Is EdTech the “Hack” We Have Been Looking For?

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Theory of the case: Can innovation “disrupt” education and give us more for less?

What do we think technological tools can do for teachers and students?

- Digitization of content/distance learning=Greater access & lower costs
- New hardware=More engagement and collaboration
- New hardware + software=More flexibility for teachers and data management
- New software="personalized learning"
  - Learn at your own pace
  - Focus on weaknesses
  - Adaptive to "learning styles"

But the evidence on tech in the classroom is mixed

- E-Rate program increased investments in educational technology but not student performance (Goolsbee and Guryan 2006)
  - ~1-1 ratio between computers and students; 88% of schools have 100kbps per student
- Rouse and Krueger (2004) find little/no impact from a popular reading software application
- Barrow et al. (2009) find positive effects from a popular algebra software application
- Bottom line is that there are conflicting findings (Bulman and Fairlie, 2016)

What can explain these conflicting findings?

- Technology can mean lots of different things (software, hardware, student information systems, etc.)
- Fidelity of implementation matters! (LA Unified and Tablets)
- Teachers are complements not substitutes
- Tech might be more distracting than beneficial
- Students might be acquiring knowledge that is not on the test
- We are not using the “right” technological tools

170,000 choices but no way to know which apps work for which students under what conditions

Very little R&D in education—0.2% of spending

What's wrong with the market?

- Diverse customer base (~130,000 secondary schools in the U.S.)
- Many key decisions made at the local level

→ **Demand** not sufficiently aggregated

- 70% of K-12 content is still printed material and dominated by a small set of companies with existing relationships
- No comprehensive way to demonstrate quality of new products

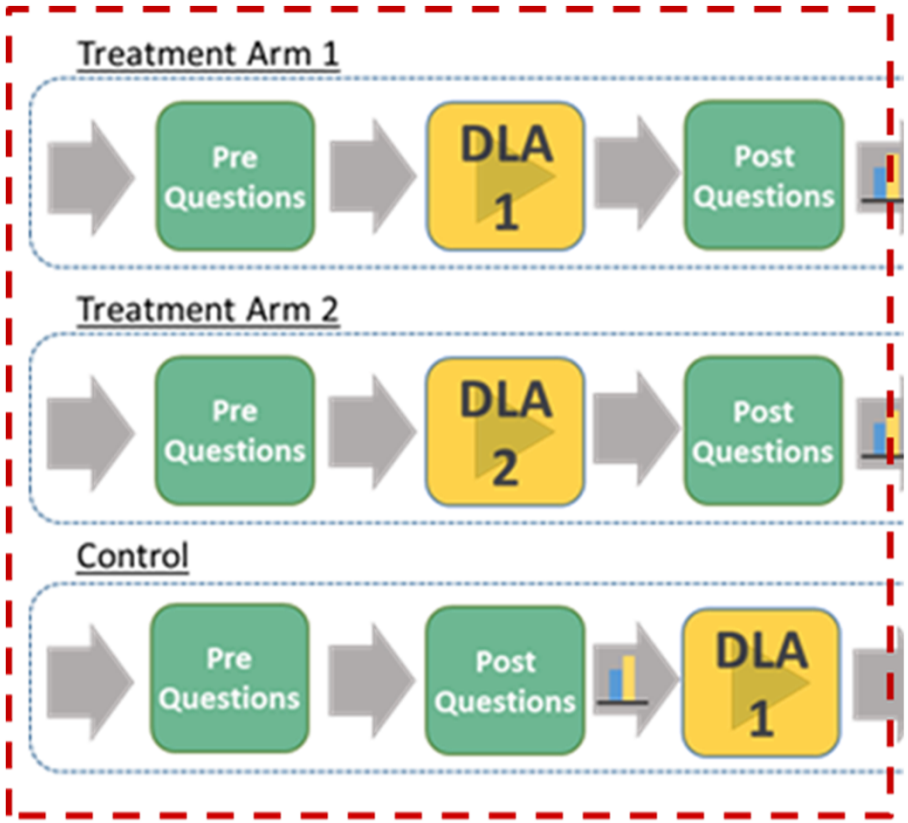
→ Incentives to **supply** innovative new tools are dampened, despite large market (~$8B/year)

Approaches to aggregating demand

- Alliances between schools to make joint purchasing decisions and fund R&D
- Environments for experimentation (coupled with rigorous evaluation and reporting!)
- Could we make more procurement decisions using evidence-based criteria?

On the supply side, one approach is applying the same methods that companies like Google and Amazon use to develop the best content:

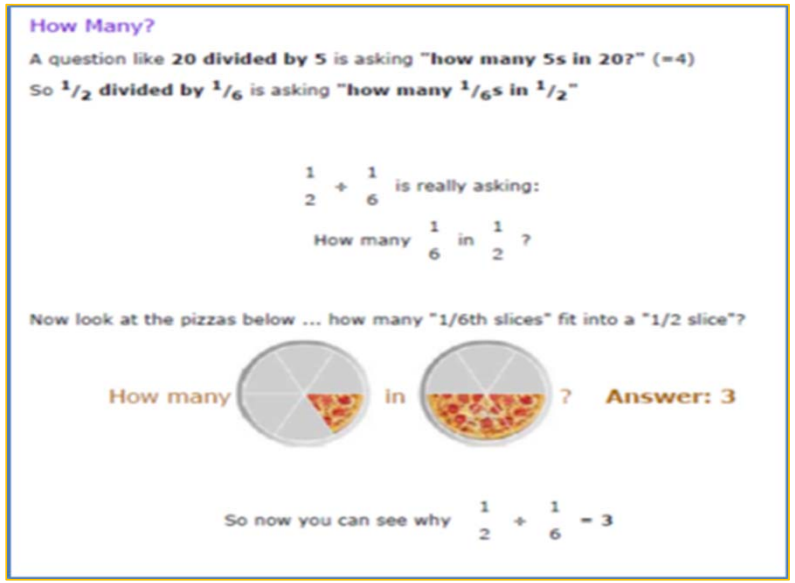
A/B testing (EDUSTAR example)



Example 1: Two activities that teach the same skill

Skill: Dividing Fractions (Common Core Standard 6.NS.A.1)

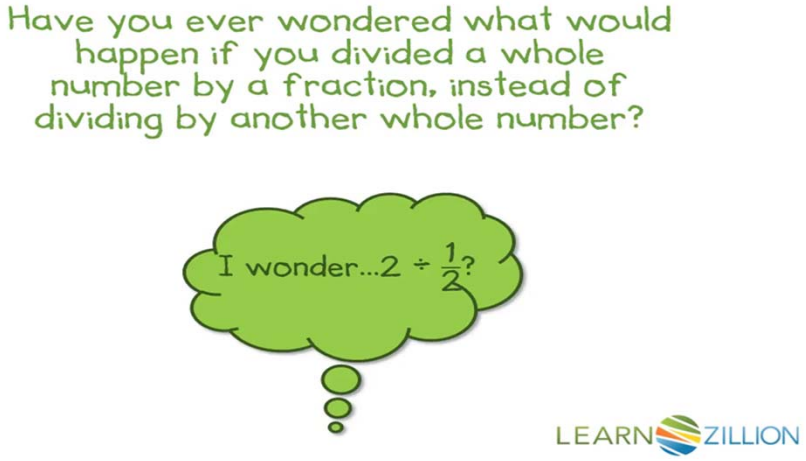
"Dividing Fractions"



"Basketball Dividing Fractions"

Example 2: Two versions of the same digital learning activity

Baseline video



Baseline video + section on "common mistakes"

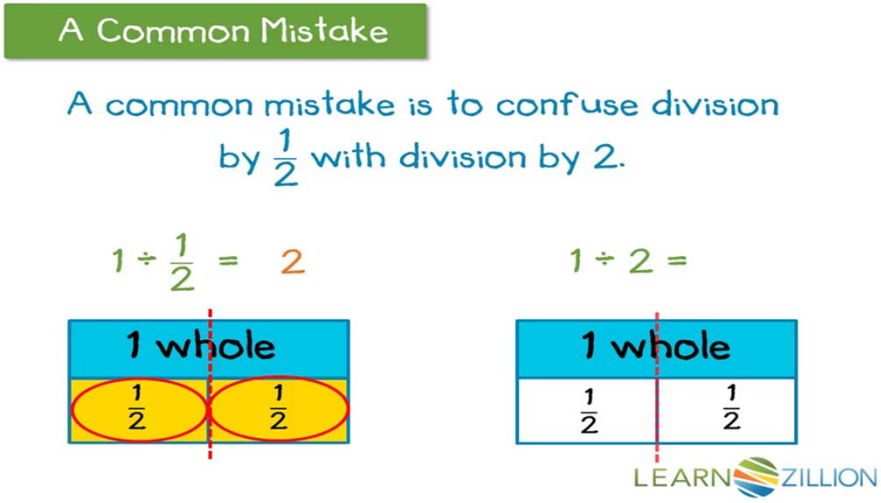
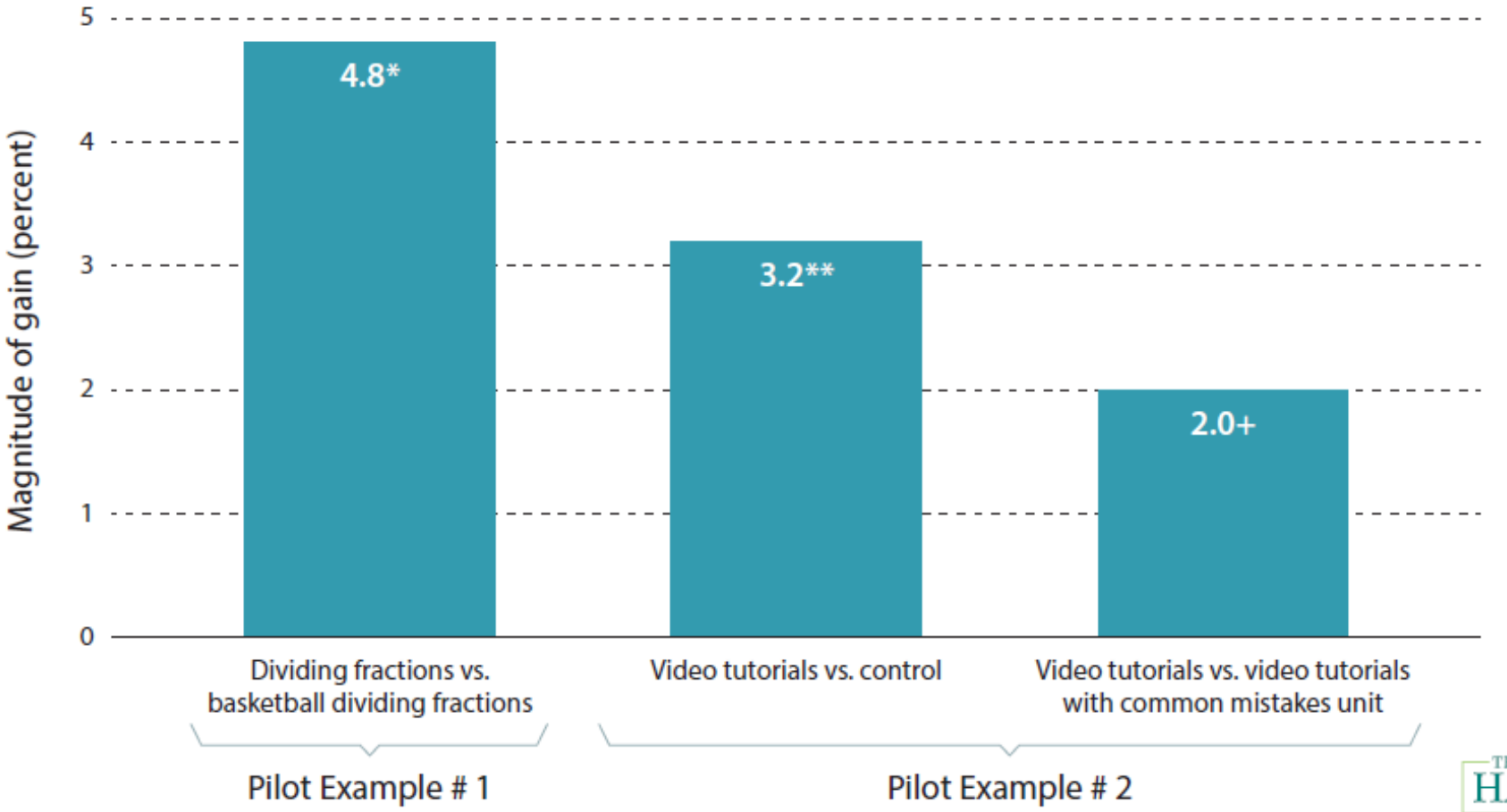


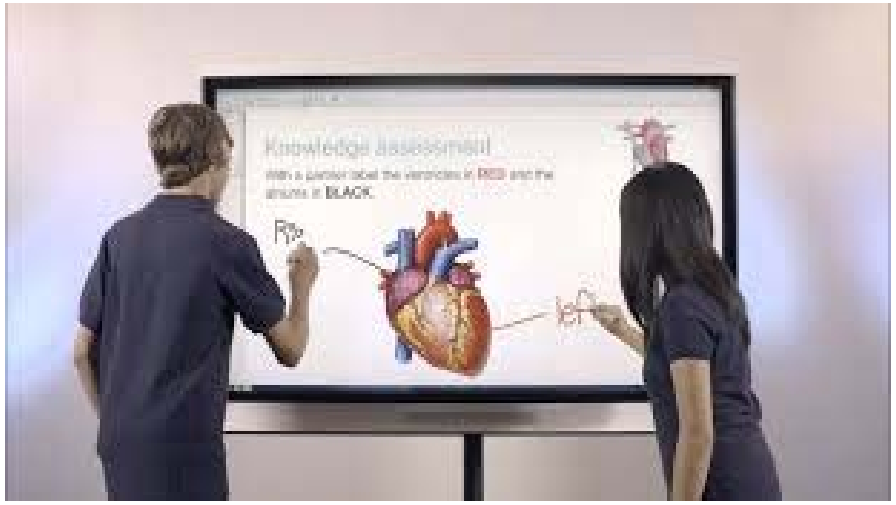
FIGURE 1.

EDUSTAR Results for Two Pilot Examples



THE HAMILTON PROJECT
BROOKINGS

Without evaluation, we do not know if shiny objects actually improve education….



Summary

- Educational technology has tremendous untapped potential to improve K-12 education **(and perhaps training programs too!)**
  - Lack of rigorous and consistent evaluation is a key challenge
  - Personalized learning needs to be better understood
  - Aggregated demand, competition on quality, R&D
- Policy Implications
  - ARPA-ED to spur innovation in education and learning sciences?
  - Tie edtech evaluation to procurement or future federal proposals ala Race to the Top
  - Prizes for workplace training apps and other market creation mechanisms