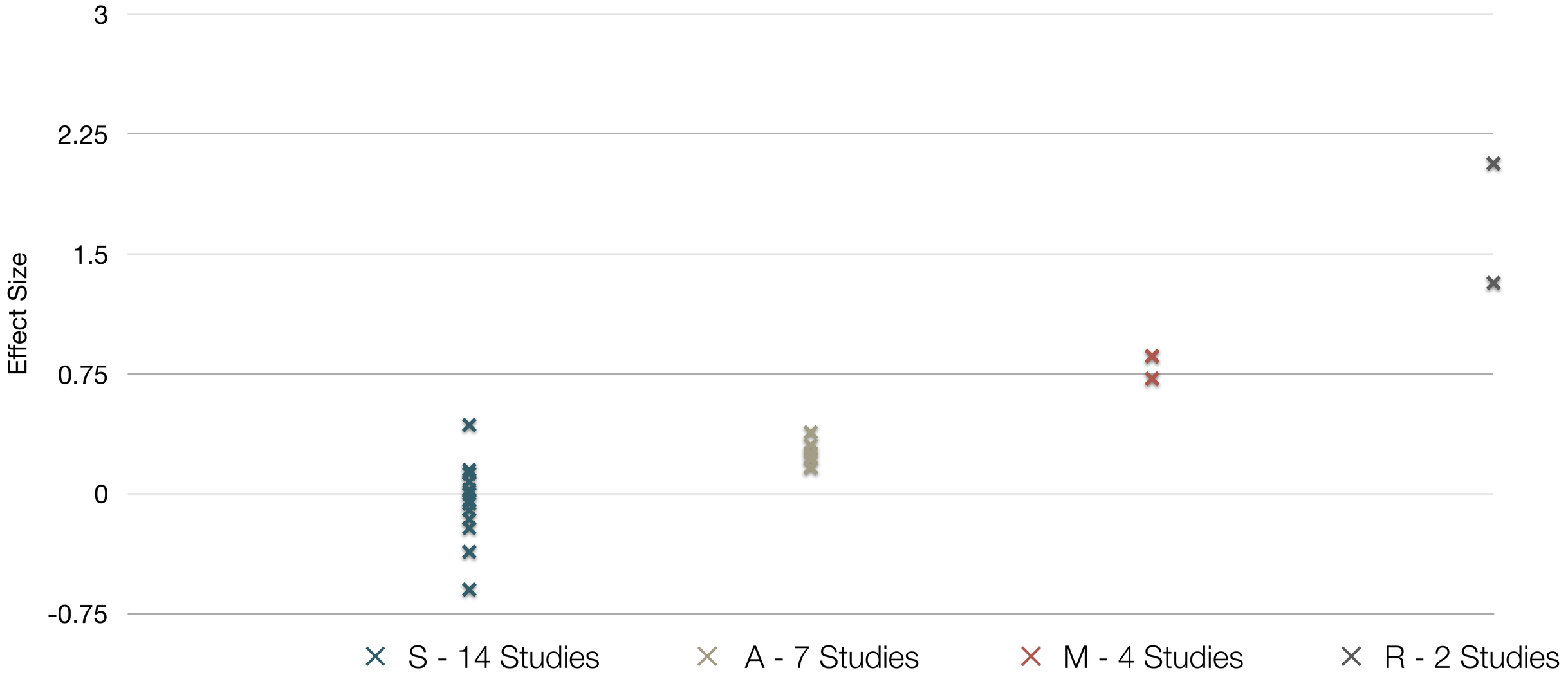
Tamim, Rana M., Robert M. Bernard, Eugene Borokhovski, Philip C. Abrami, and Richard F. Schmid. "What forty years of research says about the impact of technology on learning a second-order meta-analysis and validation study." *Review of Educational Research 81*, no. 1 (2011): 4-28.

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



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).

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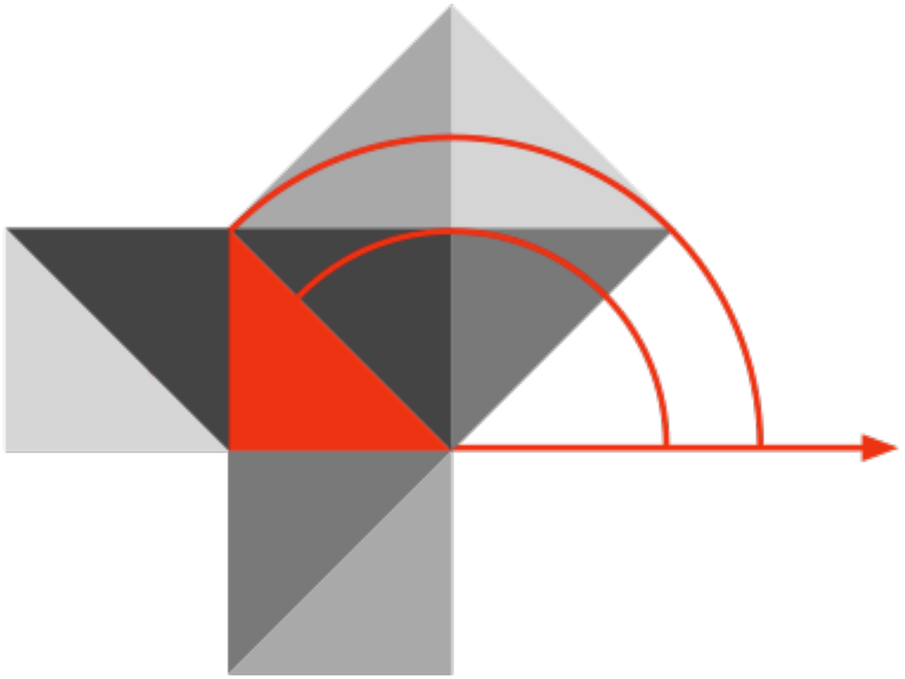

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