David Evans
http://www.cs.virginia.edu/evans
Department of Computer Science
University of Virginia
Tech-Connect 1 May 2013

Best classes…

Ron Rivest's algorithms class

Greg Papadopoulous' architecture class

Ned Block's philosophy class

Morris Halle's phonology class

Barbara Liskov's software engineering class

Gerry Sussman's computer science class

Walter Lewin's Physics class

…

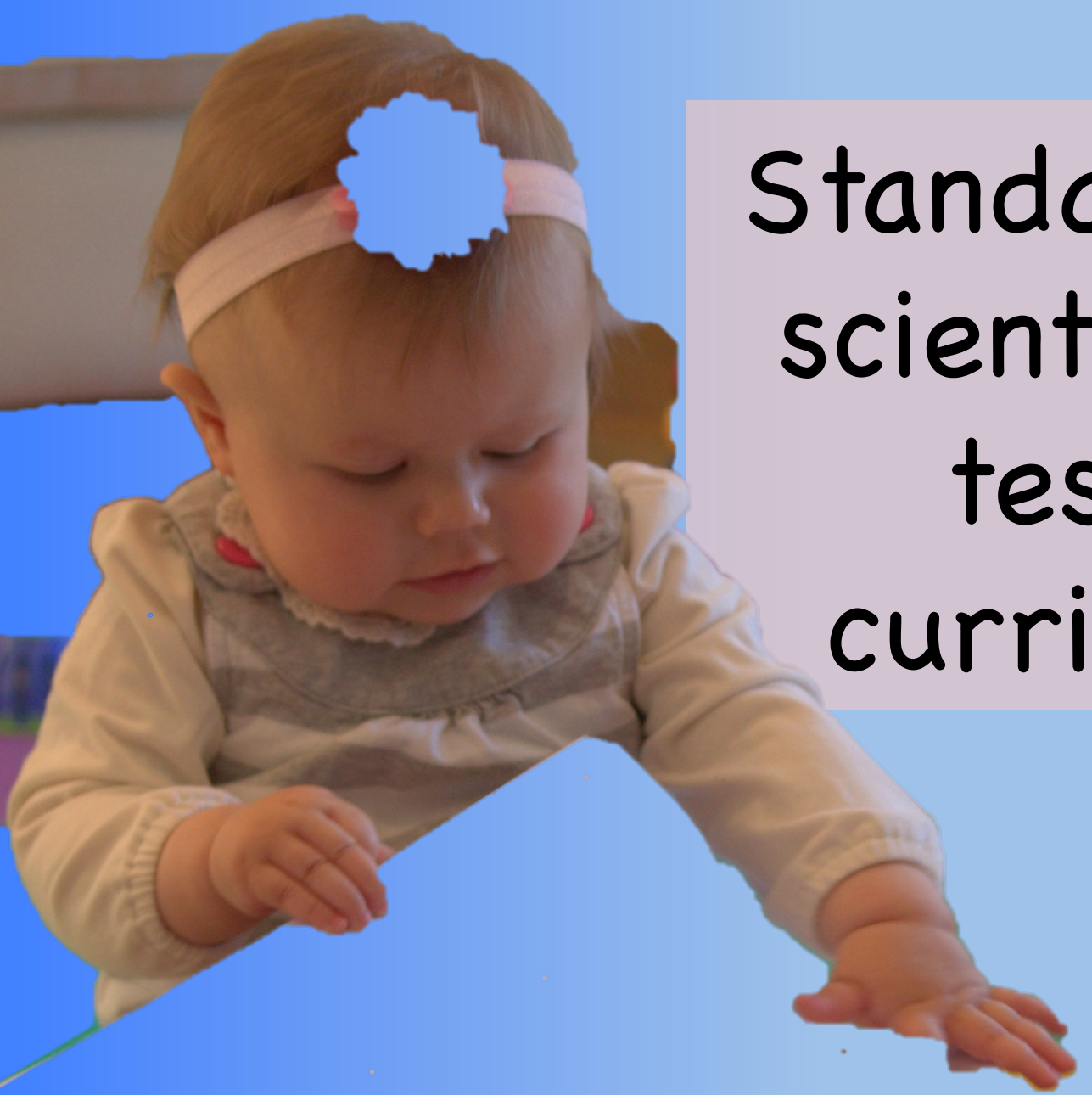
Baby Music Class!

Learn using
your whole
body and
all 5 senses

Collaborative, fun
learning environment

Designed around students' attention spans

Personal Mentor for Every Student



Standardized, scientifically tested curriculum

Class ends with a nap, not an exam

MOOCs have a long, long way to go!

The New York Times

Science

Virtual and Artificial, but 58,000 Want Course

By JOHN MARKOFF
Published: August 15, 2011

PALO ALTO, Calif. — A free online course at Stanford University on artifici
taught this fall by two leading experts from Silicon Valley, has attracted mo
students around the globe — a class nearly four times the size of Stanford's

Enlarge This Image

Noah Berger for The New York Times

The teachers, from left, Peter Norvig and Sebastian Thrun.

The course is one of three being offered experimentally by the computer science department to extend technology kn
beyond this elite campus to the entire world, the unive
on Tuesday.

The online students will not get Stanford grades or cre
ranked in comparison to the work of other online stud
a "statement of accomplishment."

For the artificial intelligence course, students may nee

My Experience with Udacity

Subject: Offer online class?
From: Sebastian Thrun <thrun@ai.stanford.edu>
Date: 11/6/11 2:23 PM
To: evans@cs.virginia.edu

Hi David:

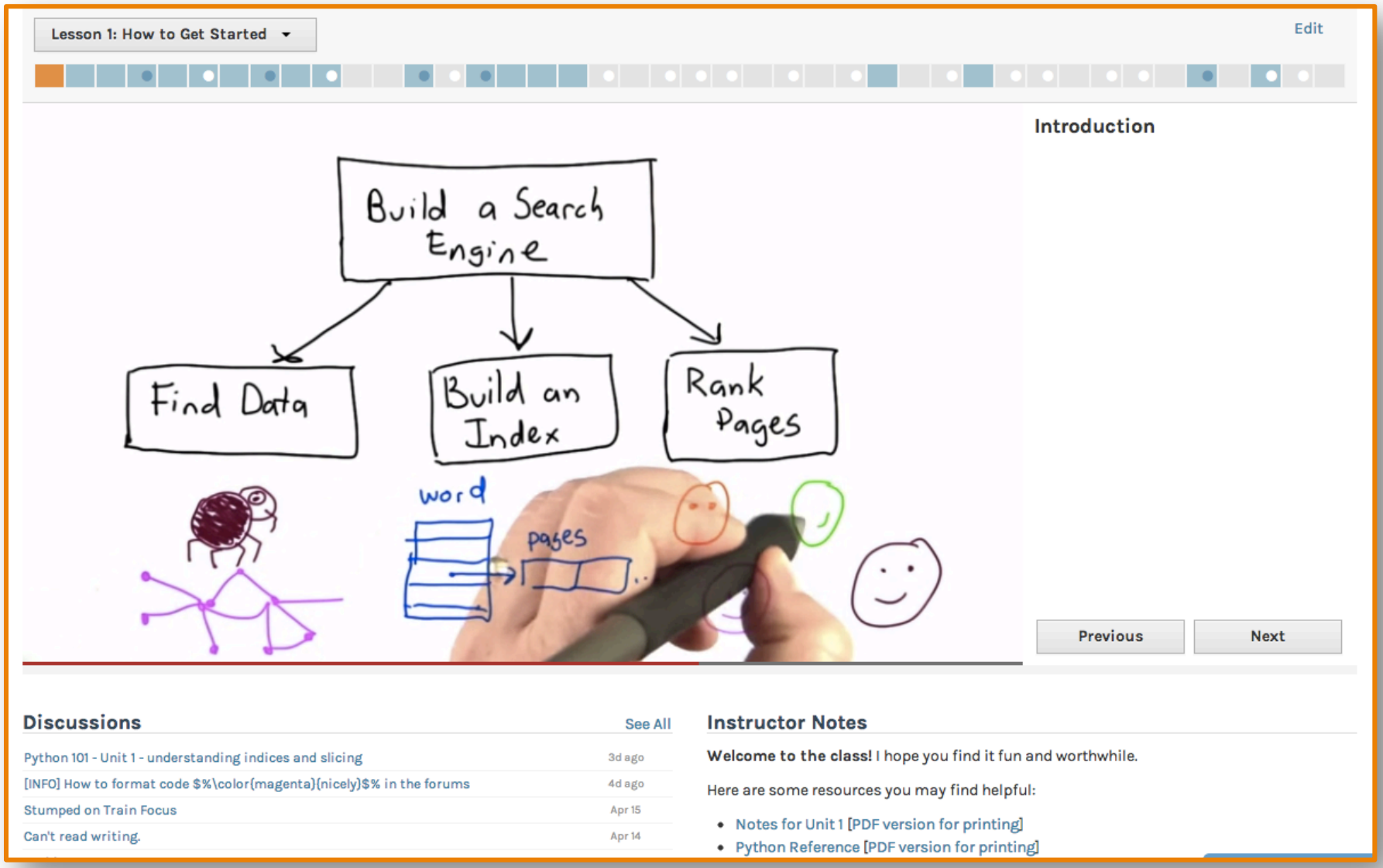
You might have heard about the online class "Introduction to Artificial Intelligence" (ai-class.org) which Peter Norvig and I are presently teaching online. After just a single Email announcing this class, 160,000 students signed up! The class is now well underway, and we have tens of thousands of students from 190 countries diligently submitting homework assignments and following the lectures. Despite the large number of students, we only use a single TA to run this ...
Emails expressing that we are literally changing people's lives, and we are getting routinely recognized by random people on the street who are enrolled in our class. The class was also featured on the front page of the New York Times (below the fold, though).

I am more than happy to answer any question you might have.

Sebastian

cs1120 Fall 2011 (49 students)

Designed from the start as an **open on-line course**



Rigorous, **academic** computer science course

Using search engine as a driving application

QUIZ

Which of these are computer programs?

- ☐ a web browser
- ☐ a slice of toast
- ☐ the Python interpreter
- ☐ calendar app on a phone
- ☐ the Python code you will write in this class

```
print 'Hello!'
```

	Cost per Bit	Latency	Latency-Distance
	$0.50	1 second	300 000 km
CPU Register	$0.001	<0.4 ns	0.12 m
DRAM	n$ 0.58	12 ns	3.6 m
Hard Drive	n$	7 ms	km

$100 for 1.(

QUIZ

A write isLeapYear(year)
B write stub daysInMonth(year, month) that always returns 30
C modify daysInMonth(year, month) to be correct except for leap years
D modify daysInMonth(year, month) to account for leap years
E modify nextDay(year, month, day) to use daysInMonth(year, month)
F test isLeapYear(year)
G test daysInMonth(year, month) except for leap years
H test daysInMonth(year, month) including leap years
I test nextDay(year, month, day) using stub daysInMonth
J test daysBetweenDates(...) for simple cases
K test daysBetweenDates(...) for all test cases

What should we do to finish this problem?

e.g., ABACAB

```
# Finish the page ranking algorithm.

def compute_ranks(graph):
    d = 0.8 # damping factor
    numloops = 10

    ranks = {}
    npages = len(graph)
    for page in graph:
        ranks[page] = 1.0 / npages

    for i in range(0, numloops):
        newranks = {}
        for page in graph:
            newrank = (1 - d) / npages

            #Insert Code Here

            newranks[page] = newrank
        ranks = newranks
    return ranks
```

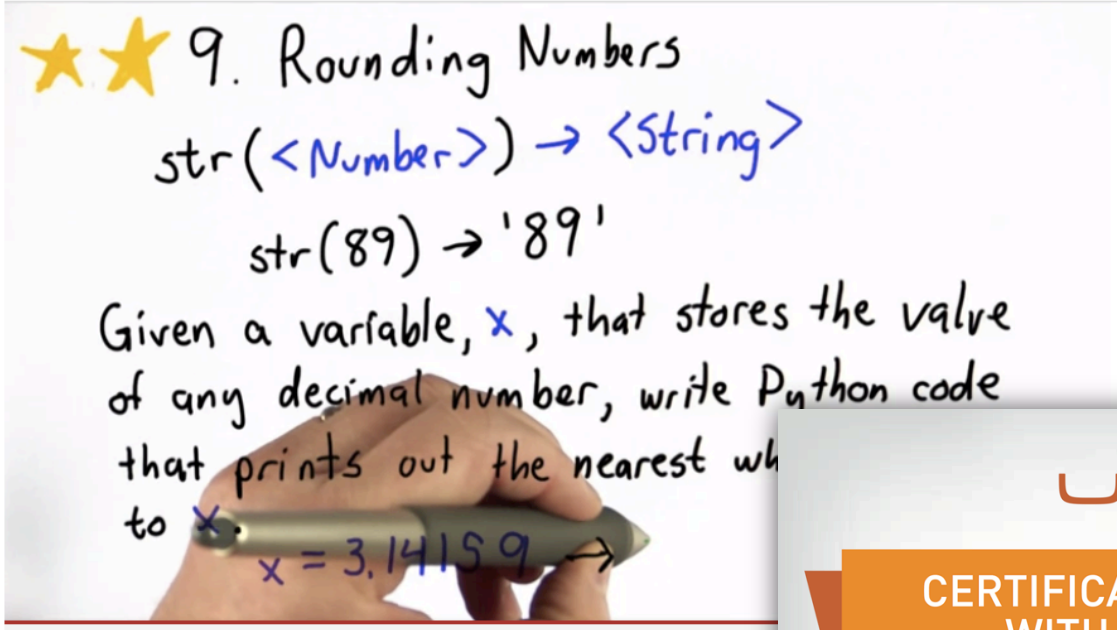
Reset | Test Run

Frequent, **meaningful** interaction

Introduction to Computer Science

CLASSROOM

Lesson 1: Problem Set



Rounding Numb

Homeworks, exams, certificates

Discussions

See All

Alternative solution?	12m ago
I was so pleased with myself until i saw the answer lol	2d ago
Incorrect even when test run shows correct	7d ago
Alternative solution using .find (searching for 5,6,7,8,9 digits after the dot)	Apr 22
rounding numbers alternative	Apr 20
Rounding numbers 1.9. I have done this it`s ok?	Mar 19
Confused!!!!!!	Mar 18
HAVE A PROBLEM WITH HOMEWORK 9 :(((	Mar 16
are we looking for an int or a string as the result?	Mar 9
I knew it had to be simple	Mar 7

Ask a Question

UDACITY

CERTIFICATE OF ACCOMPLISHMENT
WITH HIGHEST DISTINCTION

This is to certify that

DAVID EVANS

Has successfully completed

COMPUTER SCIENCE 101:
Introduction To Computer Science
Building A Search Engine

David Evans, Ph.D. *Sebastian Thrun, Ph.D.*

APRIL 6, 2012
Date

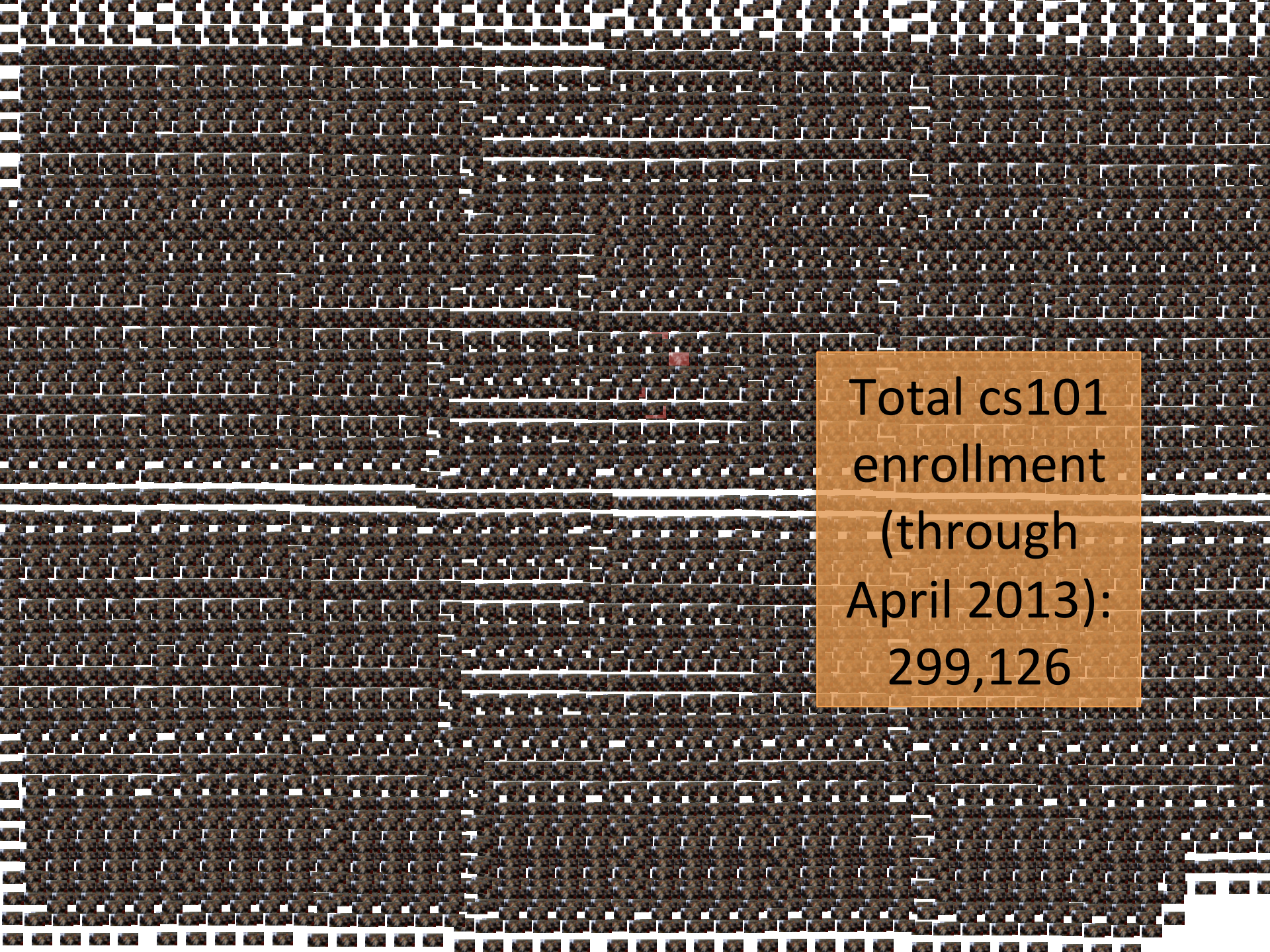
Secret weapon!

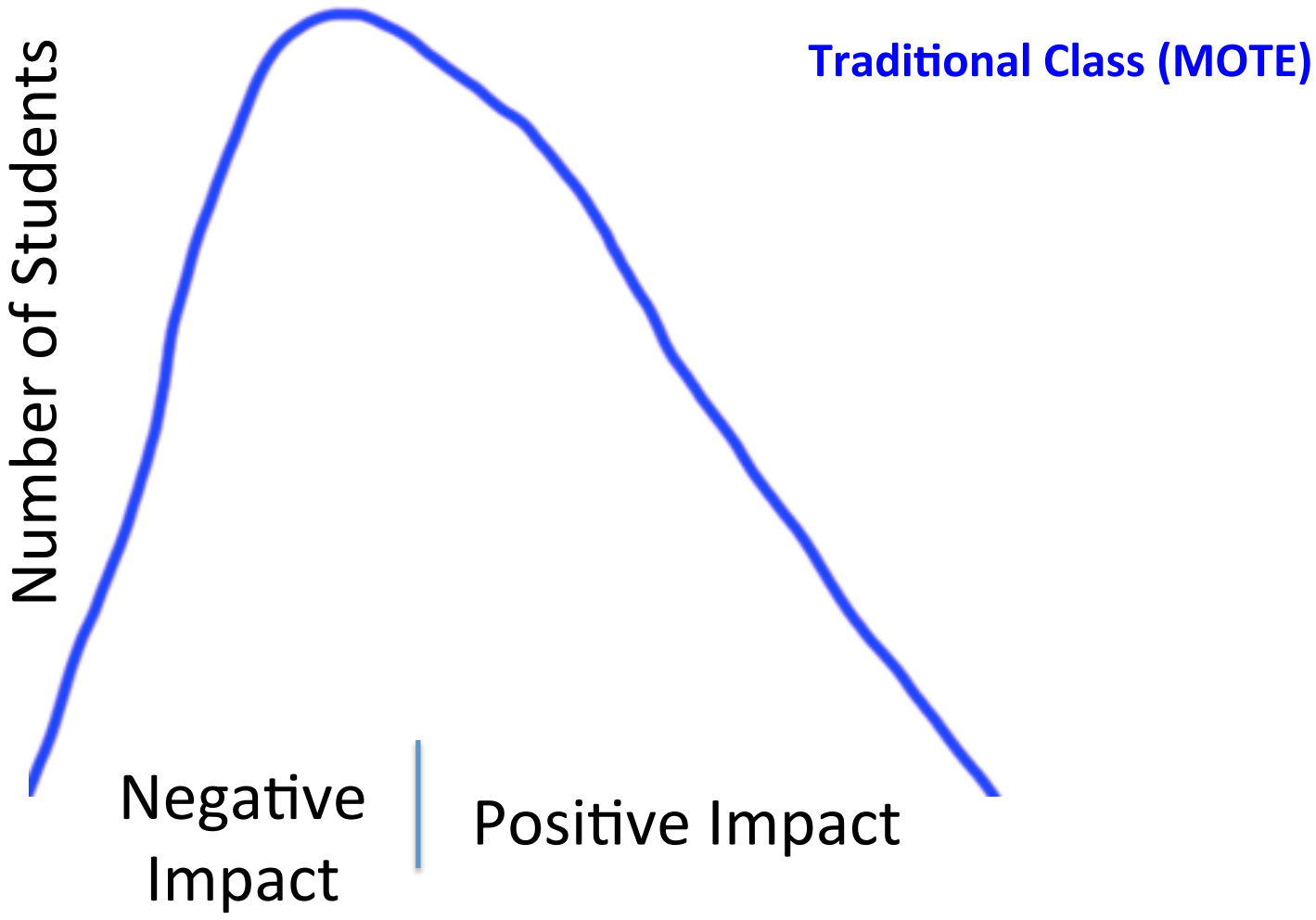
cs1120 Fall 2011 (49 students)

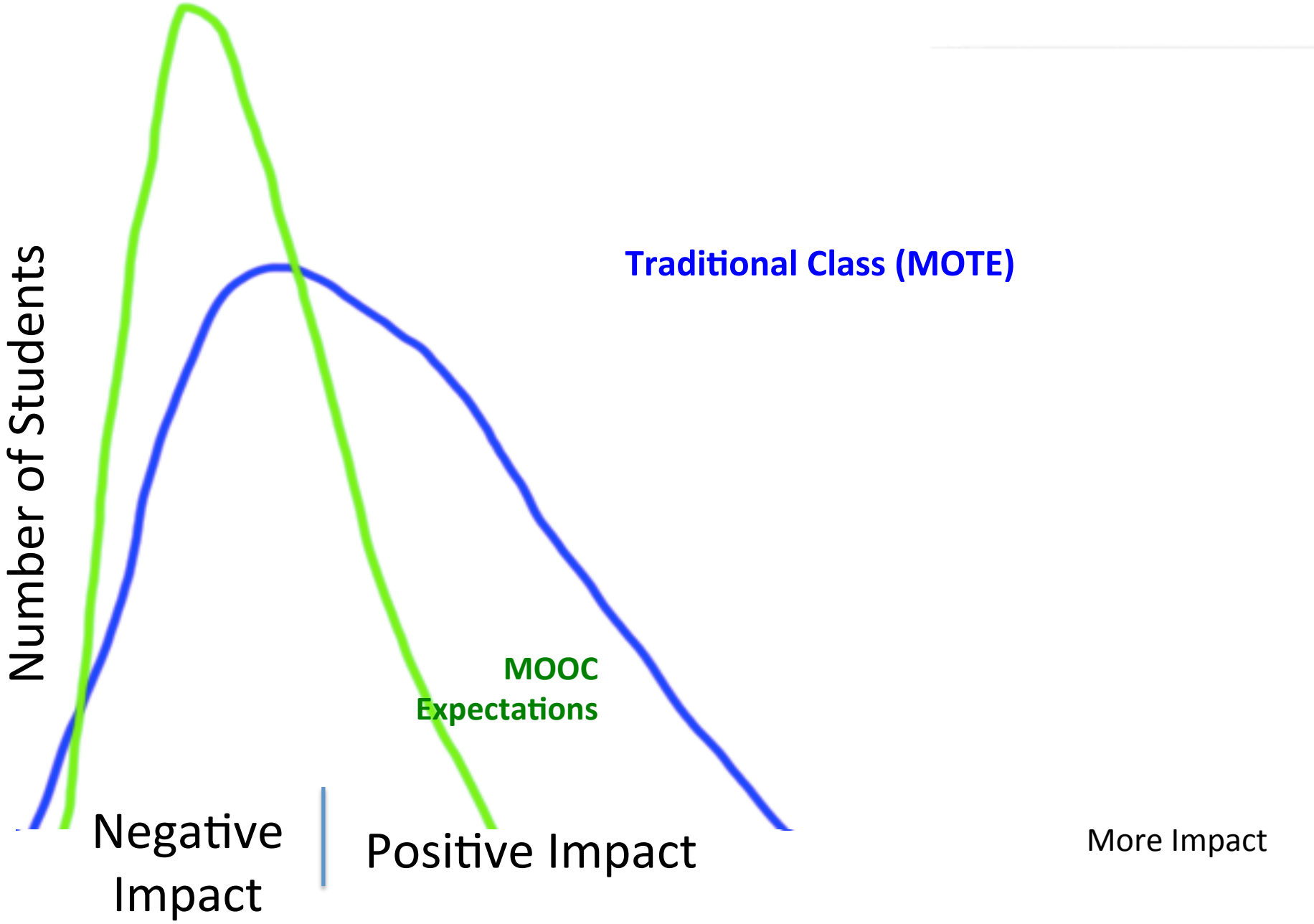
1000 students

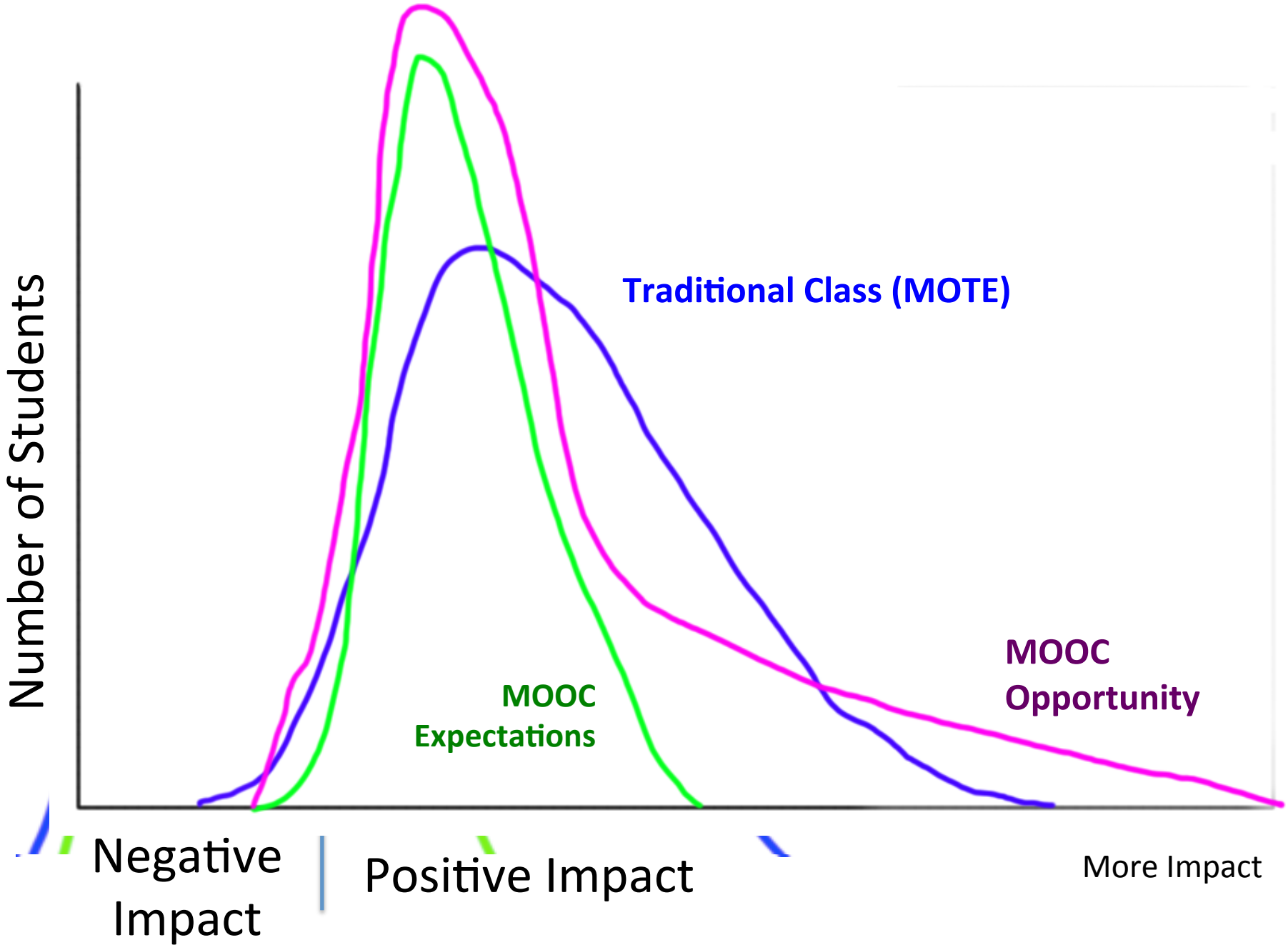
(13 years at UVa)

Initial cs101
enrollment:
94,285


Total cs101 enrollment (through April 2013): 299,126


Traditional Class (MOTE)
Number of Students
Negative Impact
Positive Impact


Number of Students
Traditional Class (MOTE)
MOOC
Expectations
Negative
Impact
Positive Impact
More Impact


Number of Students
Traditional Class (MOTE)
MOOC
Expectations
MOOC
Opportunity
Negative
Impact
Positive Impact
More Impact

Prof. Evans,

I am a student in Udacity - CS101 as well as one of those brain damaged vets struggling with life we seem to read so much about these days. **Instead of resorting to drunken violence and general self destruction (been there, done that...) I am learning, with your assistance to re-wire my brain.** Current neuroscience research and a flexible academic curriculum have given me hope. While slow as molasses in January I am progressing and the changes in brain function are having profound effects on my day-to-day life. No words can express my thanks to you and Mr. Thrun. …Good teaching and removing: stress, stigma and general bureaucratic bull from learning **yields a truly beautiful, powerful growth experience.**

Very best regards, …

reddit LEARNPROGRAMMING comments related

Please read the FAQ and posting guidelines before submitting!

Just needed to tell somebody that I feel awesome! (self.learnprogramming)

1

submitted 22 days ago by amosko

After trying different programming languages and never following through, I took most of /r/learnprogramming 's advice and picked one language (Python) and am sticking with it.

I'm taking a couple of courses to really get a good basic understanding (edx's MIT course, Udacity course and codecademy's course).

I got to the end of Udacity's first Unit and was up to the final quiz. If you don't know it, it's fine. It's probably really easy but when I got there I blanked. I looked at it, tried a couple things and said I'll do it later (I was at work and couldn't give it a lot of thought). I opened it later (still at work but everyone went home). It made a tiny bit more sense but I was still lost. When I got home I opened it up. I started getting somewhere and BOOM! It just clicked. With a little trail and error I passed! I know it's not the best way to do it but it worked. I want to go back and clean it up a little just to get into the habit of 'complex not complicated'.

I just needed to tell somebody that this gave me a major ego boost and makes me want to keep learning. Thanks for reading, carry on.

4 comments share save hide report

Budweiser
DISASTER DRILL
UNCITY

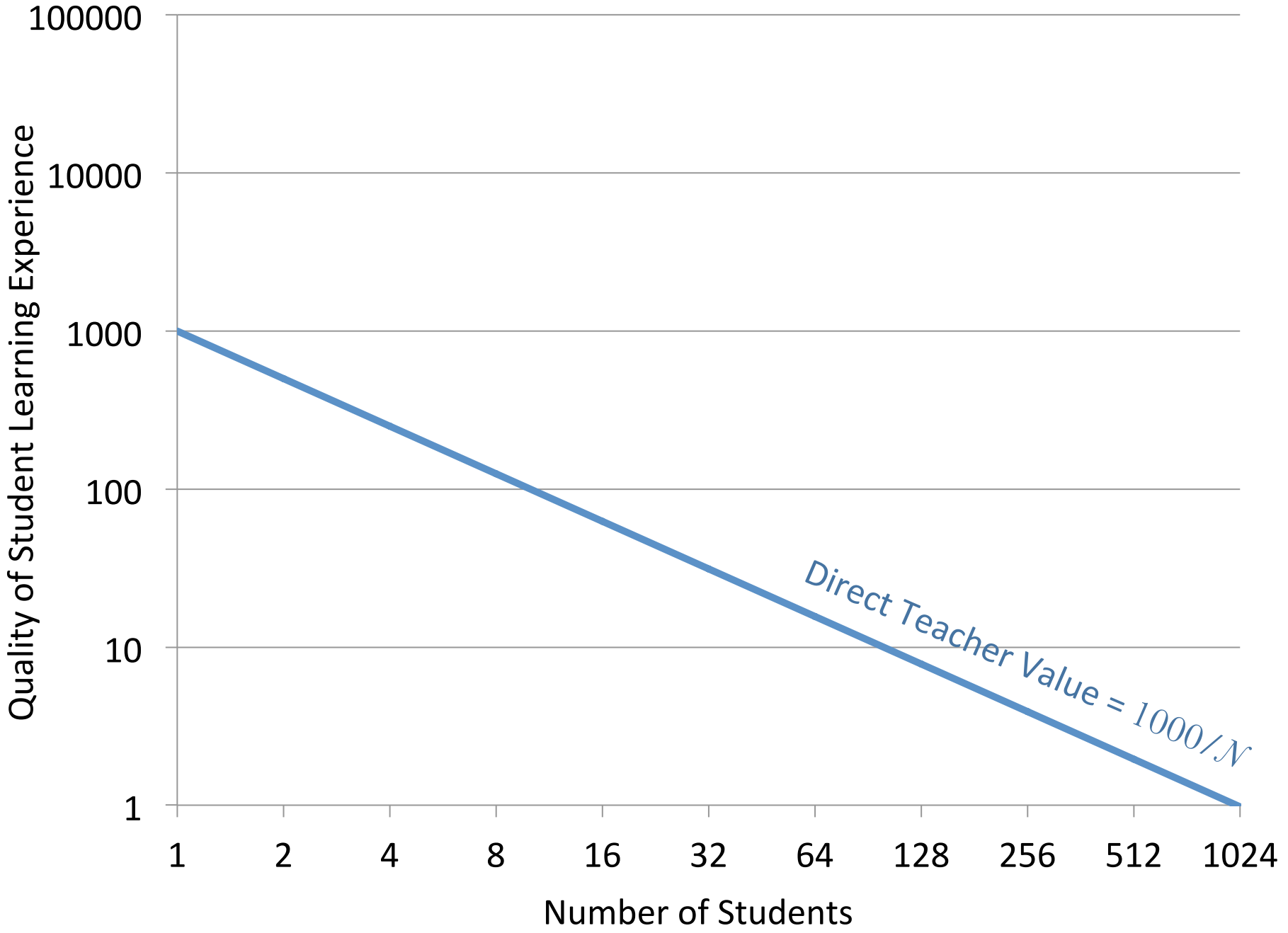
Scale Matters

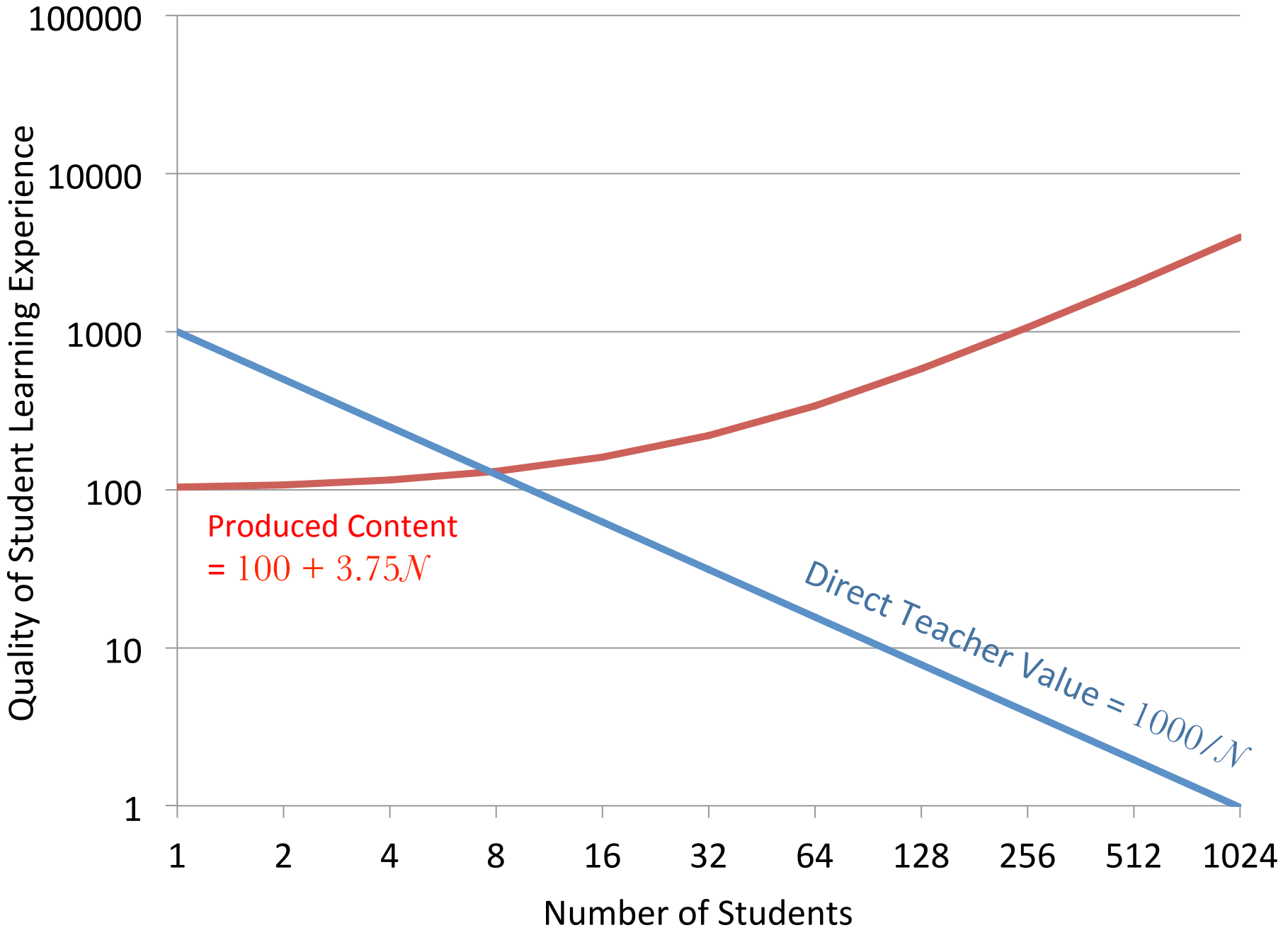
$3\frac{3}{4}$

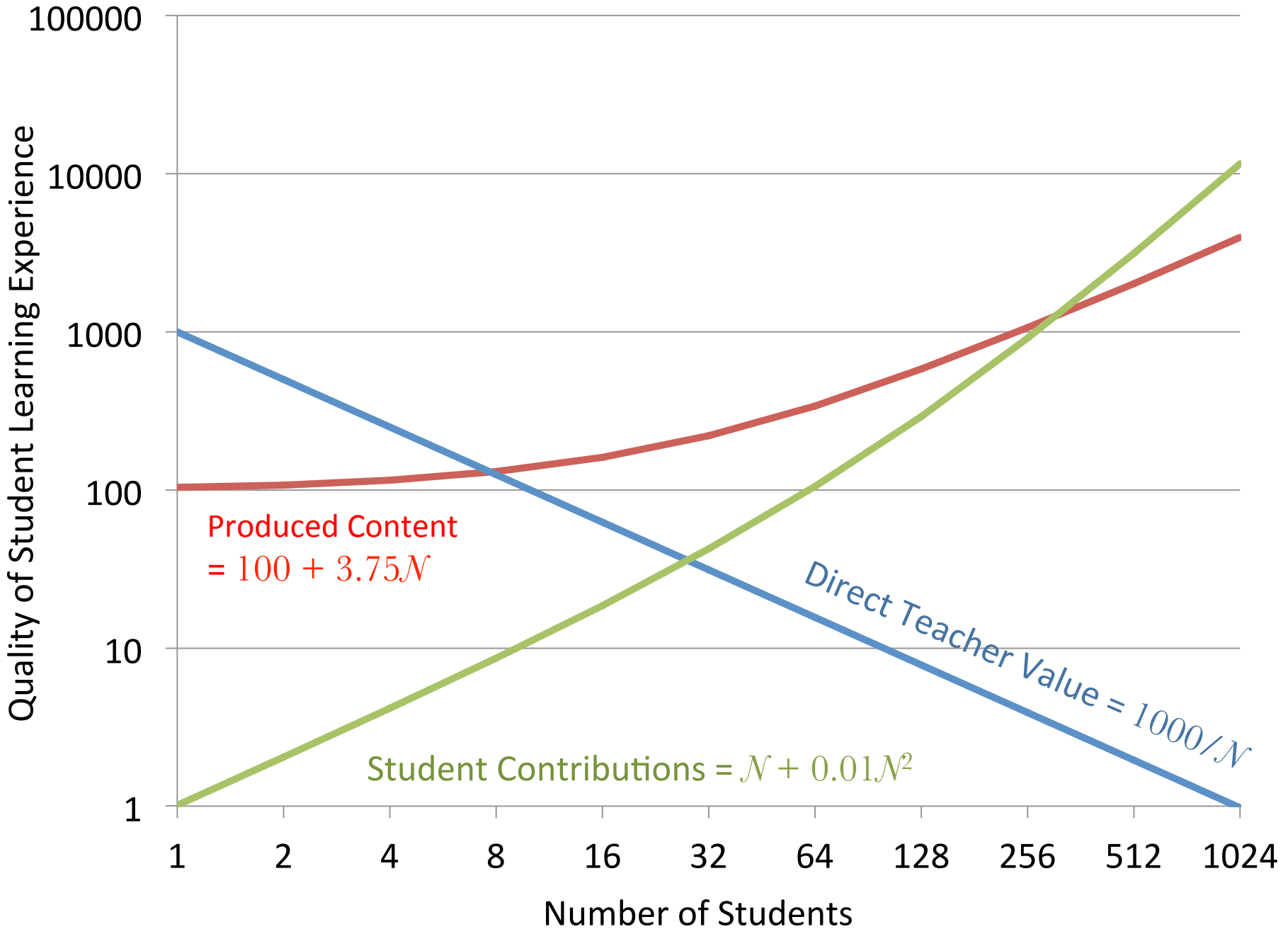
Low Cost
per Student

Community and
Contributions

Wendy Woudstra


100000
10000
1000
100
10
1
Quality of Student Learning Experience
Direct Teacher Value = 1000/N
1
2
4
8
16
32
64
128
256
512
1024
Number of Students


100000
10000
1000
100
10
1
Quality of Student Learning Experience
Produced Content
= 100 + 3.75N
Direct Teacher Value = 1000/N
1
2
4
8
16
32
64
128
256
512
1024
Number of Students


100000
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Quality of Student Learning Experience
1
2
4
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64
128
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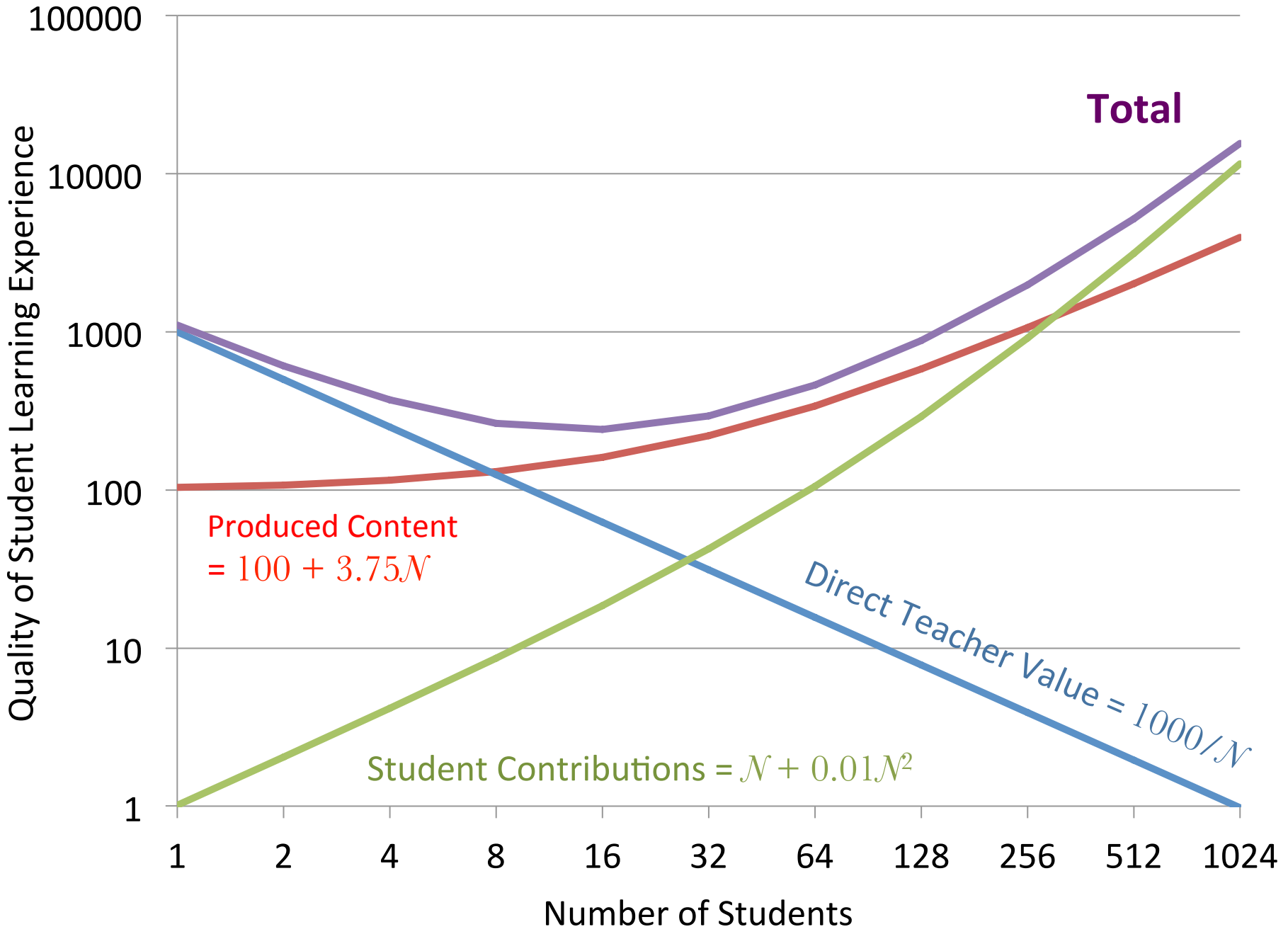
1024
Number of Students
Produced Content
= 100 + 3.75N
Direct Teacher Value = 1000/N
Student Contributions = N + 0.01N²


100000
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Quality of Student Learning Experience
Total
Produced Content
= 100 + 3.75N
Direct Teacher Value = 1000/N
Student Contributions = N + 0.01N²
1
2
4
8
16
32
64
128
256
512
1024
Number of Students

Scale and Community

http://forums.udacity.com/…/dropping-out-terrible-headache-and-i-am-not-a-machine

Scale and Contribution

Youdacity

youdacity.appspot.com

YOUDACITY SEARCH

charlottesville

SEARCH

Population Solution - CS101 - Udacity

```
1
2 population = {}
3 population['Shanghai'] = 17.8
4 population['Istanbul'] = 13.3
5 population['Karachi'] = 13.0
6 population['Mumbai'] = 12.5
7 population['Charlottesville']
```

Charlottesville 的人口比上海少很多

0:29 / 1:04

“Sascha” Coenen, Hamburg

DaveDaveFind: search

davedavefind.appspot.com/search?sear

DaveDaveFind

You searched for: search

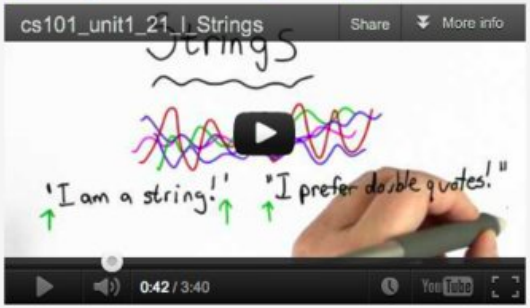
```
re.search(pattern, string[, flags])
```

> Scan through string looking for a location wher
> match, and return a corresponding MatchObject
> string matches the pattern; note that this is diffe
> some point in the string.

Read more: Python documentation

Videos:

Unit 1: Strings
http://www.youtube.com/watch?v=_VUBbQP5fag#t=00m42s



[PDF] Unit 2 Notes
http://www.udacity.com/file

`DaveRank: 0.01`

towards building your search
(Introduction to Web Browse
concepts: 1. Procedures - a

[PDF] Unit 6 Notes
http://www.udacity.com/file

`DaveRank: 0.01`

page that matches the search
to do this well. This is somet
much smarter way of ranking

Python 101 - Unit 1 - understanding indices and slicing

146

52

Many people new to Python have the same reaction to indices: "this is weird". Indices, though, permeate Python.. in lists, in strings, in conditionals and are a potential source of errors until we get used them. Thus we might as well bite the bullet, get them straight and move on.

Spanish version of this post (external link) - versión en Español de este artículo (enlace externo)

First, my apologies to the experienced programers that will find some sections of this post very basic but after the initial writing there were questions like 'what does default mean?' that made me realize that many Udacians are really really new to programming and thus, I decided to add some explanations and go very slow. Ok.. let's do it...

We'll use string slicing because that is the first thing that we all learn but it will serve us equally well later, in list indexing and setting ranges

Let

```
a = '0123456789'
```

where the char at the k-th position is k.

We slice `a` using:

```
b = a[start:stop:step]
```

or, directly:

```
'0123456789'[start:stop:step]
```

i.e, in Python, both the string and the variable
object: a number, a variable, a string, a functi

Home › programming › python interpreter, text editor, ide for udacity CS101

python interpreter, text editor, ide for udacity CS101

Posted on July 19, 2012 by ctb — 8 Comments ↓

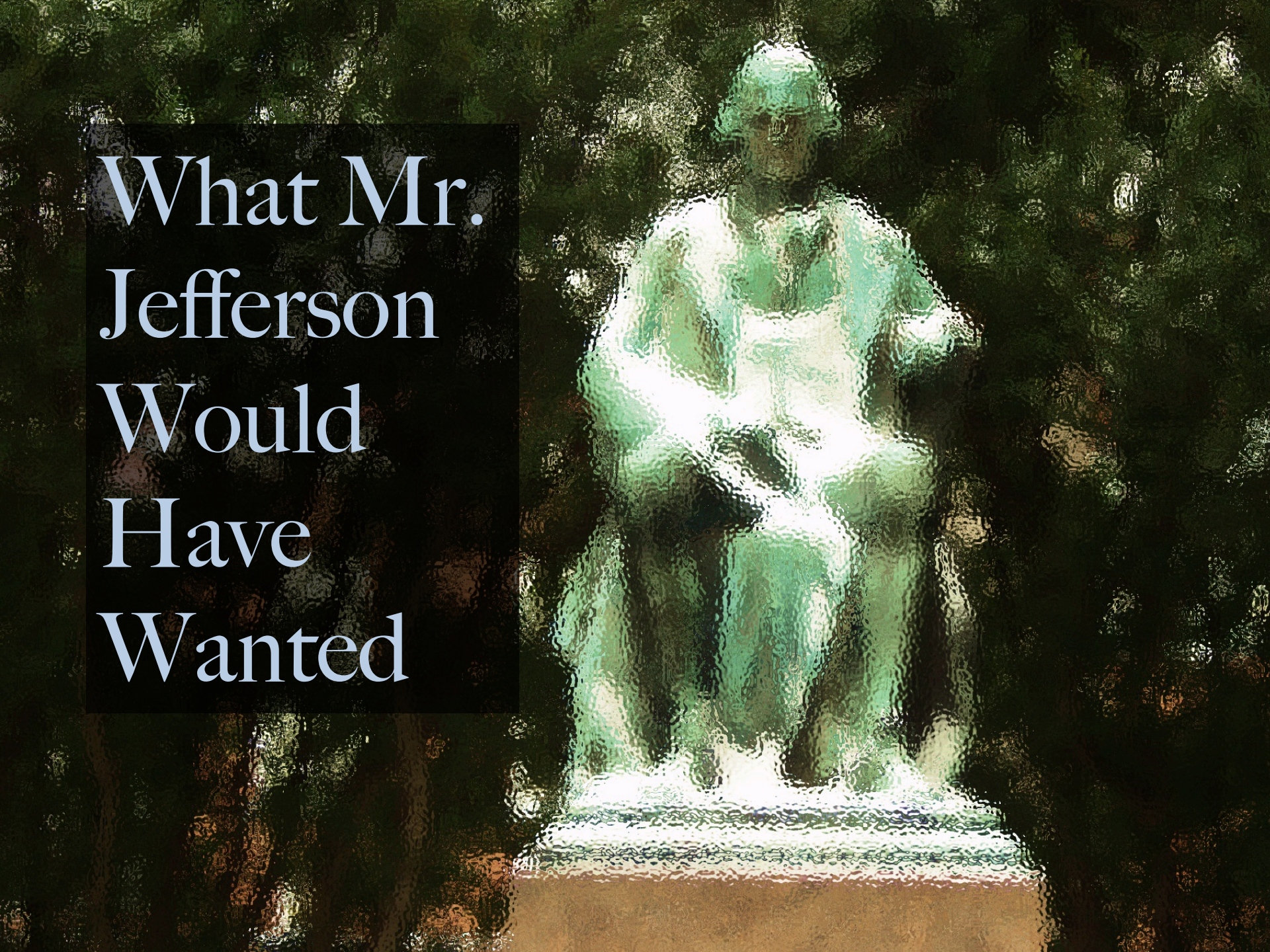
- Introduction
- Installing Python
  - Linux
  - OS X
  - Windows
- 1. Interactive Mode
- Integrated Development Environments
  - IDLE
  - Other IDEs
- Text Editors
  - Linux
  - OS X
  - Windows
- Conclusion

Introduction

In my spare time this summer, I've been working through CS101: Building a Search Engine on udacity. I've written critical things about the new wave of massive online courses before, in part because I've never finished one. That's not exactly a fair position from which to criticize, even if

What Should UVa Do?

What Mr. Jefferson Would Have Wanted



A system of general instruction, which shall reach every description of our citizens, from the richest to the poorest, as it was the earliest, so will it be the latest, of all the public concerns in which I shall permit myself to take an interest. Nor am I tenacious of the form in which it shall be introduced. Be that what it may, our descendants will be as wise as we are, and will know how to amend and amend it until it shall suit their circumstances. Give it to us, then, in any shape, and receive for the inestimable boon the thanks of the young and the blessings of the old, who are past all other services but prayers for the prosperity of their country and blessings to those who promote it.

TH: JEFFERSON.

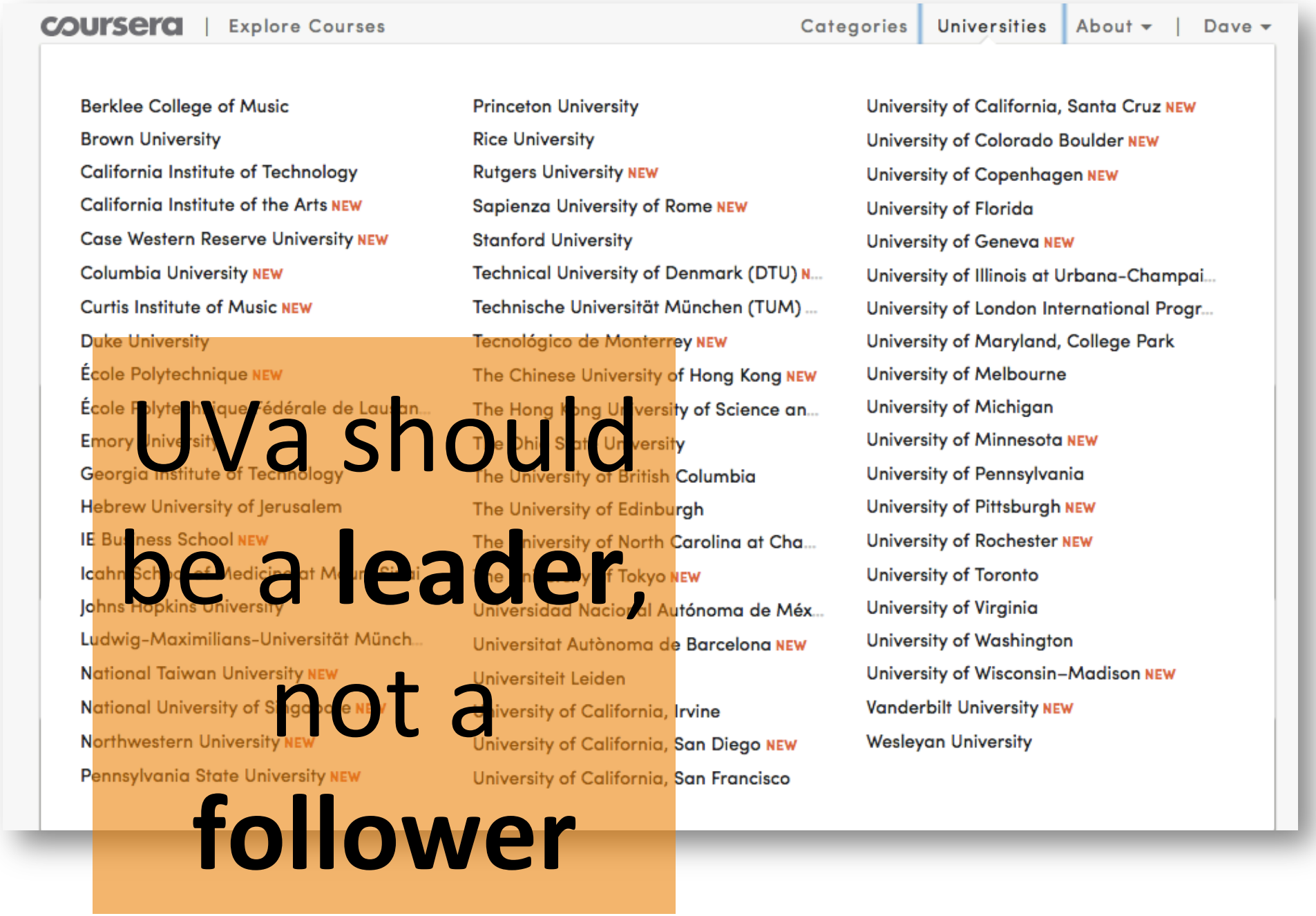
Joseph C. Cabell, Esq.

Letter from Thomas Jefferson to Joseph Cabell, 14 January 1818

earlier in the same letter…

14 in their 10th year, 13 and a
their 12th year; so that the
children of these three years (which are those that ought to be
devoted to the elementary schools,) will be a constant number
of 40; about enough to occupy one teacher constantly. His
wages of $150, partitioned on these 40, make their teaching
cost $3¾ a piece, annually. If we rec heads of
families in a ward as there are mili , the
unmarried militia men balancing in and
unmarried exempts,) $150 on 67 head (if levied
equally) would be $2 24 on each. At the same time the pro-
perty tax on the ward being $5,000÷12, or $416, and that
again subdivided on 67 heads of families (if it were levied
equally) would be $6 20 on a family of middling circum-
stances, the tax which it now pays to the State. So that to
$6 20, the present State tax, the school tax would add $2 24,

5000/12 =
$416⅔ ~ $417



UVa should be a leader, not a follower

UVa should do **big** things, not **small** things
Big "O"

Doing **Big** Things in Open Education!

UVa Coursera Courses	**$150,000**

Doing **Big** Things in Open Education!

	Cost
Academic Division (2011-2012)	$1,360,000,000
Undergraduate Tuition Paid	$232,000,000
Access UVa (2011-2012)	$92,000,000
Rice Hall	$65,000,000
Buyout cost to fire assistant football coaches last year	$1,360,000
UVa Coursera Courses	**$150,000**

UVa should be a force for **social mobility** and **public good**

(Modest/Uvacious) **Proposal**

Open (by default) **Collab**

University-Wide Hybrid Class
All Incoming Students
4th Year Discussion Leaders
Team of Faculty and Producers

Every High School Student
in Virginia should take
UVa Classes **for Admission and Credit**

Support for infrastructure and teachers

Free or Very Low Cost
Real UVa Degrees
1M+ graduates/year
High rigor
Community Centers
Global Reach and Reputation

Discussion

David Evans
www.cs.virginia.edu/evans