



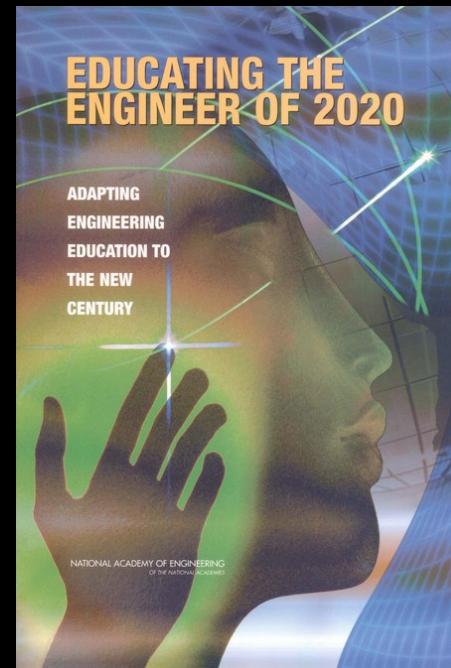
Thank you!  
[thoroughman@wustl.edu](mailto:thoroughman@wustl.edu)



Lhmoore  
@stanford.edu



Wireless: NCIIA\_OPEN  
(short URL here to submit  
goals for online entre ed)



Re-Thinking Engineering Education  
Enabled by TI Microcontrollers  
ASEE 2013 Workshops

<http://ti.com/asee2013>

With particular focus on:  
Student Engagement  
Lowest cost to university resources  
Project Based Learning  
Employable Industry Skills



- 1980: DOE formed
- 1981: Education Consolidation and Improvement Act (Reauthorization of ESEA)
- 1983: A Nation At Risk published
- 1989: Charlottesville Education Summit



- 1990: Individuals with Disabilities Education Act (IDEA)
- 1990: Teach For America founded
- 1991: First charter school
- 1994: Improving America's Schools Act (Reauthorization of ESEA)
- 1997: \$2.25B E-rate discounts
- 1997: The New Teacher Project

## REALIZATION OF AN EDUCATION CRISIS



## TIME OF CHOICE AND INNOVATION



## DIGITAL AGE

# 1980'S



(1978) Oracle Version 1



(1982) SAP R/1



(1983) Microsoft Word



(1983) Apple II



(1983) IBM 5150



(1985) Windows 1.0



(1991) Linux released



(1993) AOL for Mac & Win 3.X



(1995) Windows 3.1



(1995) Windows 95



(1994) Netscape



(1995) eBay



(1996) Yahoo!



(1996) Hotmail



(1998) Windows 98



(2001) Windows XP



(2002) Windows ME



(2003) Windows 2000

## THE AGE OF PROCESSING



(1981) The Oregon Trail for Apple II



(1983) Apple II



(1989) Math Blaster!



(1983) IBM 5150



(1991) First SMART Interactive Whiteboard



(1992) The Oregon Trail for Macintosh



(1994) Math Blaster Episode I



(1994) Virtual School



(1998) GreatSchools.org



(1999) PowerSchool release



(2000) Achieve3000



(1999) Desire2Learn



(1999) ST Math



(2005) Chegg



(2006) TeachersPayTeachers



(2006) Khan Academy



(2008) Edmodo



(2009) Edmodo

## TECH AS A PERIPHERAL TOOL

## TECH BEGINS TO SUPPLEMENT

## TECH SUPPLEMENTS INSTRUCTION

## TECH AS AN INTEGRATED TOOL



- 1990: Individuals with Disabilities Education Act (IDEA)
- 1990: Teach For America founded
- 1991: First charter school
- 1994: Improving America's Schools Act (Reauthorization of ESEA)
- 1997: \$2.25B E-rate discounts
- 1997: The New Teacher Project
- 2000: Gates Foundation founded
- 2000: ~2,000 charter schools
- 2001: No Child Left Behind (Reauthorization of ESEA)
- 2004: Reauthorization of IDEA – aligned to NCLB
- 2009: Common Core State Standards Initiative begins
- 2009: Race to the Top \$4.35B



- 2010: ~5,000 charter schools
- 2010: EduJobs Bill \$10B
- 2010: Investing in Innovation (i3) grant \$646K
- 2010: CCSS released
- 2012: Race to the Top Districts \$400M
- 2013: ConnectEd
- 2013: RTI 2 round \$120M

## FOCUS ON 21<sup>ST</sup> CENTURY SKILLS AND COLLEGE READINESS



## SMART + PORTABLE

# 2000'S



(2007) Zynga



(2010) Spotify



(2010) Pinterest



(2012) Oracle Exadata DB Machine X3



(2011) Mac OS Lion



(2012) Windows 8

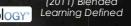


(2012) Android 4.0

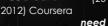


(2012) SAP ERP 6.0

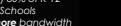
## PERSONALIZATION



(2010) Quora (public)



(2011) Intel Oak Trail SoC + Sandy Bridge



(2012) Windows Phone 7



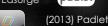
(2012) Android 4.0



(2012) SAP ERP 6.0



(2012) Coursera



(2009) Kno



(2013) Padlet



(2010) Udemy



(2011) EdSurge



(2011) InBloom (Formerly SLC)



(2012) NearPod



(2011) Udacity



(2012) Ampify



(2013) EduClipper

## need more bandwidth

(2013) 80% of K-12 Schools

Blended Learning Defined

Code Academy

more bandwidth

## TECH AS AN INTEGRATED TOOL

(2013) Tablets in Classrooms

<http://www.edelements.com/setting-the-context-a-brief-history-of-edtech/>



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## REALIZATION OF AN EDUCATION CRISIS



## DIGITAL AGE 1980'S



(1978)  
Oracle  
Version 1



(1973)  
SAP R/1



(1982) Term "internet"  
is coined



(1984) AppleWorks



(1983) Microsoft  
Word



(1985)  
Windows  
1.0



(1991) Linux  
released



(1992) Windows 3.1



(1993) AOL for  
Mac & Win 3.X



(1995) ebay



(1995) Yahoo!



(1995) Amazon



(1996) Hotmail



(1999) Salesforce.com



(1999) Google



(1999) Netflix

## THE AGE OF PROCESSING



(1981) The Oregon Trail  
for Apple II



(1983) IBM 5150



(1991) First SMART  
Interactive Whiteboard

(1992) Many computers in  
schools – lack of latest  
software

(1994) 3% of  
classrooms  
had internet access



(1997) Florida  
Virtual  
School



(1998) Greatschools.org

(1999) 64% of class-  
rooms had internet access



(1999) ST Math



(1999) PowerSchool  
release



(1999) Desire2Learn



(1983) SunGard Data  
Systems Inc.

## TECH AS A PERIPHERAL TOOL

## TIME OF CHOICE AND INNOVATION



## HARDWARE 2.0 1990'S



## WORLD WIDE WEB 1990'S



## TECH BEGINS TO SUPPLEMENT



- 2000: Gates Foundation founded
  - 2000: ~2,000 charter schools
  - 2001: No Child Left Behind (Reauthorization of ESEA)
  - 2004: Reauthorization of IDEA – aligned to NCLB
  - 2007 Common Core State Standards initiative begins
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- 2010: ~5,000 charter schools
  - 2010: Edujobs Bill \$10B
  - 2010: Investing in Innovation (i3) grant \$646K
  - 2010: CCSS released
  - 2011 NCLB Waivers
  - 2012: Race to the Top Districts \$400M
  - 2013: ConnectEd
  - 2013: RTT-D round 2 \$120M

# HOW DO WE MEASURE PROGRESS AND INCREASE ACCOUNTABILITY?



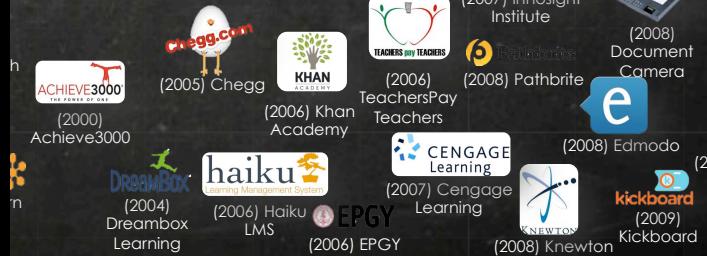
## SMART + PORTABLE



# CONNECTIVITY

rooms (2000) 80% of schools  
access using broadband

(2005) 94% of classrooms have internet access



# TECH SUPPLEMENTS INSTRUCTION

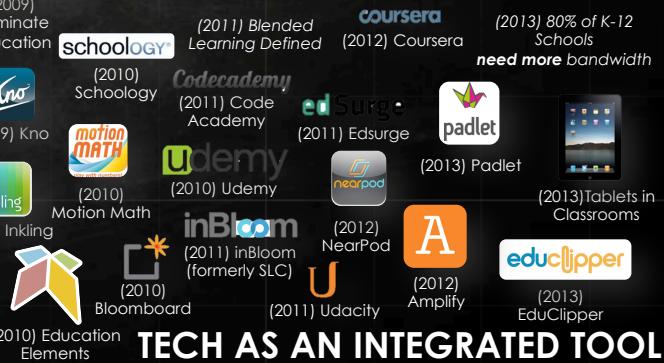
# **FOCUS ON 21<sup>ST</sup> CENTURY SKILLS AND COLLEGE READINESS**



# MULTIFUNCTIONAL DEVICES



# PERSONALIZATION



In 2s, 3s, 4s: Write and Post Best Practices in:

Offline

Entre



+



Engineering



Goals (short URL)



Online



+



+



+

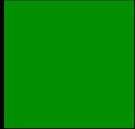


or



Needs & mashups  
(given tech of 2014)

[11 a-noon,  
here: Future  
tech]



# How the rest of the session went...

- All discussed in small groups, posted ideas on room wall around prompts from last slide
- Laurie led discussion of very best practices / ideas / needs from post-its
- Kurt showed paragraphs uploaded in response to prompt: “In a full paragraph please describe your goals for online teaching of engineering, innovation, and entrepreneurship.”
- Kurt processed compilation of submitted text into [textisbeautiful.net/create](http://textisbeautiful.net/create)
- Web app discovered themes, connections arising from submitted text; one visualization of this emergent structure shown in next slide “correlation wheel”

