UC Berkeley EECS
Sr Lecturer SOE
Dan Garcia

# The Beauty and Joy of Computing

## Lecture #12
## Social Implications of Computing I

### BERKELEY CENTRAL PART OF EDX!

Online education now has a player in the open access / free education space, it's called edX, and UC Berkeley was the first west coast school to become involved with the initiative. Several UC Berkeley classes are now available!

Your project partners may be in different sections, try to attend "Project Work" labs together

Read project tips!

www.edx.org/university_profile/BerkeleyX

# Overview

- META: This course is NOT just about programming!
  - Lecs + Reading: Big ideas
  - Labs: Programming
  - Disc: Distillation
- META: plug CS195 Social Implications of Computers
- Computers in Education
  - Most important use?
  - Judah Schwartz' continuum
  - RSA Animate "Changing Education Paradigms"
  - UC Online Pilot

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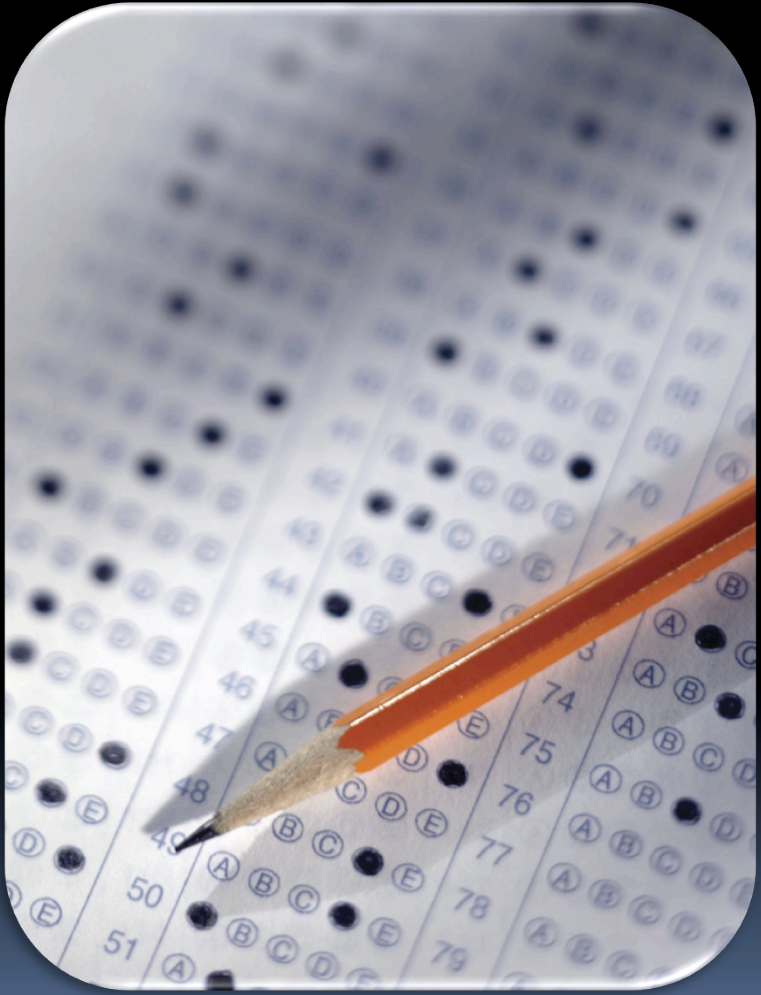
# Peer Instruction (thanks to BH)

The most important use of computers in education so far…

a) Web search
b) Arithmetic drill programs
c) Word processing
d) iclicker-like technologies
e) Social networking

# Answer

- *"Multiple choice tests have changed what counts as knowledge in schools.  Open-ended questions were the norm 30 years ago.  The kind of knowledge you can report on multiple-choice tests is unimportant in the big scheme of things, and what's really important is not what you already know, but how you can take what you already know and apply it something you've never seen before. Multiple choice tests make that hard. Teaching follows tests! The folks who invented Standardized Testing didn't foresee how it would affect what knowledge means! (unintended consequence)"*
  – Brian Harvey



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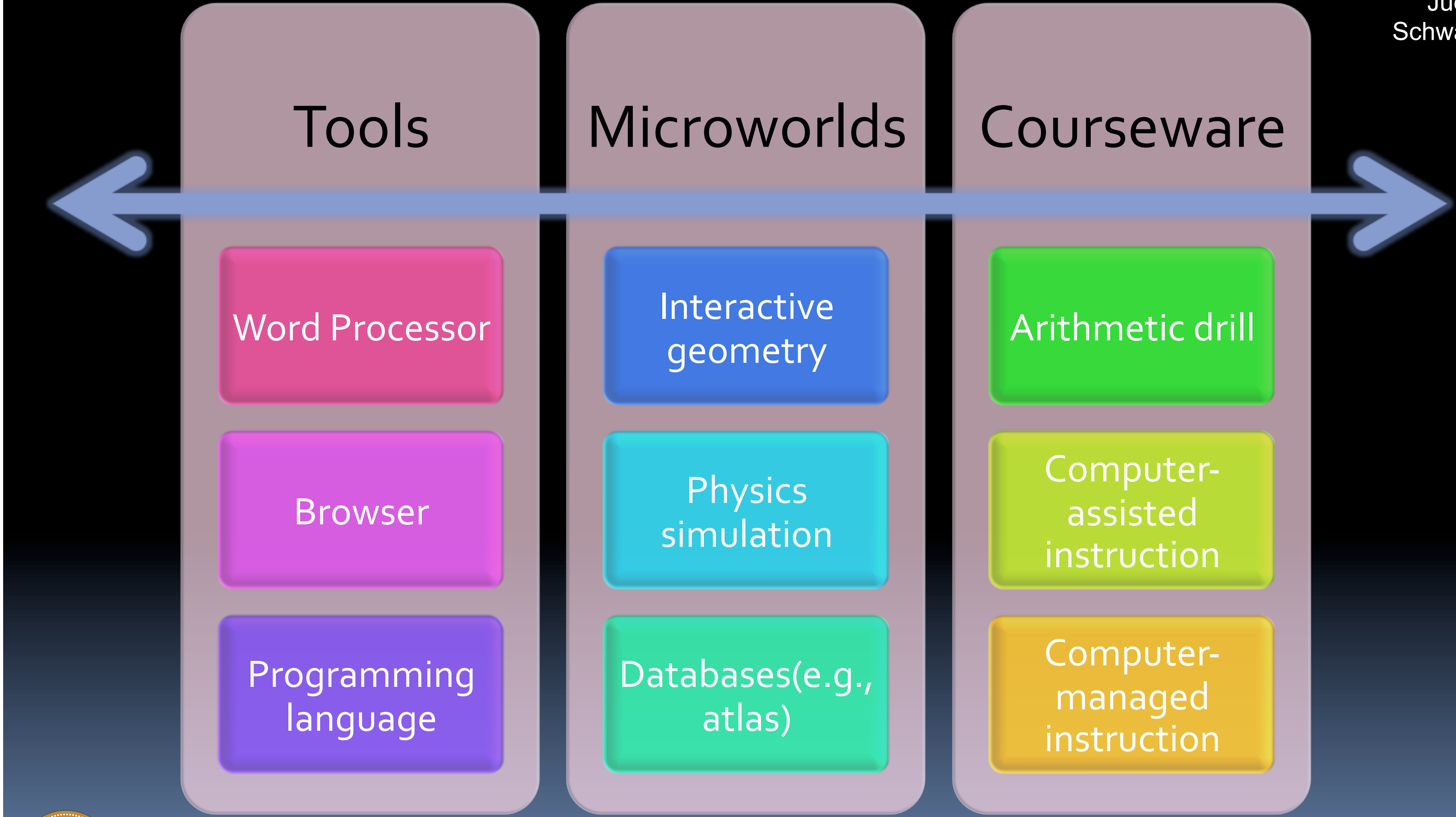
# Computers in Education (open?)

Judah Schwartz

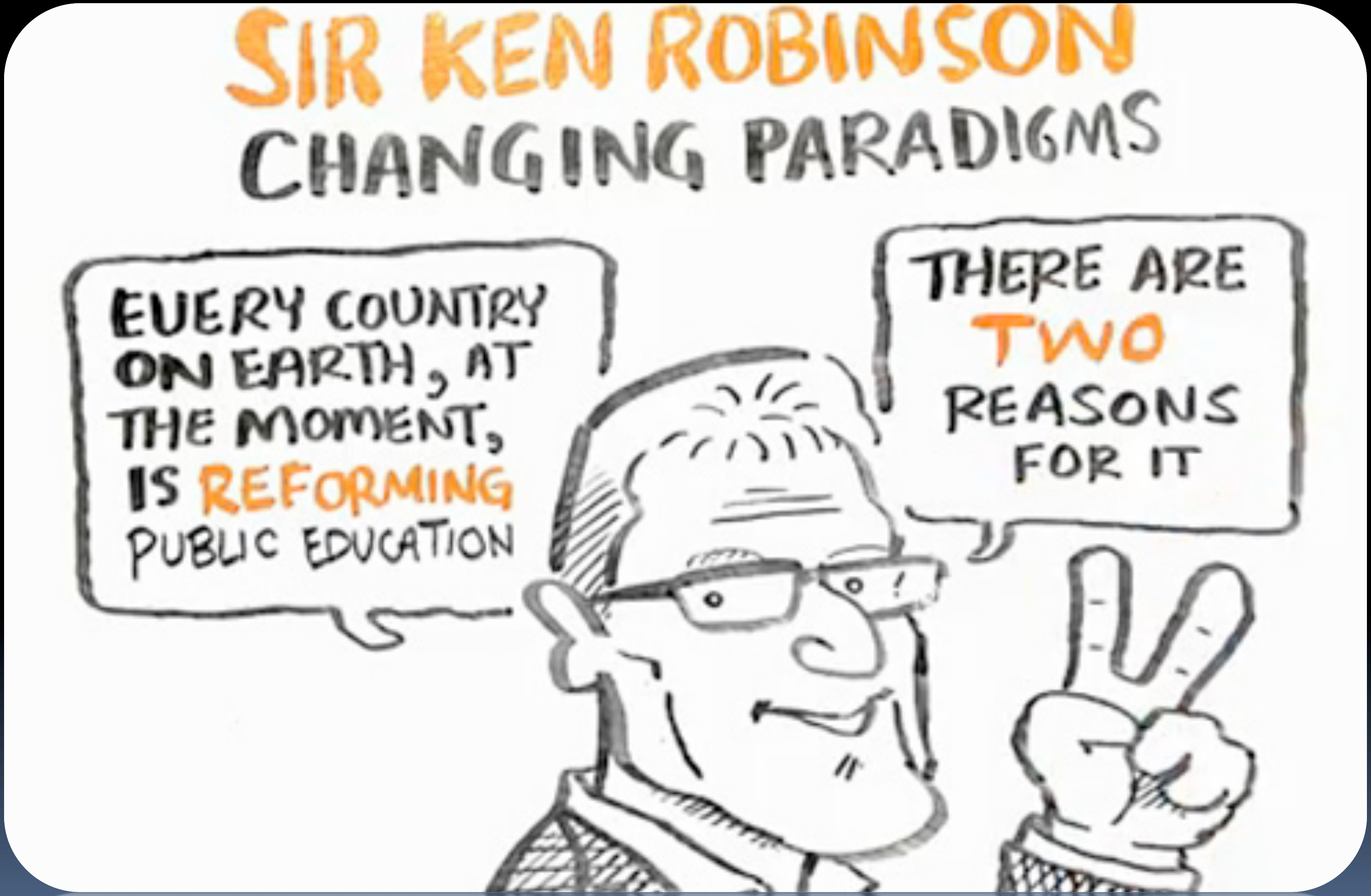


| Tools | Microworlds | Courseware |
|---|---|---|
| Word Processor | Interactive geometry | Arithmetic drill |
| Browser | Physics simulation | Computer-assisted instruction |
| Programming language | Databases(e.g., atlas) | Computer-managed instruction |

Myphysicslab demo
ASSIST movie

# RSA Animate : Changing Education Paradigms

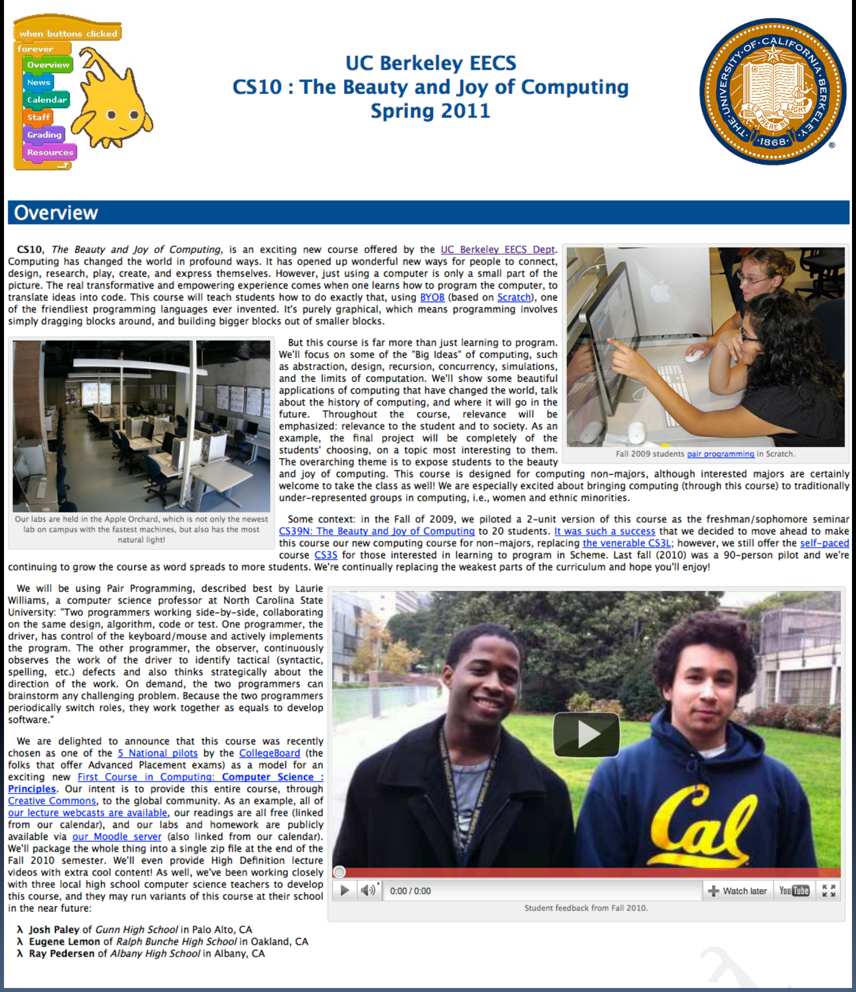
www.youtube.com/watch?v=zDZFcDGpL4U


SIR KEN ROBINSON
CHANGING PARADIGMS
EVERY COUNTRY ON EARTH, AT THE MOMENT, IS REFORMING PUBLIC EDUCATION
THERE ARE TWO REASONS FOR IT

groups.ischool.berkeley.edu/onlineeducation/

# UC Berkeley Online Pilot

- Basics of Pilot
  - Blended vs Online
- What should we do?
  - How can CS10 be the course for everyone?
  - How can we use peers?
  - What'd help you most?
- Would you take this course if it'd been offered at another UC?
  - Does f2f matter?



UC Berkeley EECS
CS10 : The Beauty and Joy of Computing
Spring 2011

## Overview

**CS10**, *The Beauty and Joy of Computing*, is an exciting new course offered by the UC Berkeley EECS Dept. Computing has changed the world in profound ways. It has opened up wonderful new ways for people to connect, design, research, play, create, and express themselves. However, just using a computer is only a small part of the picture. The real transformative and empowering experience comes when one learns how to program the computer, to translate ideas into code. This course will teach students how to do exactly that, using BYOB (based on Scratch), one of the friendliest programming languages ever invented. It's purely graphical, which means programming involves simply dragging blocks around, and building bigger blocks out of smaller blocks.

Fall 2009 students pair programming in Scratch.

Our labs are held in the Apple Orchard, which is not only the newest lab on campus with the fastest machines, but also has the most natural light!

But this course is far more than just learning to program. We'll focus on some of the "Big Ideas" of computing, such as abstraction, design, recursion, concurrency, simulations, and the limits of computation. We'll show some beautiful applications of computing that have changed the world, talk about the history of computing, and where it will go in the future. Throughout the course, relevance will be emphasized: relevance to the student and to society. As an example, the final project will be completely of the students' choosing, on a topic most interesting to them. The overarching theme is to expose students to the beauty and joy of computing. This course is designed for computing non-majors, although interested majors are certainly welcome to take the class as well! We are especially excited about bringing computing (through this course) to traditionally under-represented groups in computing, i.e., women and ethnic minorities.

Some context: in the Fall of 2009, we piloted a 2-unit version of this course as the freshman/sophomore seminar CS39N: The Beauty and Joy of Computing to 20 students. It was such a success that we decided to move ahead to make this course our new computing course for non-majors, replacing the venerable CS3L; however, we still offer the self-paced course CS3S for those interested in learning to program in Scheme. Last fall (2010) was a 90-person pilot and we're continuing to grow the course as word spreads to more students. We're continually replacing the weakest parts of the curriculum and hope you'll enjoy!

We will be using Pair Programming, described best by Laurie Williams, a computer science professor at North Carolina State University: "Two programmers working side-by-side, collaborating on the same design, algorithm, code or test. One programmer, the driver, has control of the keyboard/mouse and actively implements the program. The other programmer, the observer, continuously observes the work of the driver to identify tactical (syntactic, spelling, etc.) defects and also thinks strategically about the direction of the work. On demand, the two programmers can brainstorm any challenging problem. Because the two programmers periodically switch roles, they work together as equals to develop software."

Student feedback from Fall 2010.

We are delighted to announce that this course was recently chosen as one of the 5 National pilots by the CollegeBoard (the folks that offer Advanced Placement exams) as a model for an exciting new First Course in Computing: **Computer Science : Principles**. Our intent is to provide this entire course, through Creative Commons, to the global community. As an example, all of our lecture webcasts are available, our readings are all free (linked from our calendar), and our labs and homework are publicly available via our Moodle server (also linked from our calendar). We'll package the whole thing into a single zip file at the end of the Fall 2010 semester. We'll even provide High Definition lecture videos with extra cool content! As well, we've been working closely with three local high school computer science teachers to develop this course, and they may run variants of this course at their school in the near future:

λ **Josh Paley** of *Gunn High School* in Palo Alto, CA
λ **Eugene Lemon** of *Ralph Bunche High School* in Oakland, CA
λ **Ray Pedersen** of *Albany High School* in Albany, CA

# Taking CS10 Online (via UCOP, edX)

**The most effective thing for your learning, if you were taking CS10 online (remotely)…**

a) "Test yourself" mini-quizzes
b) More illustrations to learn hard concepts
c) Tree-structure interface to lectures
d) "In the browser" Snap! coding for labs so you don't have to leave the browser
e) A "smart" system that adjusts the difficulty of a problem to match your ability

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