STEM Tools
Crossing the Educational Chasm

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the STEM Tools Chasm

happy kids in front of computer

Self-selected teachers and students

everybody ELSE
1 Exposure
expose everybody through low-threshold tools to engaging STEM activities
Computer Science Education

“Programming is hard and boring”
Cognitive Challenge
“hard” → accessible

1995:
AgentSheets pioneers drag and drop programming
Affective Challenge
“boring” → exciting
social dimension: share your STEM simulation

start with simple 2D games that everybody can build in a couple of hours
how motivated?

Girl Scout Survey

Please tell us your number of activity:

ACTIVITY
NCAR movies
NCAR Exhibits
Balloon Launch
I can code
Wind Activity
Field Measure

Describe something you discovered:

I discovered when I used the computer I also discovered a new job I want to be when I grow up!
Exposure 2013: as part of Hour of Code the AgentCubes “Make a 3D Frogger” game activity was used by ~250,000 participants in just one week.
2 In-Service Teacher Professional Development
STEM + C curriculum for all

1. Learn about Computational Thinking by creating increasingly complex games

2. Leverage Computational Thinking to create STEM simulations (NGSS)
Instrumentation Challenge

- **Assessing Transfer**: how can we measure that skills acquired in game design can be leveraged in STEM simulation building?
- **Scaling Up**: how can we determine shifts in teacher professional development efficacy when transitioning from face-to-face to online learning?
does it work?

SCALABLE
GAME DESIGN
Exposure study: over 10,000 students in inner city, remote rural, and Native American Communities; some middle schools expose 350 students per year; 48% underrepresented; Alaska, California, Colorado, Georgia, Ohio, South Dakota, Texas and Wyoming...
3

Pre-Service Teacher Professional Development
Incentive Challenge

An intricate mix of economic needs, funding, educational standards, certifications, available tools and many other factors result in potential incentives for schools of education to integrate Computer Science education.
2017

Every new elementary school teacher will receive mandatory training in computer science education.
how to cross the chasm

1
Exposure

2
In-Service
Teacher Professional Development

3
Pre-Service
Teacher Professional Development
Thank you!

SCALABLE GAME DESIGN