

Paradigm Shift? One economist's travelogue in online education

Teaching with Technology Forum

April 12, 2012

Ben Ho

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Really?!

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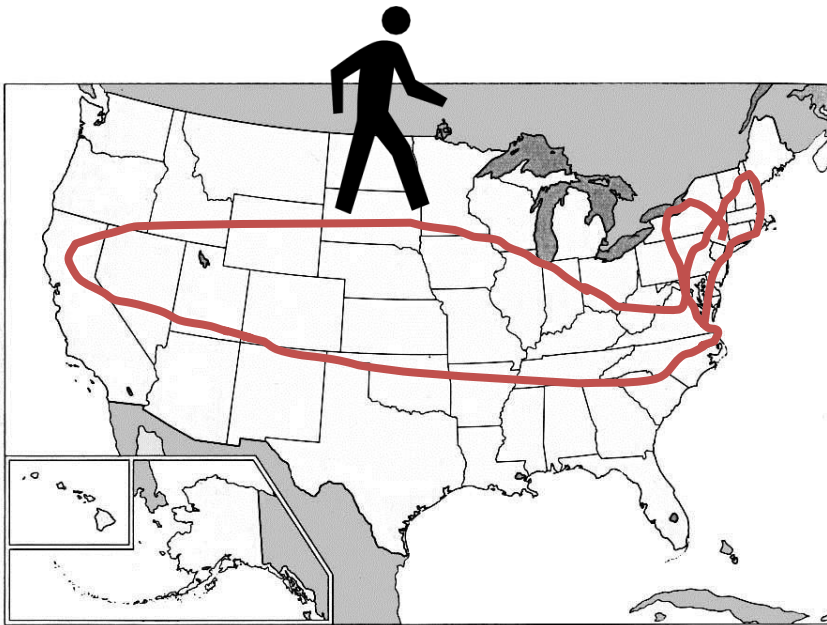
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Why Me?!



- Learned to program computers when I was 5 years old.
- Degrees from MIT in Math, Economics, Computer Science, Electrical Engineering
- Several Dot Com Startups
- Designed data visualization tools for Morgan Stanley (applied for a patent...)
- Degrees from Stanford in Economics, Political Science, Education
- Energy Economist at the White House
- Cornell – Johnson School of Management
- Vassar

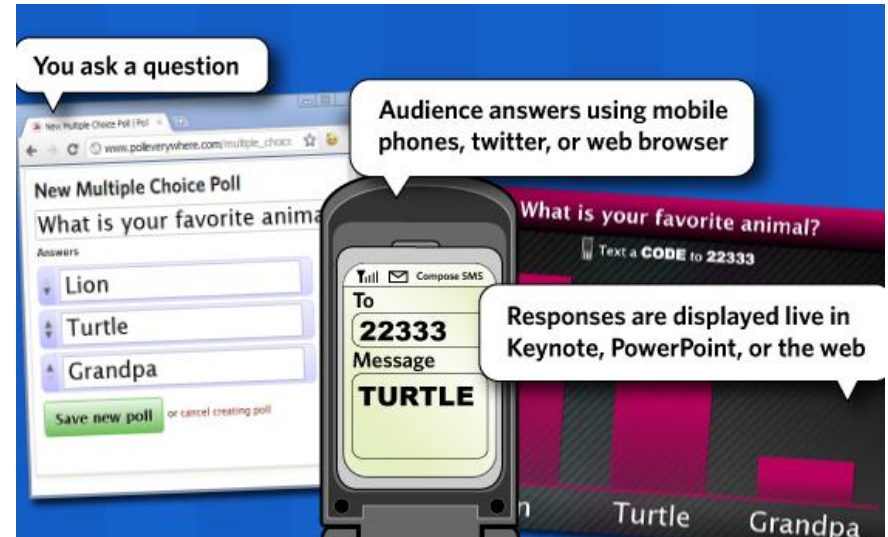
My educational technology perambulations

- Poll Everywhere
- Blogs
- Moodle Forums
- Moodle voting
- Economic experiment tools (z-tree, veconlab)
- Web textbook (Aplia)
- E-mail
- Power points / Prezi.com
- Online education :Udemy

Poll Everywhere

Turns student cell phones into a clicker!

- Generates real data for students to use on problem sets.
- Allows for interactivity.
- Knowledge Check
- Cool Factor.



But

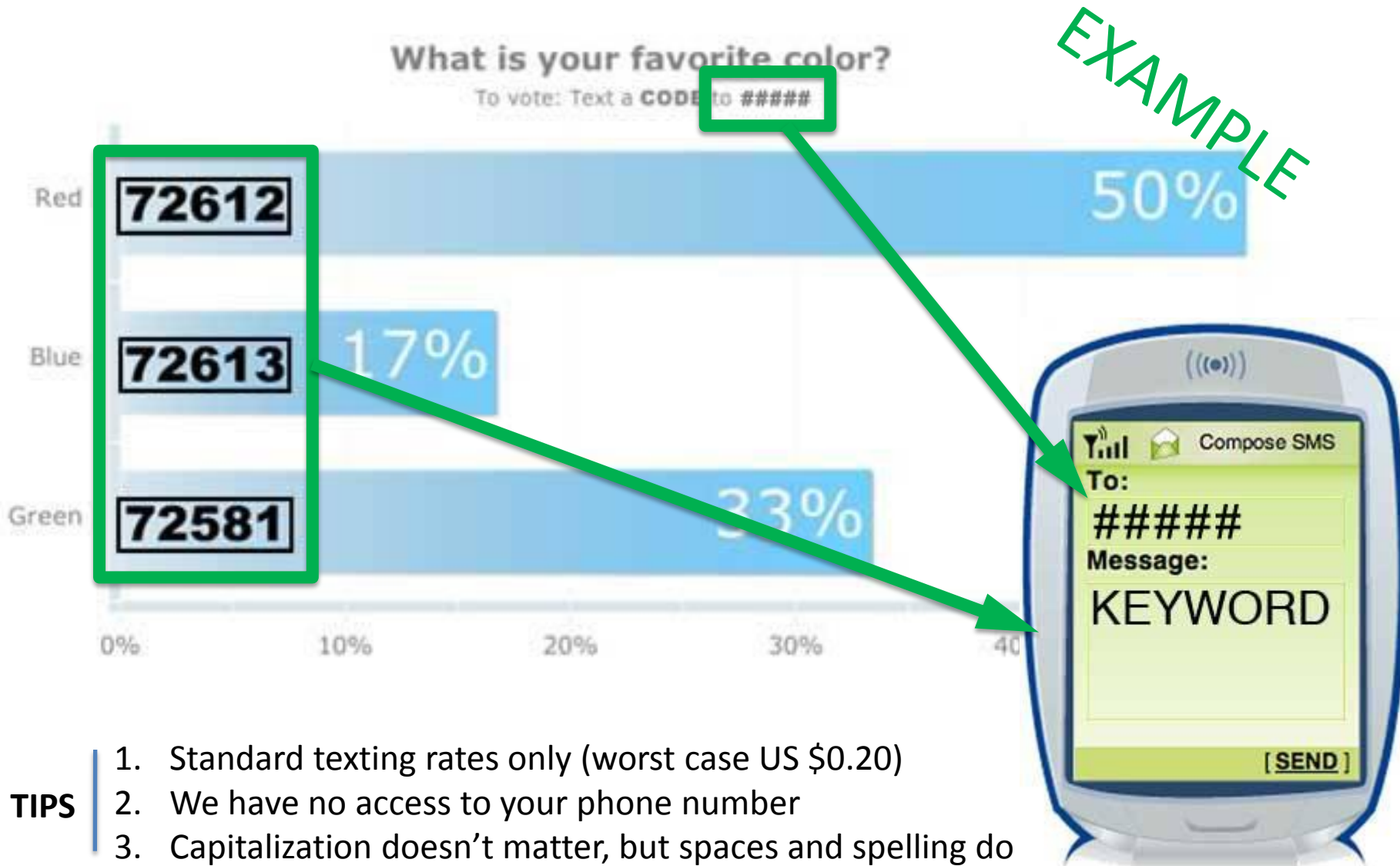
- May be distracting
- It is buggy and fiddly
- It is tricky to analyze data in real time

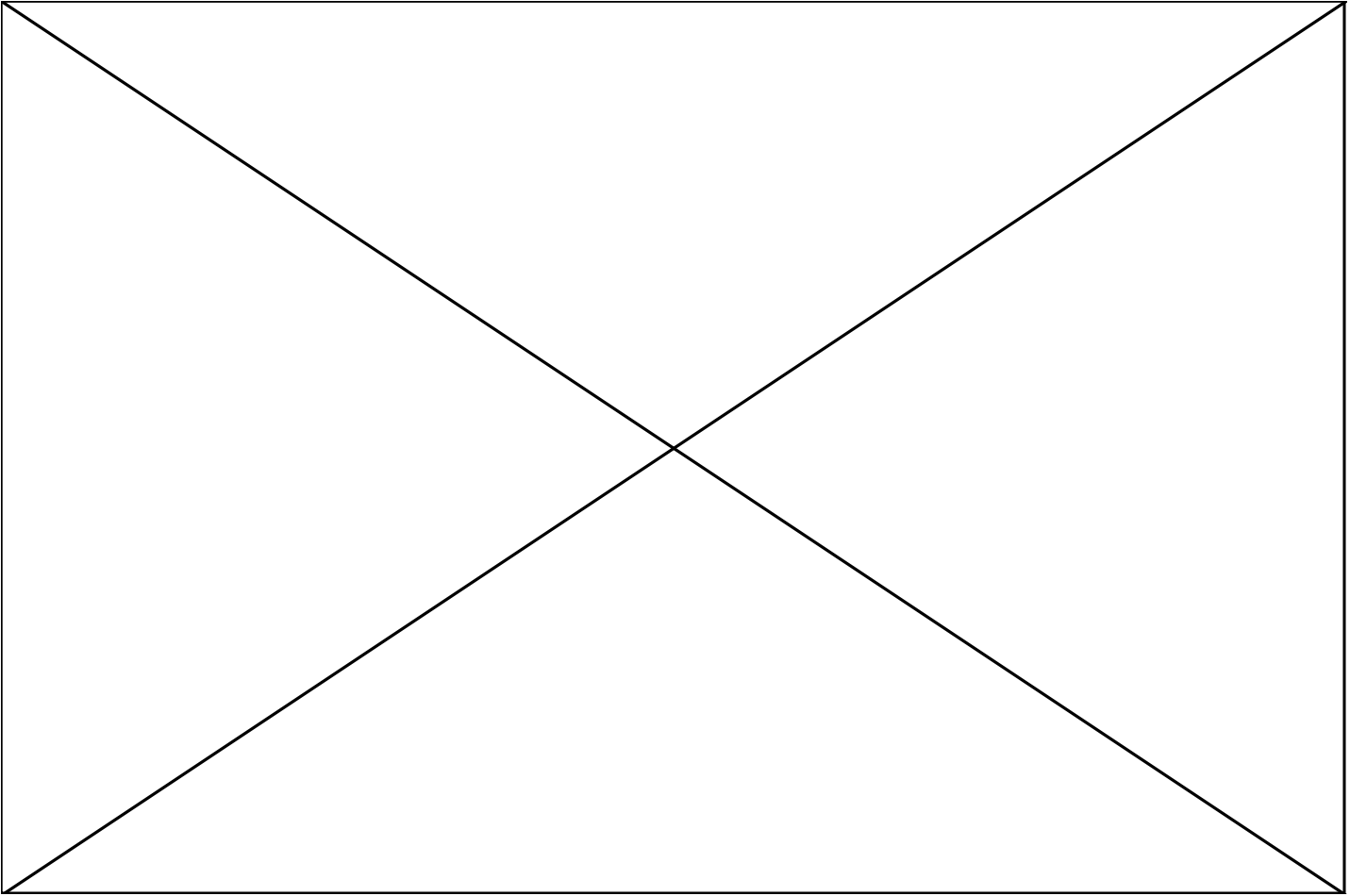
Let's Try it

- Question: Is the move toward more online courses good for education or bad for education?
- Take out your cell phones

How To Vote via Texting

(can also tweet or website)





More Poll Everywhere

- Can also text questions/comments
- Twitter feed might also be appropriate here.
- Phone Number: 37607
- Message:
199209 <your comment or question here>

An example of poll everywhere that I use for econ 333:

Question 2:

- How many countries in Africa are in the UN?

Question 1:

Write down the last two digits of your SSN (or Vassar ID), call it X

- Are there more than X or less than X countries in Africa in the UN?
- Write down More or Less

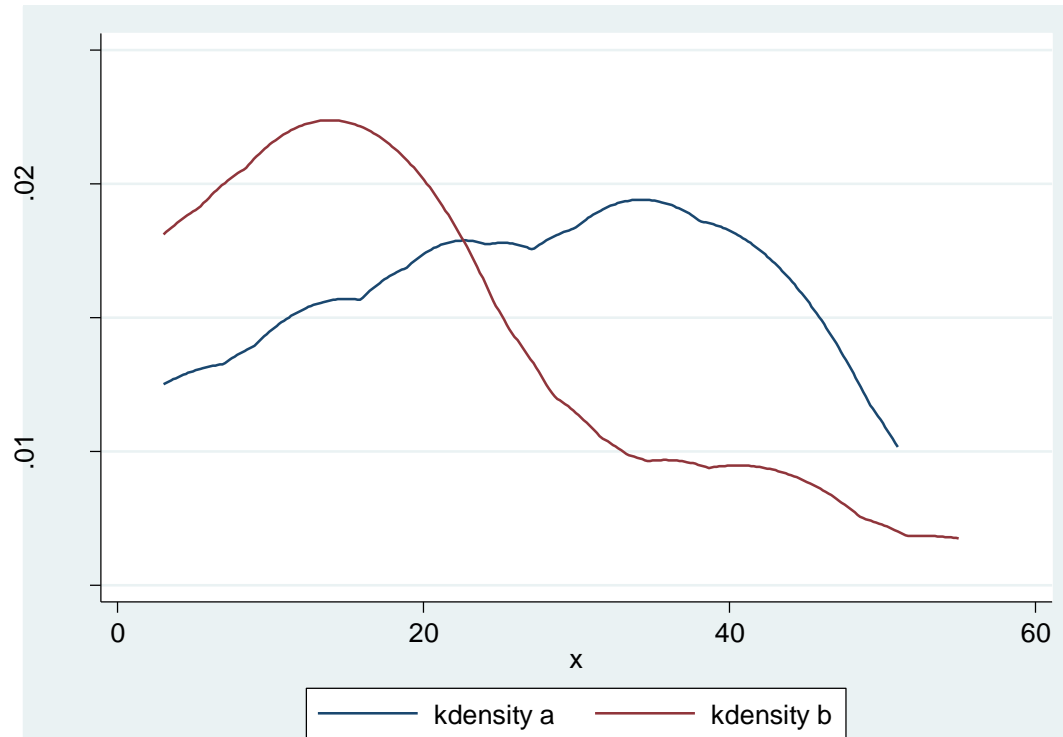
Results of Experiment

twoway kdensity a || kdensity b

Question 2: How many countries in Africa are in the UN?

Group A (those with $X < 50$)

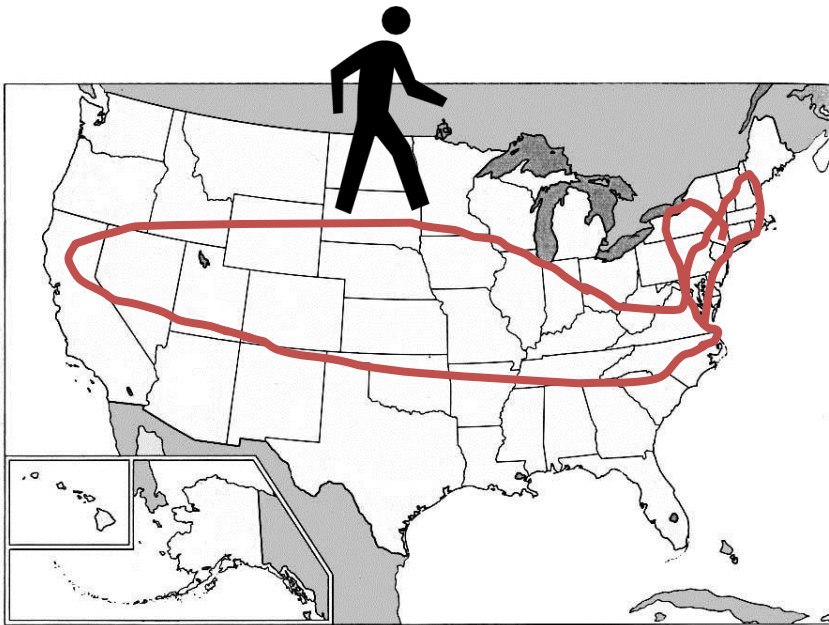
Group B (those with $X \geq 50$)



My educational technology perambulations

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- **Online education :Udemy**

History and Future of (asynchronous and free) Online Education



- University of Phoenix
 - Est 1976 (as many as 600,000 students in 2010, 5% grad.)
- MIT Open Courseware (2002)
 - “too late” for closed model
 - Now putting lectures online
- Stanford and iTunes U 2005
- (aside Johns Hopkins Med)
- Kahn Academy K-12
- Today: 30% take at least 1 course online.

Economics of Education

Why online education matters

- Baumol's Cost disease
 - A Mozart quartet required 4 musicians 4'17" to perform in 1812. It still takes 4 musicians 4'17" to perform in 2012.
 - Paradigm shifts..
- Models of Education
 - Signaling (Spence) vs. Human Capital (Mincer)
 - Years of education matters more than the piece of paper
 - Though Dale and Krueger (200?) find that attending a higher selectivity school doesn't matter, but attending a higher tuition school does help.
- Education and Competition
 - Public-private competition and Hoxby
 - Public-private competition and higher-ed



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Universities are coming to
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What is it About?

The Faculty Project brings academia's most outstanding professors to the computers, tablets and smartphones of people all over the world.

All courses will be free with open enrollment for anyone with an Internet connection.

COURSES



MODERN CHINA

Pamela Crossley - Professor of History - Dartmouth College

Earlier scholarship on China has left us with a set of assumptions and characterizations that still powerfully affect opinion columns, television commentary, and popular books. In this course, we will rely on recent research and analysis to reach a new understanding of China's recent past, its present and future.

The course adds a software channel to keep you abreast of developments and supply you with additional materials, including a lexical device and original graphis. In response to helpful comments from users, the software has been updated, and subscribers are invited to download it and replace the old application. To download the current software, visit [this link](#).

ENROLL 546 Subscribers



ECONOMICS OF ENERGY AND THE ENVIRONMENT

Ben Ho - Assistant Professor of Economics - Vassar College

Energy use and its impact on the environment will be two of the most important issues of the 21st century. The large role of energy in geo-political relationships combined with the fact that most of the greenhouse gas emissions associated with global climate change come from energy production means the energy sector is poised for dramatic change, and thus great opportunity. This course is designed to be a primer for potential entrepreneurs, investors, managers and policy makers on energy and environmental issues.

Topics will include environmental economics, energy economics, environmental ethics, oil sector, the electricity sector, alternative energy, sustainability, climate change and climate policy.

ENROLL 935 Subscribers



POETRY

Margaret Soltan - Associate Professor of English - George Washington University

[The Newest Faculty Project Course!](#)

<http://www.facultyproject.com>

Why I got involved w/ Udemy

- Lakhani and von Hippel (2003) and Ho (2000) and Open Source Software
- Also, more recently, Carbon Offsets (Bento, Ho, Ramierz, working paper)
- Money
- Career Concerns
- Reputation
- Learning/Practice
- Reciprocity
- Helping Cause
- Fun

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- Reciprocity
- Helping Cause
- Fun

Why I got involved w/ Udemy

- My main motives
 - Learn about online education (**Learning/Practice**)
 - Spread the word on the consensus on environmental economics (**Helping Cause**)
 - Spent time at the White House (in different administrations) frustrated with the scientists that politicians don't understand the science of climate change but even more frustrated that the scientists and politicians both don't understand the economics.

What is a udemy?

<http://www.udemy.com>

- Like blogger, **provides tools for instructors** to share and sell their expertise.
- Sales Pitch to Instructors:
“Builds your brand, Access Students, Sells your Course (or give it away), Leave a Legacy”
- Sales to Pitch to Students:
 - Access to a world of experts
 - Can watch anywhere: Iphone, ipad, online
- Faculty Project
 - Recruited from Poets and Quants list
 - Expanding from their tech niche
 - Courses are free
 - Would be promoted
 - Would be supported by Udemy

98 people are now taking Economics of Energy and the Environment course [Show All]
2 new comments on lecture: Economics of Energy and the Environment: Introductions [Show All]
Clear Notifications

Create a New Lecture Schedule a Live Session More Public / Published / Free



Economics of Energy and the Environment

By Ben Ho

★★★★★ (2 Reviews)

Tweet

Like

Send

Share with your friends

Change image

About the Course:

Energy use and its impact on the environment will be two of the most important issues of the 21st century. The large role of energy in geo-political relationships combined with the fact that most of the greenhouse gas emissions associated with global climate change come from energy production means the energy sector is poised for dramatic change, and thus great opportunity. This course is designed to be a primer for potential entrepreneurs, investors, managers and policy makers on energy and environmental issues.

Topics will include environmental economics, energy economics, environmental ethics, oil sector, the electricity sector, alternative energy, sustainability, climate change and climate policy.

(more)

935 users are taking this course

Lectures (20)

Discussions (6)

Live Sessions (0)

Chapter 1 - Lecture 1

Economics of Energy and the Environment: Introductions Edit Delete

What is covered?



HD is off

share

1: Introduction
2 lectures

Lecture 1: Economics of Energy...
09:02

Lecture 2: Lecture1 Economics O...
13 slides

2: Thinking Like an Economist: Cost-Benefit Analysis feedback

Timeline for creating a lecture

- **Powerpoint/PDF/prezi** file (public domain pic)
- **Explain Everything** – iPad App
- **Audacity** for Audio and video editing (i.e npr)
- Generate mp4 Videos for upload
- Upload supplemental information (lecture notes, online resources, slides)
- Gamification and Peer incentives for exams that consolidate knowledge (Ho, Taber, Poe, Bento, 2012)

AN iPad APP TO

EXPLAIN ANYTHING AND EVERYTHING.

Navigating The Grand Canyon

Follow the boat along the river

Limestone

Colorado River

Photos by Jeff Marke and AGirlNextDoor

Slide 1 of 1

00:01:14

The screenshot shows an iPad interface for an educational app. The main content is a 3D-rendered canyon landscape. A bright blue line traces a path through the canyon, ending in a small brown boat. Two white arrows point to specific geological features: 'Limestone' and 'Colorado River'. The app's interface includes a vertical toolbar on the left with various icons for navigation and editing, and a bottom control bar with a slide indicator, a timer, and social media icons.

CREATE, ANNOTATE, ANIMATE, AND NARRATE MULTI-SLIDE VIDEO PRODUCTIONS.

NEXT

Karl Koscher, Alexei Czeskis, Franziska Roesner, Shwetak Patel, and Tadayoshi Kohno
*Department of Computer Science and Engineering
University of Washington
Seattle, Washington 98195-2350
Email: [supersat,aczeskis,franzi,shwetak,yoshi]@cs.washington.edu*

Stephen Checkoway, Damon McCoy, Brian Kantor, Danny Anderson, Hovav Shacham, and Stefan Savage
*Department of Computer Science and Engineering
University of California San Diego
La Jolla, California 92093-0404
Email: [scheckow, damon, brian, danders, hovav, savage]@cs.ucsd.edu*

Modern automobiles are no longer mere mechanical devices; they are pervasively monitored and controlled by a network of digital computers coordinated via internal vehicle communication buses. While this transformation has driven major advances in efficiency and safety, it has also introduced a range of potential risks. In this paper we experimentally evaluate these risks on a modern automobile and demonstrate the vulnerability of the underlying system structure. We demonstrate how an attacker who is able to infiltrate virtually any Electronic Control Unit (ECU) can leverage this ability to completely compromise a broad array of safety-critical systems. Over a series of experiments, both in the lab and in road tests, we demonstrate the ability to adversarially control a wide range of automotive functions and completely ignore driver input—disabling the brakes, selectively braking individual wheels on demand, stopping the engine, and so on. We find it is possible to bypass rudimentary network security mechanisms within the car, such as maliciously bridging between the car's two internal networks. We also present composite attacks that exploit these weaknesses, including a

independent computers—*Electronic Control Units (ECUs)* in automotive vernacular—in turn communicating over one or more shared *internal network buses* [8], [13].

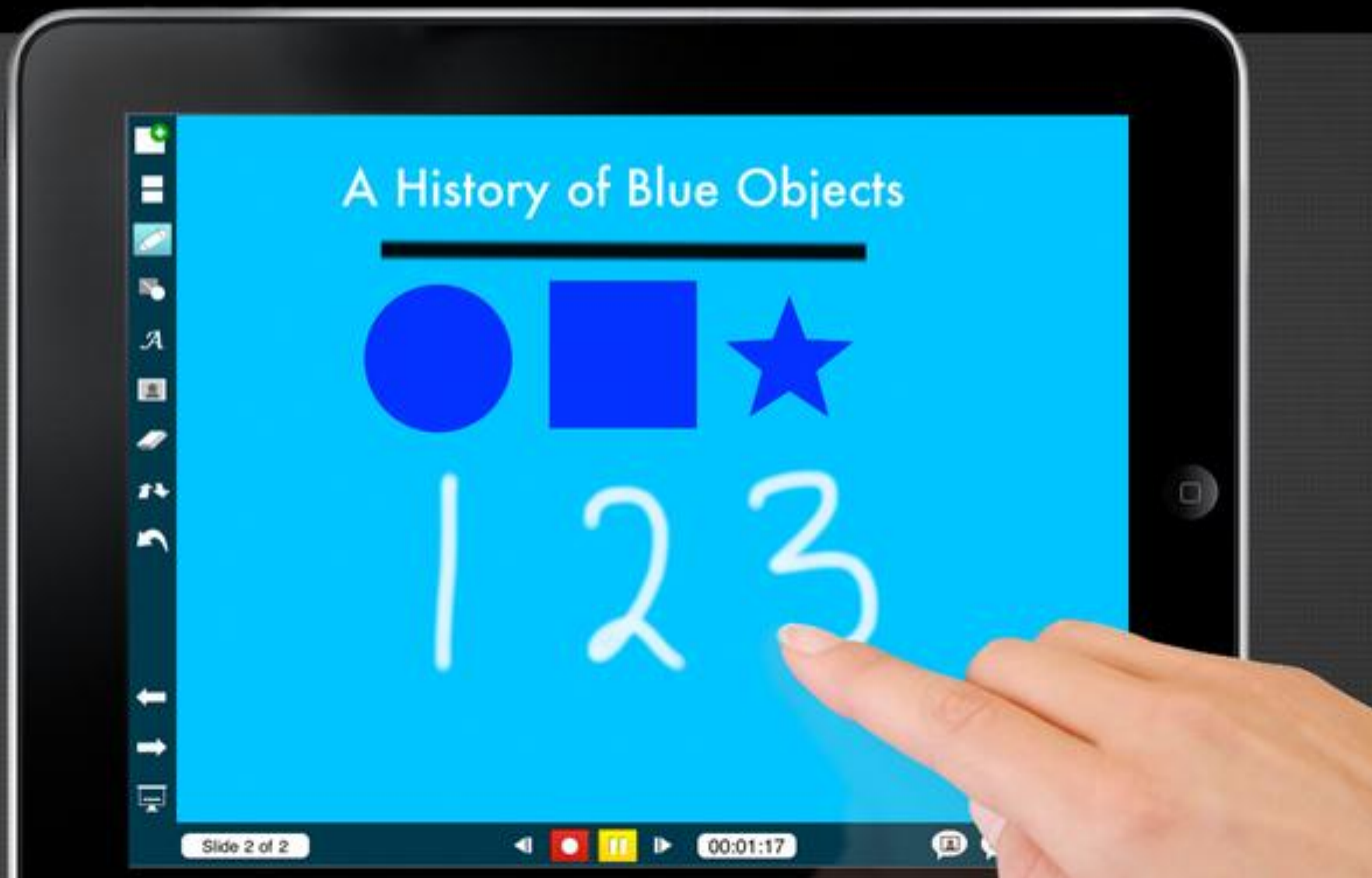
While the automotive industry has always considered safety a critical engineering concern, much of this new technology introduced specifically to *increase* safety, e.g., *Anti-lock Brake Systems*) it is not clear whether vehicle manufacturers have anticipated in their designs the possibility of an adversary. Indeed, it seems likely that this increasing degree of computerized control also brings with it a corresponding array of potential threats.

Compounding this issue, the attack surface for modern automobiles is growing swiftly as more sophisticated services and communications features are incorporated into vehicles. In the United States, the federally-mandated *On-Board Diagnostics (OBD-II)* port, under the dash in virtually all vehicles, provides

Slide 2 of 2

ADD DRAWINGS, SHAPES, TEXT, AND IMAGES AND
MANIPULATE THEM ON THE SCREEN.

PREV



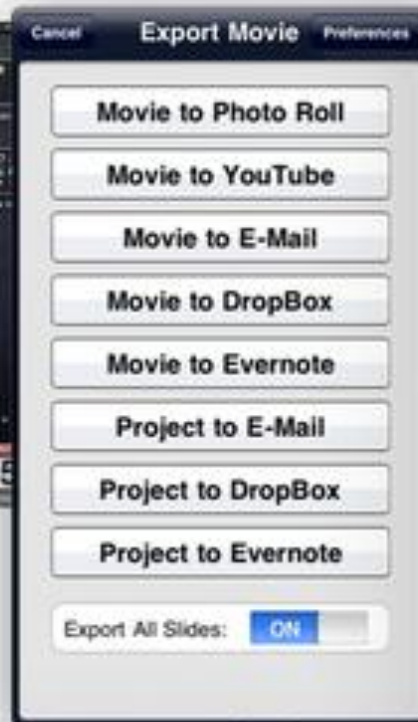
EASILY SHARE RECORDED MOVIE FILES WITH OTHERS.



NEX

My iPad Apps

July 29, 2011



Slide 2 of 2

00:00:00



IMPORT IMAGES, PDF, PPT, AND KEYNOTE FILES FROM
YOUR iPad, DROPBOX, & EVERNOTE.



DEMO TIME

- [Udemy – Course Site](#)
- [Prezi](#)
- [Ted Talk on Kahn Academy](#)
- [Faculty Project](#)
 - Intro to Climate Change
 - Poetry
 - Modern China
- [Explain Everything](#)
- [Poll Anywhere](#)

Differences Between Online Vs In Person

- No feedback
 - Responsiveness via Discussion Threads
- Shorter More Bite Sized Lectures - memetic
- More Visual Medium
- Different Backgrounds
 - Math and models?
- Different Motivations
 - Mostly curious citizens, also teachers, students.

Marketing Online Lectures

- Marketing? What's that?!
 - I have over 1200 students
- Topics? Tech is best.
- Channels:
 - Press Releases. (public relations department?)
 - News Stories. (US News, Insider higher Ed)
 - Blogs? (env-econ.net)
 - Facebook? Social Media?

Virality

- Made to Stick (Heath and Heath)
- Coordinated Divergence (Berger, Heath and Ho, 2006)
- Identity Signaling with Social Capital (Berger, Ho, Joshi, working paper)
- Warning: Salganic, Dodds, Watts and arbitrary-ness of trends (Science 2006)



- Simple
- Unexpected
- Concrete
- Credible
- Emotional
- Story

Beware Acronym Models

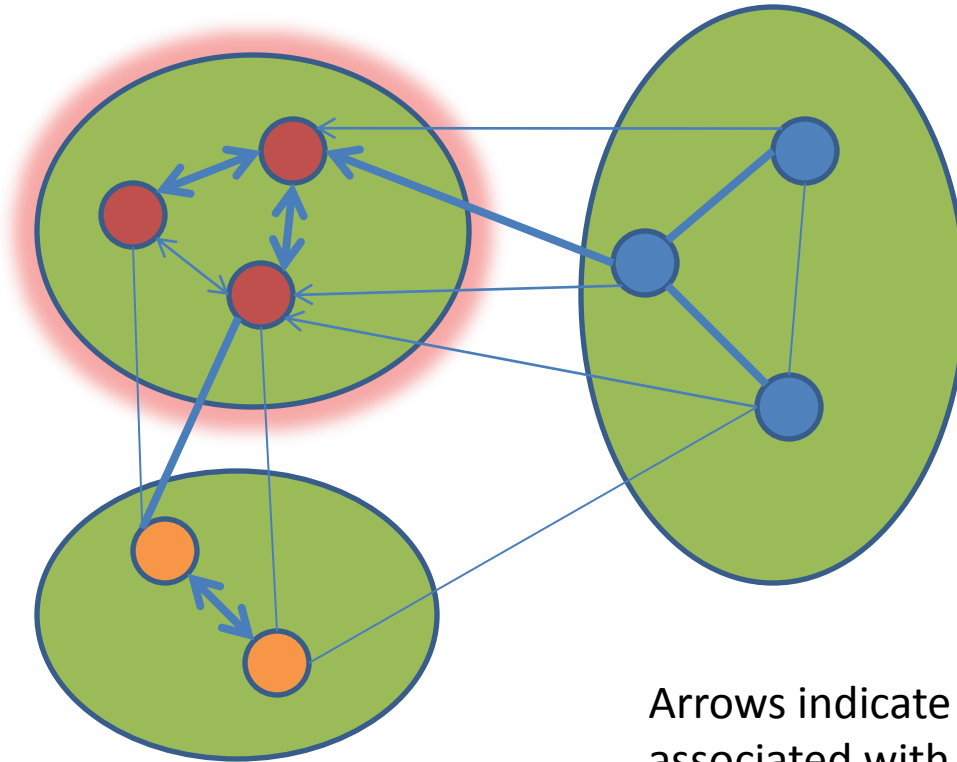
(courtesy of Dan Ariely)

- Beautiful
- Engaging
- Novel
- Humble
- Organized

- 
- Beautiful
 - Engaging
 - Novel
 - Humble
 - Organized

Ho et al (working paper): How do trends spread in the model?

A group of insiders adopt a **new trend**.

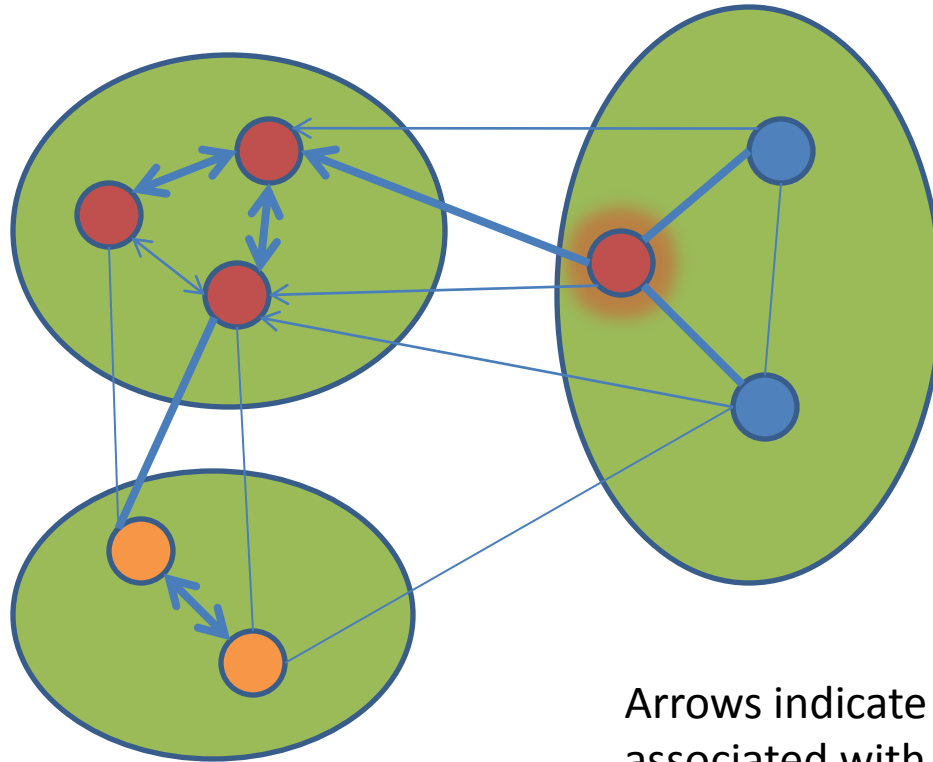


Arrows indicate whether that type likes being associated with the other type.

The weight indicates frequency of interaction.

Ho et al (working paper): How do trends spread in the model?

In the first round, one imitator now **knows** about the trend and adopts it.

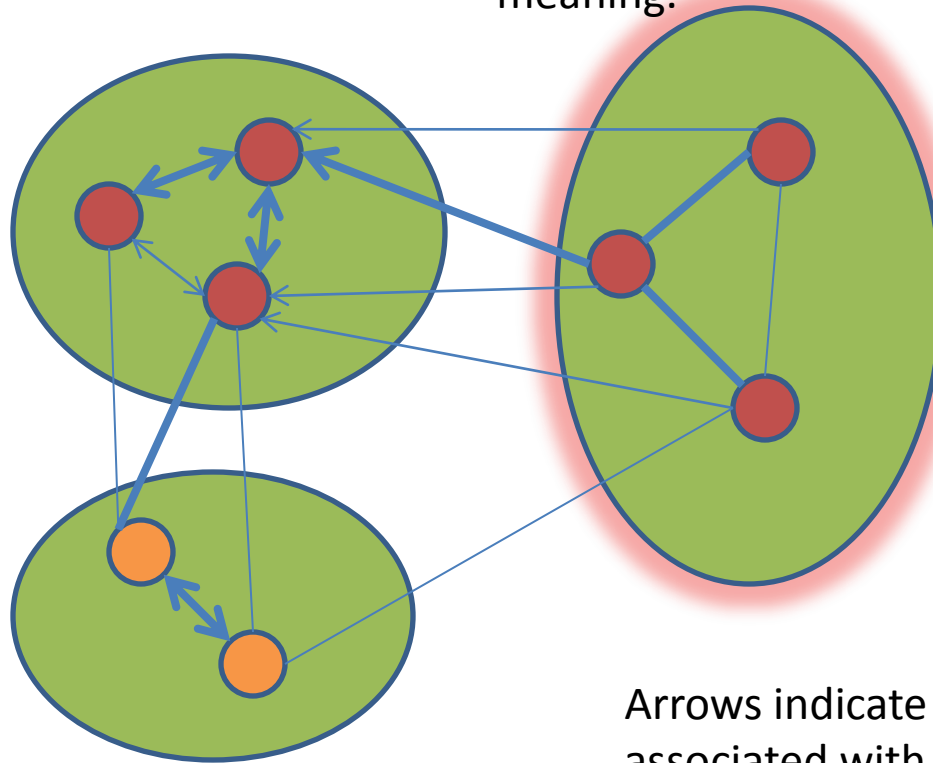


Arrows indicate whether that type likes being associated with the other type.

The weight indicates frequency of interaction.

Ho et al (working paper): How do trends spread in the model?

Other imitators adopt the trend, diluting the meaning.

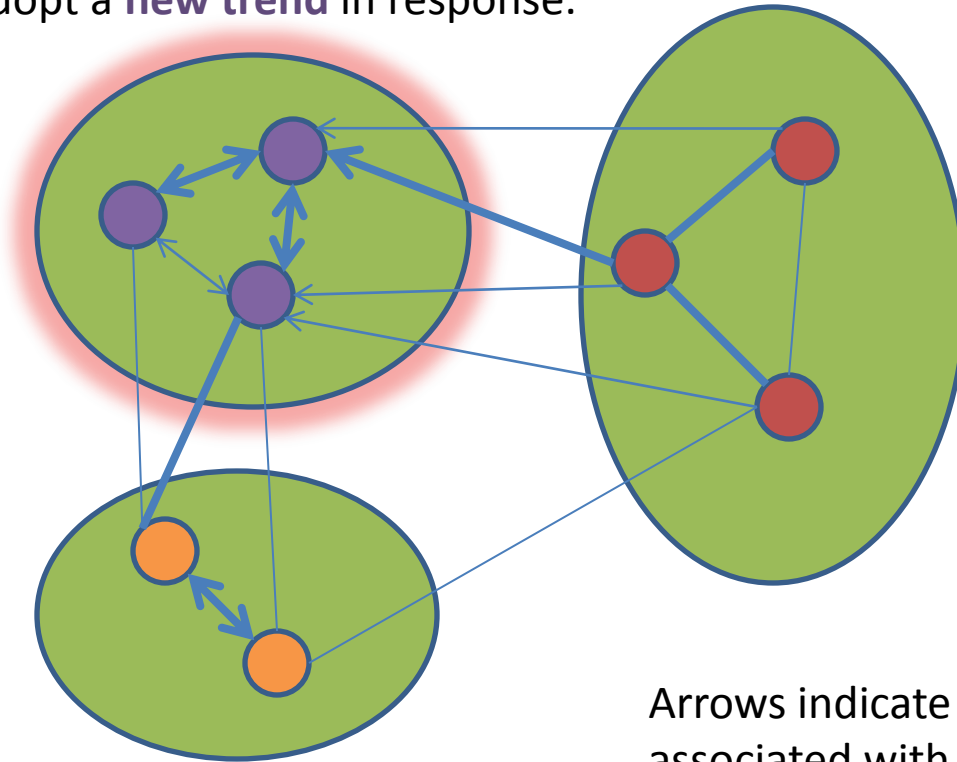


Arrows indicate whether that type likes being associated with the other type.

The weight indicates frequency of interaction.

Ho et al (working paper): How do trends spread in the model?

The insiders adopt a **new trend** in response.



Arrows indicate whether that type likes being associated with the other type.

The weight indicates frequency of interaction.

Ho et al (working paper): How do trends spread in the model?

- Lessons for Viral Marketing
 - Target Influencers, and High Status
 - Target those connected to influencers
 - Target those pre-disposed to like the trend
 - Build coherence/momentum in isolated cohesive sub-cultures

Udemy and You

- Supplement for interested students in my classes
- Honing Teaching Skills / Honing Class Design
- Broadening the Vassar brand
- Another channel for broader impacts
- Useful as a User to learn something new
- Complement not substitute to a Vassar education
 - Dale and Krueger (200?) find that attending a higher selectivity school doesn't matter, but attending a higher tuition school does.

Practical Difficulties

- Better tablets – iPad designed for fingers not pens. Thinkpad better but clunky.
- Udemy discussion board technology clunky
- Uploading files clunky
- Explain Everything clunky
- External Microphone clunky

Pure speculation on “the future”

- Huge implications for broadening access to knowledge.
 - Issac Newton was not that smart.
 - Half the world has cell phones.
- Implications for schools like Vassar?

Thanks!