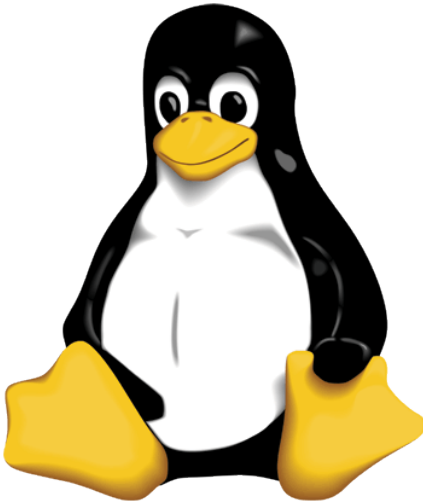# MOOCs are here, so what?

Jaakko Kurhila | *head of studies*

Department of Computer Science

University of Helsinki, Finland

MOOCs

massive open online courses:

Well-prepared materials, e.g. short videos, some interaction – all fully online

by *someone*, for *me*, for *free*

Full disclosure: I have no stake in any of the companies mentioned

NY Times: "year 2012 was the year of the MOOC"

Web Search Interest: **mooc**. Worldwide, Jan 2007 - Jan 2013.

Interest over time ⓘ

The number 100 represents the peak search volume

☑ News headlines   ☐ Forecast ⓘ

March 2011

■ mooc: 3

Why the hype?

2 reasons:

It is possible
It is lucrative

It is **possible**
It is lucrative

Possible:

tools and connections are in place, culture is in place

Possible:

tools and connections are in place, culture is in place

> …just look at facebook, youtube, google, wikipedia usage statistics

> …people can appreciate the flexibility online studying offers

Possible:

tools and connections are in place,
culture is in place

there is already evidence of practices that
scale up and work as expected

- Stanford Univ course on AI drew 160000 registrants
- Khan Academy videos have been watched n times

It is not only possible, it is a **good story:**

So it is a **good story:**

free education for all, even in the developing world

Khadija Niazi

Khadija Niazi, 11-year-old girl from Lahore, Pakistan, successfully completed Udacity's MOOC on Physics100

Khadija Niazi, 11-year-old girl from Lahore, Pakistan, successfully completed Udacity's MOOC on Physics100

She spoke in WEF in Davos along with Larry Summers et al

So it is a **good story:**

free education for all, even in the developing world

learner becomes the king, for less

"I can see a day soon where you'll create your own college degree by taking the best online courses from the best professors from around the world — some computing from Stanford, some entrepreneurship from Wharton, some ethics from Brandeis, some literature from Edinburgh — paying only the nominal fee for the certificates of completion. It will change teaching, learning and the pathway to employment."

- Thomas Friedman in NYTimes 27 Jan 2013

"I can see a day soon where you'll create your own college degree by taking the best online courses from the best professors from around the world — some computing from Stanford, some entrepreneurship from Wharton, some ethics from Brandeis, some literature from Edinburgh — paying only the nominal fee for the certificates of completion. It will change teaching, learning and the pathway to employment."

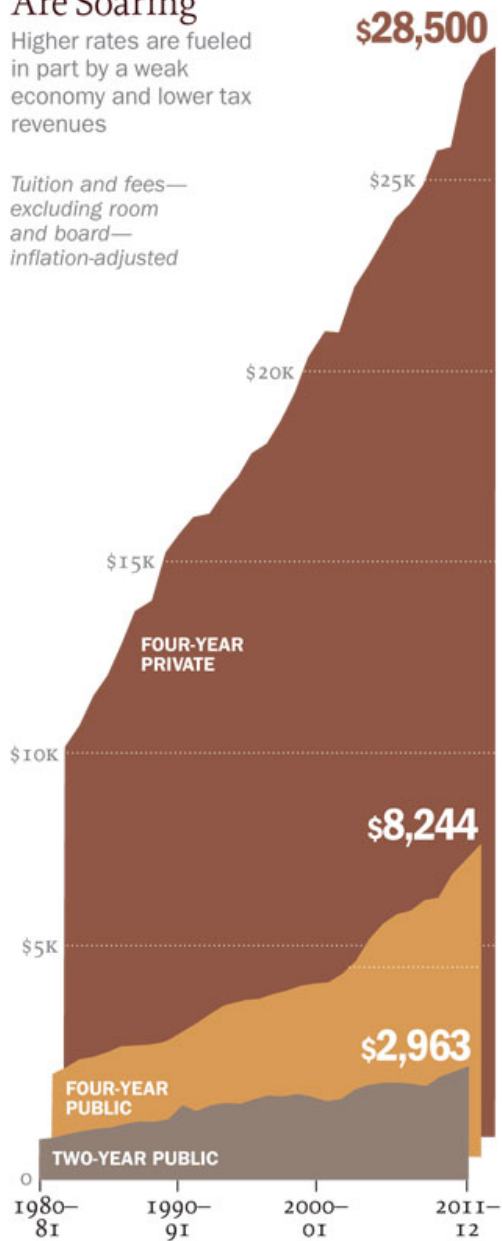*- Thomas Friedman in NYTimes 27 Jan 2013*

It is possible
It is **lucrative**

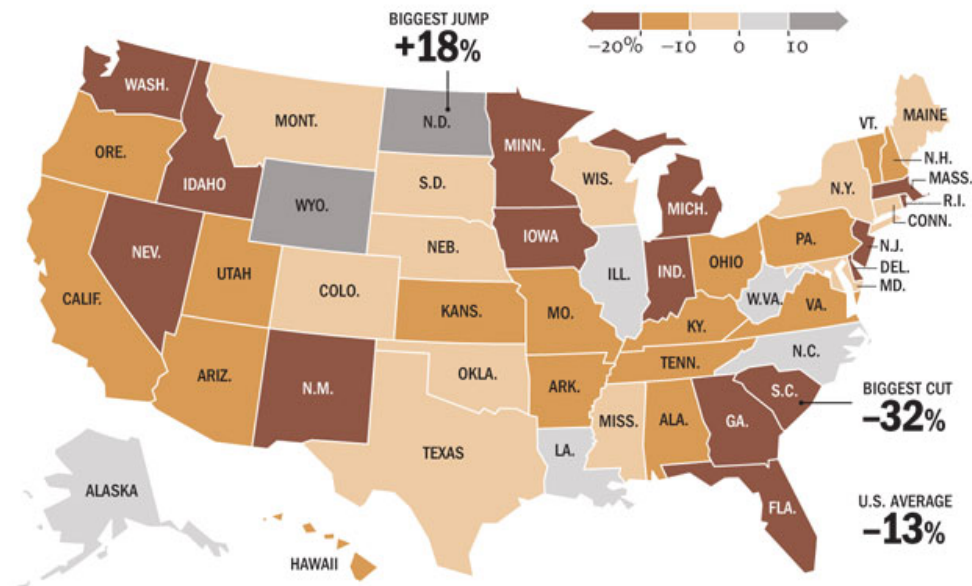**Lucrative**: World-wide, education is multi-trillion dollar "business"

Tuition Costs Are Soaring

Higher rates are fueled in part by a weak economy and lower tax revenues

Tuition and fees— excluding room and board— inflation-adjusted

$28,500

$25K

$20K

$15K

$10K

$5K

FOUR-YEAR PRIVATE

$8,244

$2,963

FOUR-YEAR PUBLIC

TWO-YEAR PUBLIC

0

1980– 81 | 1990– 91 | 2000– 01 | 2011– 12

States are reducing per-student funding to colleges

Change in state spending on public colleges and universities, 2006–11

BIGGEST JUMP
+18%

−20% −10 0 10

WASH. | MONT. | N.D. | MINN. | VT. | MAINE
ORE. | IDAHO | WYO. | S.D. | WIS. | N.Y. | N.H. | MASS. | R.I. | CONN.
CALIF. | NEV. | UTAH | COLO. | NEB. | IOWA | MICH. | PA. | N.J. | DEL. | MD.
ARIZ. | N.M. | KANS. | MO. | ILL. | IND. | OHIO | W.VA. | VA.
OKLA. | ARK. | KY. | TENN. | N.C.
TEXAS | MISS. | ALA. | GA. | S.C.
LA. | FLA.

ALASKA

HAWAII

BIGGEST CUT
−32%

U.S. AVERAGE
−13%

Student debt loads are increasing

Percentage with debt

46% 1993

66% 2011
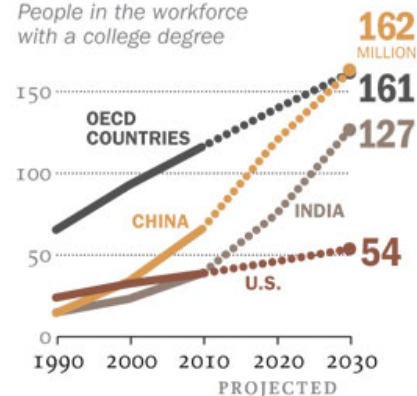
Average debt (2011 dollars)

$14,500 1993

$26,600 2011

The default rate was **5.6%** in 1999. In 2010 it was **9.1%**

Having fewer degrees threatens our global competitiveness

People in the workforce with a college degree

162 MILLION
161
127

150

OECD COUNTRIES

100

CHINA

INDIA

50

U.S.

54
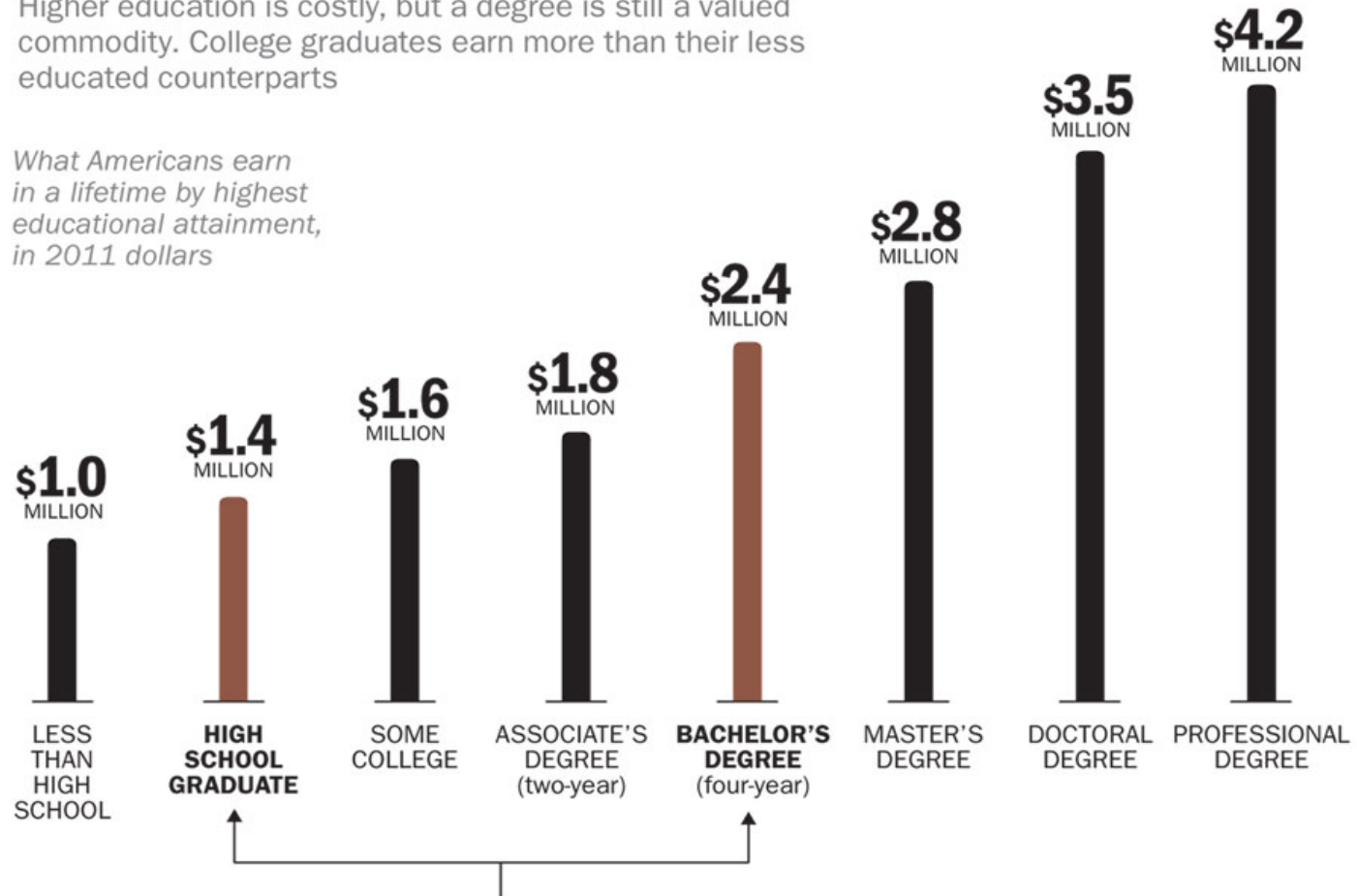
1990 | 2000 | 2010 | 2020 | 2030

PROJECTED

Time, 2012

"Teaching students 30 at a time is expensive and becoming relatively more expensive […] for the same reason that butlers have become relatively more expensive–butler productivity increased more slowly than productivity in other fields, so wages for butlers rose even as their output stagnated; as a result, the opportunity cost of butlers increased. The productivity of teaching […] hasn't increased much. As a result, the opportunity cost of teaching has increased, an example of what's known as **Baumol's cost disease**. Teaching has remained economic only because the value [of teaching] has increased due to discoveries in (some) other fields.
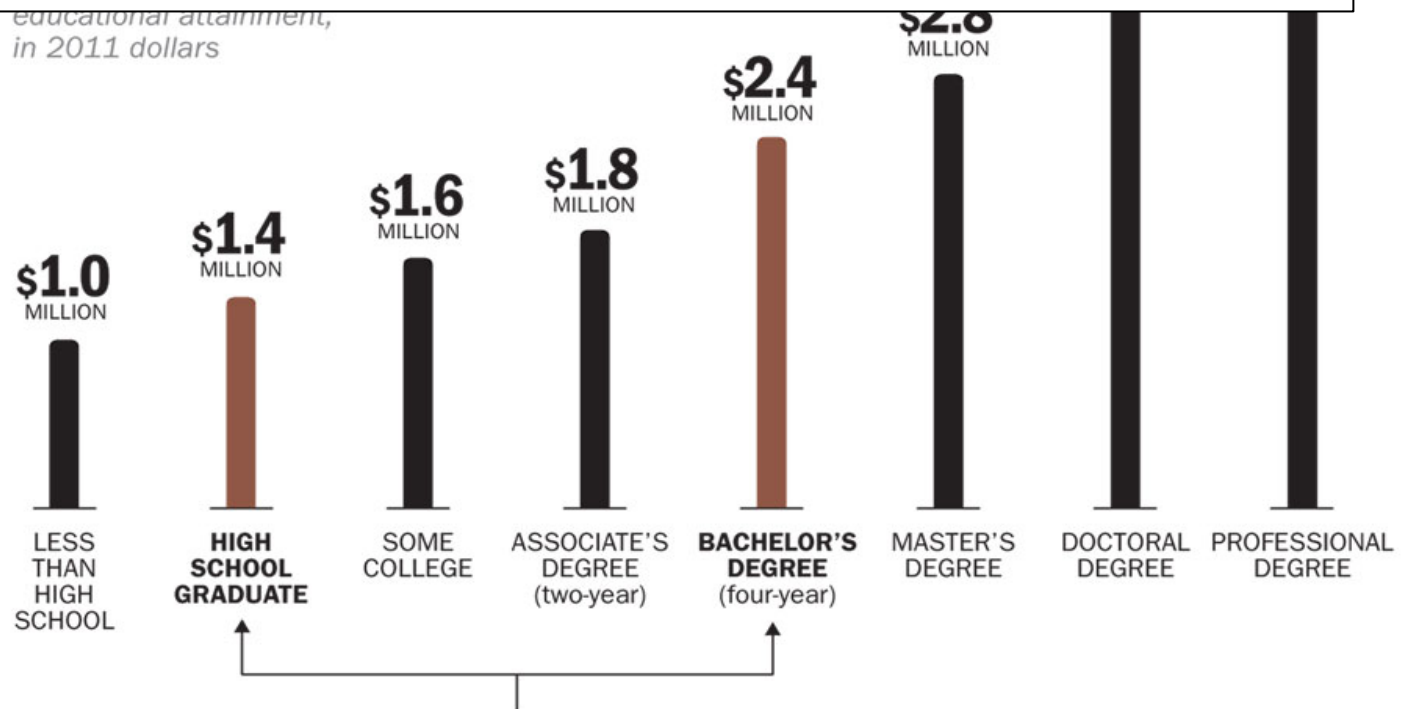
--Alex Tabarrok, MRU, 2012

Attending College Is Still a Smart Move

Higher education is costly, but a degree is still a valued commodity. College graduates earn more than their less educated counterparts

What Americans earn in a lifetime by highest educational attainment, in 2011 dollars

$1.0 MILLION — LESS THAN HIGH SCHOOL

$1.4 MILLION — HIGH SCHOOL GRADUATE

$1.6 MILLION — SOME COLLEGE

$1.8 MILLION — ASSOCIATE'S DEGREE (two-year)

$2.4 MILLION — BACHELOR'S DEGREE (four-year)

$2.8 MILLION — MASTER'S DEGREE

$3.5 MILLION — DOCTORAL DEGREE

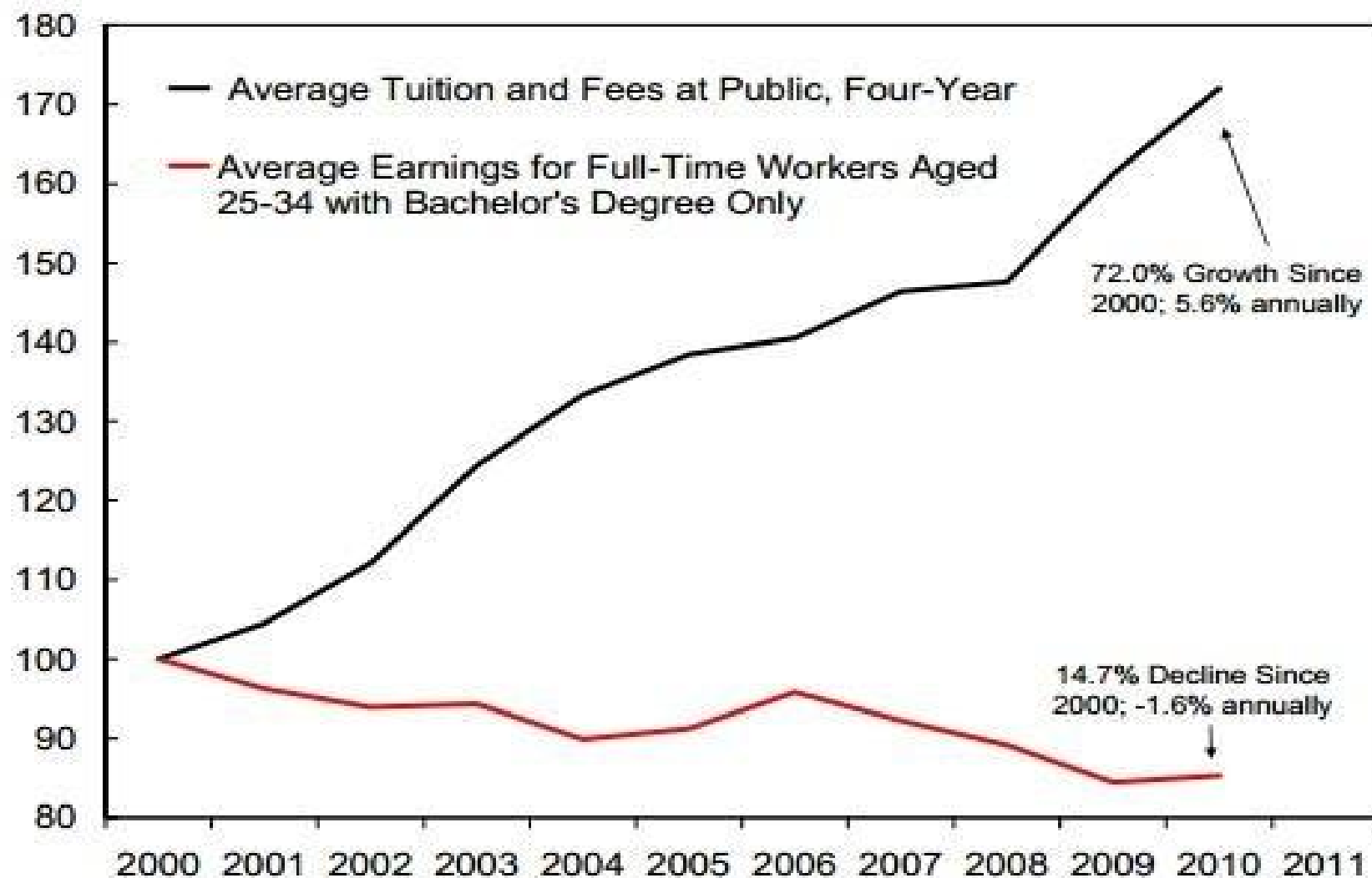**$4.2 MILLION** — PROFESSIONAL DEGREE

Percentage more that those with a bachelor's degree can expect to earn in their lifetime compared with those with only a high school diploma

77% In 1975 the gap was **50%**

Time, 2012

Attending College Is Still a Smart Move

Higher education is costly, but a degree is still a valued commodity. College graduates earn more than their less educational attainment, in 2011 dollars

But for how long?

$4.2 MILLION

$2.8 MILLION

$2.4 MILLION

$1.8 MILLION

$1.6 MILLION

$1.4 MILLION

$1.0 MILLION

| LESS THAN HIGH SCHOOL | HIGH SCHOOL GRADUATE | SOME COLLEGE | ASSOCIATE'S DEGREE (two-year) | BACHELOR'S DEGREE (four-year) | MASTER'S DEGREE | DOCTORAL DEGREE | PROFESSIONAL DEGREE |

Percentage more that those with a bachelor's degree can expect to earn in their lifetime compared with those with only a high school diploma

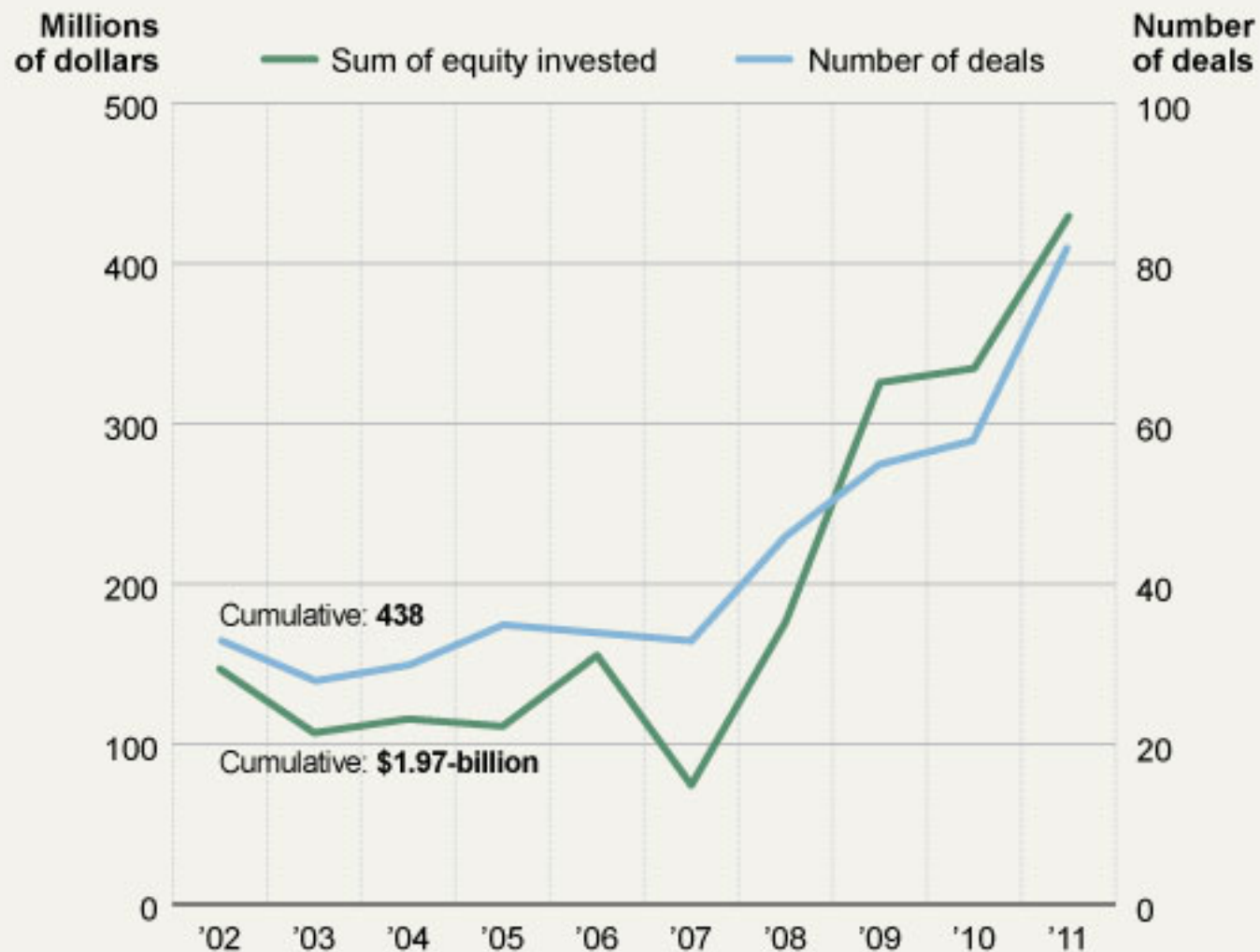**77%** In 1975 the gap was **50%**

Time, 2012

Figure 5. Real Tuition and Fees at a Public, Four-Year College and Average Earnings for Full-Time Workers Aged 25–34 with Bachelor's Degree Only (Indexed, 2000 = 100)

— Average Tuition and Fees at Public, Four-Year

— Average Earnings for Full-Time Workers Aged 25-34 with Bachelor's Degree Only

72.0% Growth Since 2000; 5.6% annually

14.7% Decline Since 2000; -1.6% annually

"Teaching students 30 at a time is expensive and becoming relatively more expensive […] for the same reason that butlers have become relatively more expensive–butler productivity increased more slowly than productivity in other fields, so wages for butlers rose even as their output stagnated; as a result, the opportunity cost of butlers increased. The productivity of teaching […] hasn't increased much. As a result, the opportunity cost of teaching has increased, an example of what's known as **Baumol's cost disease**. Teaching has remained economic only because the value [of teaching] has increased due to discoveries in (some) other fields. Online education, however, dramatically increases the productivity of teaching. […] it's now possible for a single professor to teach more students in an afternoon than was previously possible in a lifetime."   *--Alex Tabarrok, MRU, 2012*

Venture-Capital Investment in Education-Technology Companies

Millions of dollars

Number of deals

— Sum of equity invested   — Number of deals

Cumulative: **438**

Cumulative: **$1.97-billion**

'02 '03 '04 '05 '06 '07 '08 '09 '10 '11

Note: Data include educational-technology companies in elementary and secondary education, higher education, lifelong learning, and informal education.

Source: National Venture Capital Association, thomson Reuters

Keeps rising in 2012

Keeps rising in 2012

Bubble?

MOOC as a business? At the moment:

MOOC as a business? At the moment:

- Sorting-out of people for employers
- Open "tuition", cheap testing, degree
- Licencing courses to existing universities

"… an educational system does more than provide education. It also identifies talent - talent which it in part helps to develop. That makes a MOOC the equivalent of Google, where it is not the right information you want to find but the right people." …"Globally, talent recruiting is a $130BN industry (Forbes.com, 2.12.12). It's 'Google search for people' in action"

-- K. Devlin, Dec 2012

MOOC completion data is typically not shared but the claim is that completion rate is somewhere between 3-10%

Coursera Social Network by the Numbers

- registered students
- watched at least one video
- tried at least one in-video quiz
- submitted at least one assignment
- took the final exam
- earned the regular certificate
- submitted a final project
- 107 earned the programming versio...

0   20000   40000   60000

Alan Levine, 27 Nov 2012

Most passers have a degree already

Many have taken the same course as part of their studies

Most passers have a degree already

Many have taken the same course as part of their studies

edX's Circuits & Electronics course:
37% BSc, 28% MSc, 6% PhD

Coursera's Programming in Scala course:
36% BSc, 45% MSc, 6% PhD

MOOC as a business? In 2012, funding for prominent MOOC providers:

edX (nonprofit) $60m
Minerva Project (starting classes 2015) $25m
Coursera (nonprofit) $23m
Udacity $18m

Note: Coursera racked up 2 million
   users faster than Facebook or Twitter

2012 was a "race to the top" for MOOCs. For business, it is "1-2-exit". But for established universities, only a fraction did *anything*:

~35 universities world-wide signed up with Coursera

MIT and Harvard formed edX, joined by some others

FutureLearn was formed by 12 British universities

Spotifying education:

Udacity wants to hire best teachers (~2%), not best
  professors
- MIT BSc as *the* teacher in Physics

StraighterLine with Professor Direct:
- "Are you a rockstar professor?"
- Sell your teaching directly to individual students,
  get compensated accordingly
- Promising full transfer of credits

Spotifying education:

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Meanwhile:

MOOC → xOOC → xxOC → xxxC

Meanwhile:

MOOC → xOOC → xxOC → xxxC

"**San Jose State University** has partnered with Udacity. […] classes aren't really "MOOCs." They aren't massive — just 100 students apiece. They aren't open — they're limited to a select group of SJSU, community college, and high school students. They aren't free. The credits will cost $150 a piece. "

-- A. Watters, Dec 2012

Important for MOOC business: learning analytics

learning analytics ~ education data mining

learning analytics is taking baby steps:

Measures time/clicks on various activities, paths; i.e., *distant markers* for learning

Measures time/clicks on various activities, paths; i.e., *distant markers* for learning

- Easy to classify people to "in risk to drop out" or other simple categories

- Coursera plans to use keystroke patterns as identification measure for tests

2 examples of different MOOCs:

- Univ. Helsinki *MOOC.fi* for introduction
  to programming;

- *Duolingo* as a clever outsourcing
  exercise for language learning

"tää on kyl syvällisin ohjelmointikurssi mitä mä oon ikin käyny ... aivan armotonta"

"Täytyy sanoa, että MOOC:in jälkeen alkaa ymmärtää miksi olio-ohjelmointi on kehitetty"

"nyt on sellanen fiilis et duunis hanskat tiskiin välittömästi ja koulun penkille takas"

Kurssit:

OHJELMOINNIN MOOC

Ohjelmointi on tietokoneen käskemistä. Kurssilla perehdytään algoritmien laatimiseen ja nykyaikaisen ohjelmoinnin perusideoihin. Opiskelijalta ei edellytetä ennakkotietoja ohjelmoinnista. Tämä on se MOOC, joka liittyy opinto-oikeuden saamiseen Helsingin yliopistoon. **Kurssi on alkanut ja ensimmäinen deadline on 24.2.2013 klo 23.59.**

Mene kurssille ››

PROGRAMMING MOOC

In the Programming MOOC participants learn basics in object-

PELIOHJELMOINNIN MOOC

Peliohjelmointikurssilla tutustutaan peliohjelmoinnin perusteisiin käyttäen Java-ohjelmointikieltä. Kurssin tavoitteena on tutustua ohjelmoinnin perusteisiin ja innostaa jatkamaan harrastusta. **Kurssi on alkanut, eikä siinä ole deadlineja.**

Mene kurssille ››

WEB-PALVELINOHJELMOINTI

Kurssilla tutustutaan nykyaikaisten, skaalautuvien ja virheenkestävien web-sovellusten toteuttamiseen, testaamiseen ja julkaisemiseen. Kurssilla keskitytään
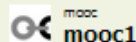
ALGORITMIEN MOOC

Algoritmit, eli "mekaaniset toimintaohjeet ongelmien ratkaisemiseen", ovat oleellinen osa ohjelmointia ja tietojenkäsittelytiedettä. AlgoMOOC tarjoaa lisähaastetta Ohjelmoinnin MOOCin suorittajille ja muille kiinnostuneille. Tehtävien ratkaisemisessa ei enää harjoitella pelkkää ohjelmointia, vaan ohjelmoimalla ratkaistavia ongelmia. **Kurssi on alkanut 11.2.2013.**

Mene kurssille ››

Twitter

mooc
mooc1

linjaaho Sano MOOC kun haluat opetusta online bit.ly/UCA7pi #mooc Hyvä Jaakko ja kumppanit!
4 hours ago · reply · retweet · favorite

mooc1 @linjaaho Danke!
4 hours ago · reply · retweet · favorite

STTInfo MOOC- eli avoin online-opetus kasvattaa suosiotaan myös Helsingin yliopistossa: Jos MOOC, englannin massive open... bit.ly/137sWF1
7 hours ago · reply · retweet · favorite

rageresearch Jaakko will give a talk about MOOCs at Free University of Bozen-Bolzano, Italy, on Wed. You can follow the talk at inf.unibz.it/stream/
4 hours ago · reply · retweet · favorite

mooc1 Ohjelmoinnin MOOCn viikon 5 tehtävät on julkaistu! Vielä ehtii mukaan, sillä viikon 1 deadline on vasta 24.2. mooc.fi
5 days ago · reply · retweet · favorite

LUMAsanomat Opiskelijaksi yliopistoon? blogs.helsinki.fi/wdc-2012/2013/...
7 days ago · reply · retweet · favorite

mooc1 SpeedRun Challenge:n tulokset: 1. Kultaa: Metabolix ajalla 3h 21m 2. Hopeaa: poiru ajalla 5h 19m 3. Pronssia: Aleksi Salmela ajalla 14h 20m
7 days ago · reply · retweet · favorite

mooc1 @frbbs Pahoitteluni, en ollut huomannut viestiäsi. Ohjeet ongelman poistamiseen on lisätty sivulle mooc.fi/ohjelmointi/oh... kohtaan 10
7 days ago · reply · retweet · favorite

mooc1 Hopeaa: poiru ajalla 5:19 tmc.mooc.fi/mooc/courses/1...
7 days ago · reply · retweet · favorite

mooc1 Algoritmien MOOCin SpeedRun Challengen voitti Metabolix ajalla 3:22! Onnittelut!
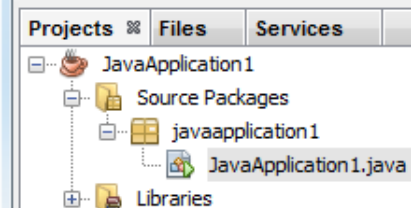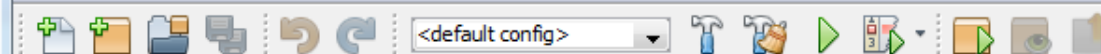7 days ago · reply · retweet · favorite

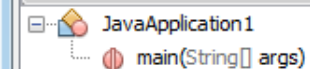Join the conversation

Our MOOC for introductory programming;

Aiming for ''2-sigma effect'' in pure online course

***seeing* stuff ≠ *doing* stuff**

File   Edit   View   Navigate   Source   Refactor   Run   Debug   Team   Tools   TMC   Window   Help

Search (Ctrl+I)

<default config>

Projects %   Files   Services

JavaApplication1   Run tests locally

- JavaApplication1
  - Source Packages
    - javaapplication1
      - JavaApplication1.java
  - Libraries

Source   History

```
1    /*
2     * To change this template, choose Tools | Templates
3     * and open the template in the editor.
4     */
5    package javaapplication1;
6
7    /**
8     *
9     * @author kurhila
10    */
11   public class JavaApplication1 {
12
13       /**
14        * @param args the command line arguments
15        */
16       public static void main(String[] args) {
17           // TODO code application logic here
18       }
19   }
20
```

JavaApplication1.java - Navigator %

Members View

- JavaApplication1
  - main(String[] args)

1 | 1   INS

Course activity is based on our Extreme Apprenticeship (XA) model

Professional tools
Authentic tasks
Open playground

Professional tools
Authentic tasks
Open playground

but also strict adherence to XA principles

XA principles

1. ***start with exercises***; use small **incremental** exercises that ensure achievable tasks; exercises need to provide clear guidelines on **how to start** solving the task and when a task is considered **finished**
2. ***exercises define lecture form and content***; minimize lecturing and maximize number of exercises
3. advisor must be **present** in a same space when student is working on the exercises
4. best up-to-date programming practices are emphasized throughout the scaffolding phase
5. students are encouraged to extend their knowledge beyond the instruction provided

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Zero lectures, spot-on material with *doing* orientation

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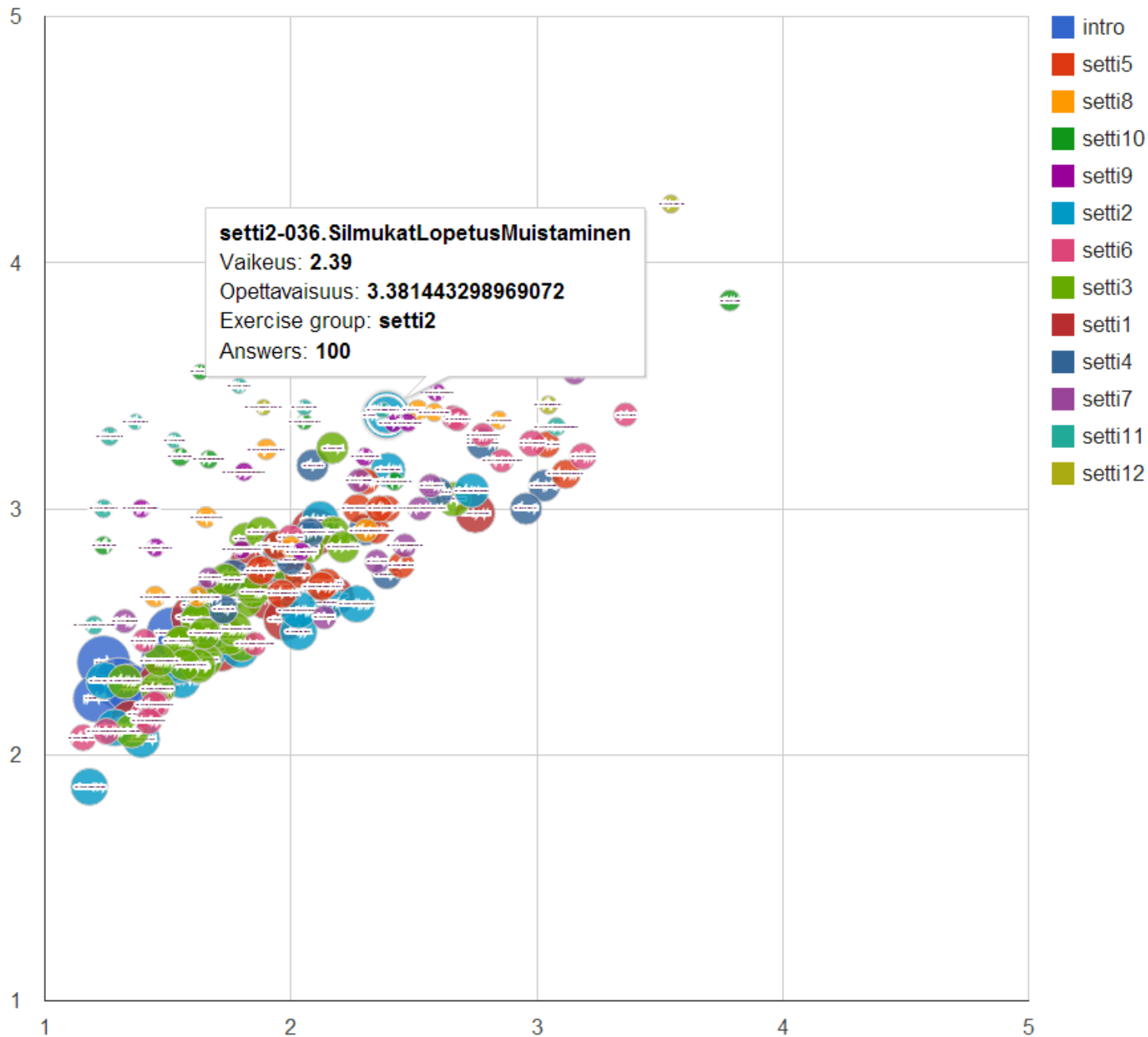Zero lectures, spot-on material with *doing* orientation

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Automated tests and chat-based peer-scaffolding

4. best up-to-date programming practices are emphasized throughout the scaffolding phase

5. students are encouraged to extend their knowledge beyond the instruction provided

- Of course, we have learning analytics:

The best part:

our MOOC is tied to our structures

- on-campus students serve as beta testers

- MOOC serves as an **entrance exam**:

* who has the skills and stamina

* if yes, flying start to studies

Duolingo

Translate this text to English

Io mangio una mela.

I eat an apple

Feedback

You are correct

Report a Problem ▾   💬 13 Comments

Check   Continue

© 2013 Duolingo   About   Terms   Privacy   Help   Jobs   Blog   Twitter   Facebook

Duolingo

- Language learning ed tech
- Classic start by drill-and-practice
    - strongly gamified
- Rapid progress to a level which allows translation/inspection of foreign language sentences
    - that are deemed suitable for your skill level

Duolingo *emerged from its private beta this week with over 125,000 active users who have so far translated 75 million sentences from Wikipedia and other online sources. Soon the site will allow people to upload their own documents for translation, von Ahn says. 'We're translating millions of sentences a day already, which is a pretty good scale,' he says."*

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June 25, 2012, MIT Technology Review

MOOCs: connection to established universities?

Let's face the facts: most MOOCs, as they are now, are for *autodidacts*

MOOCs are more textbooks than education

Obvious: MOOCs must be much more, aim to boost *learning*.

But: MOOCs start to reflect all other types of education: it can be good or bad.

- Some of our students do Codeschool, 2-hour courses on very specific programming topics. With all components in place, we can all be surprisingly autodidactic

Possible lines of development:

"How did we get to this point, that people are seriously talking about shutting down schools in favor of MOOCs? Maybe it's because we in Universities haven't done enough to recognize, value, and publicize good teaching. We haven't done enough to tell people what we do well. MOOCs do what the external world *thinks* that University teachers do."

-- M. Guzdial, Jan 2013

"How did we get to this point, that people are seriously talking about shutting down schools in favor of MOOCs? Maybe it's because we in Universities haven't done enough to

Greg Wilson: "But how much difference is there between MOOCs and *average* teachers? I think the answer is, "Less than we'd like," which in turn explains why so many people are willing to buy what MOOCs' advocates are selling."

-- M. Guzdial, Jan 2013

"How did we get to this point, that people are seriously talking about shutting down schools in favor of MOOCs? Maybe it's because we in

David from MIT: "Interesting conundrum. Suppose we have to make a choice between educating few people at high quality versus educating many at low quality. Which should we do? In fact, I suspect we'll get both. There will always be an elite willing to pay more for that higher quality."

-- M. Guzdial, Jan 2013

i.e., the intellectually rich get intellectually richer

Thank you!

www.cs.helsinki.fi/rage