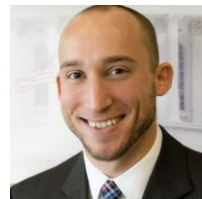




Making Sense of MOOCs

Implications and Lessons from Early Entrants into Large-Scale Instructional Innovation



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Opening the Floodgates

Sebastian Thrun's Massive Open Online Course (MOOC) Goes Viral

Two Fashionable Brands

Celebrity Faculty



Dr. Sebastian Thrun
Stanford Professor



*Cutting-Edge
Corporation*



One Hot Global Topic

INTRODUCTION TO

Artificial Intelligence

Topics Covered

- Knowledge Representation
- Inference
- Machine Learning
- Planning and Game Playing
- Information Retrieval
- Computer Vision
- Robotics



Truly Amazing Uptake

160,000



Enrolled
Students

*From
Announcement
to Launch:
2 months*

195



Countries

A Seminar at Scale

New Teaching Technologies and Social Models Essential to Course Design

Relatively Common

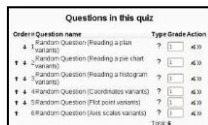
Still Rare

Instructional Videos



Instructors Thrun and Norvig record traditional lectures and post online

Automated Assessment



Students' homework, quizzes, and exams graded by computer

Peer-to-Peer Academic Support



Students post and answer thousands of questions on various message boards

Student-Designed Tools

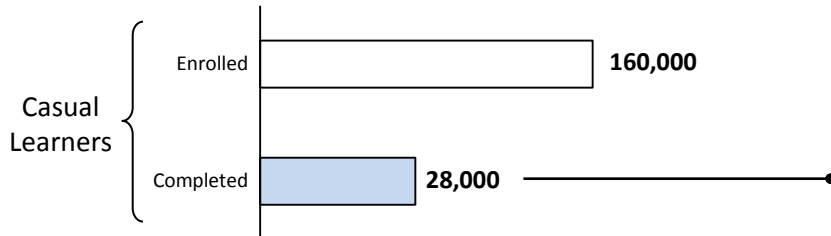


Students create software tools to support the course, including an AI "playground" for testing code

Parting Ways Over Assessment

Thrun and Stanford Differ Over Credentialing

Open to All, But Winning the Elite

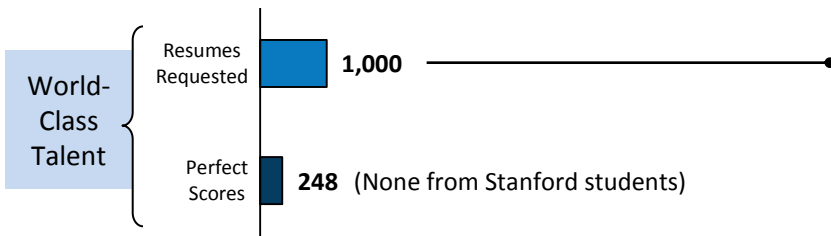


Connecting to Industry

Certificates of Completion



Students completing class can add certificate to CV



Employer Introductions



Top student resumes passed along to employers

A Venture Capital-Backed Startup

Your Revenue Model Is Thrun's Loss Leader

An Inverted Revenue Model

- Courses are free
- Assessment and certificates are free
- Revenue comes from value-added services to students and employers:
 - Lead Generation
 - Authenticated Credentials
 - Tutoring and Support



No Going Back for Thrun

“Having done this, I can’t teach at Stanford again. It’s impossible. There’s a red pill and a blue pill and you can take the blue pill and go back to your classroom and lecture your 20 students. But I’ve taken the red pill and seen Wonderland.”

Sebastian Thrun

“The Four Elements of Udacity”

19 Free STEM Courses
(Mostly Programming)



An Active Online Community



Optional Proctored Exams



Career Placement Service



The Incumbent Response

New Ventures Offer Elite Universities a New Platform



A Venue for Star Faculty

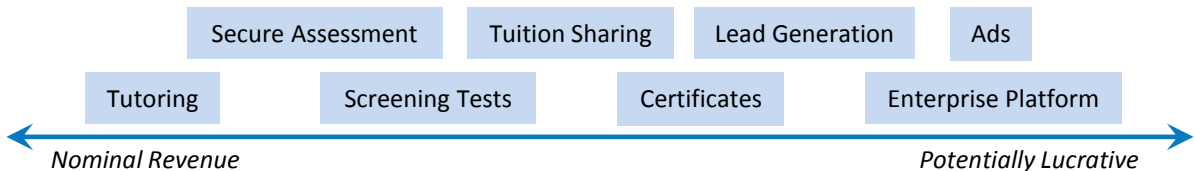
- Private company founded by Stanford computer scientists Andrew Ng and Daphne Koller
- Partners with elite universities to showcase “the world’s best courses”
- Has grown from 5 universities in Spring 2012 to 33 universities and 214 courses in Jan 2013



Building an Open Platform

- Not-for-profit organization coordinating partner MOOCs (Harvard, MIT, UC Berkeley, U of Texas System, Wellesley, and Georgetown)
- Led by Anant Agarwal, MIT computer scientist and MITx’s first instructor
- 24 courses available as of Jan 2013

Sustainable Business Model or Marginal Revenue?



Reading Between the Lines

What's Motivating the Rush to Online Offerings?

Brand Enhancement

"They will in no way diminish the value of a UVA degree, but rather enhance our brand and allow others to experience the learning environment of [Thomas] Jefferson's Academical Village."



*Teresa Sullivan
President, University of Virginia*

Public Service

"The missions of Harvard and MIT are to provide access to learning and education and improve the general quality of life of humankind. What we're doing is simply a continuation of that mission."



*Anant Agarwal
President, EdX*

Improving Pedagogy

"Through this partnership, we will not only make knowledge more available, but we will learn more about learning. We will refine proven teaching methods and develop new approaches that take full advantage of established and emerging technology..."



*Drew Faust
President, Harvard University*

Fear of Missing Out

"You're known by your partners, and this is the College of Cardinals. It's some of the best universities in the country... We're doing this in the hope and expectation that we'll be able to build a financial model, but I don't know what it is. But we can't be too far behind in an area that's growing and changing as fast as this one."



*E. Gordon Gee
President, Ohio State University*

A Cure for Everything?

Proponents Argue that MOOCs Can Solve Broad Range of Issues

Proposed MOOC Benefits

**Student
Access**

**Cost
Reduction**

**Degree
Completion**

**Skill
Certification**

**Job
Placement**

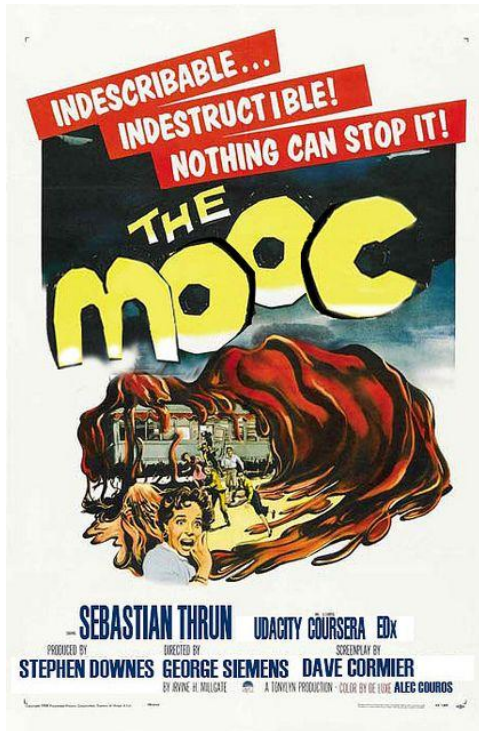
**Educational
Quality**

“Our goal through our partnership with edX is to better meet the learning needs of a wide range of students, **raise graduation rates and cut the cost of higher education**, all while maintaining our commitment to education of the highest quality.”

Gene Powell, Chairman of the UT System Board of Regents

A Growing Chorus Among Skeptics

Will “MOOC Mania” Commoditize Learning and Cost Faculty Jobs?



The rush toward the creation of massive open online courses (MOOCs) is catching on in higher education like wildfire. All it takes, it seems, is to wave a bit of money around, talk up the brave new world of technological innovation, bash the “failed” world of higher education as we know it, and **the privatization troops have administrators in a fit of unexamined, swooning technophilia.** These “courses,” however, in addition to offering false promises, also **undermine shared governance, run roughshod over established curriculum development procedures and move colleges toward the era of “teacherless classrooms,”** which destroy the academic integrity of our institutions and demean the value of the education our students receive.

MOOCs are designed to impose, not improved learning, but a new business model on higher education, which opens the door for wide-scale profiteering. **Public institutions of higher education then become shells for private interests who will offer small grants on the front end and reap larger profits on the back end.**

*“Unthinking Technophilia”
Inside Higher Education, 1/14/13*

What Would a “MOOC Strategy” Look Like?

Four Broad Categories Have Emerged

Public Service and Perception

- Establish a platform for high-profile faculty and prestigious brands to expand their reach



Scaling Signature Programs

- Increase interest in select programs through a “freemium” or “try before you buy” offering

MOOC² DEGREE



Outsource and Articulate

- Address curricular gaps or problems by contracting with MOOC providers on particular courses



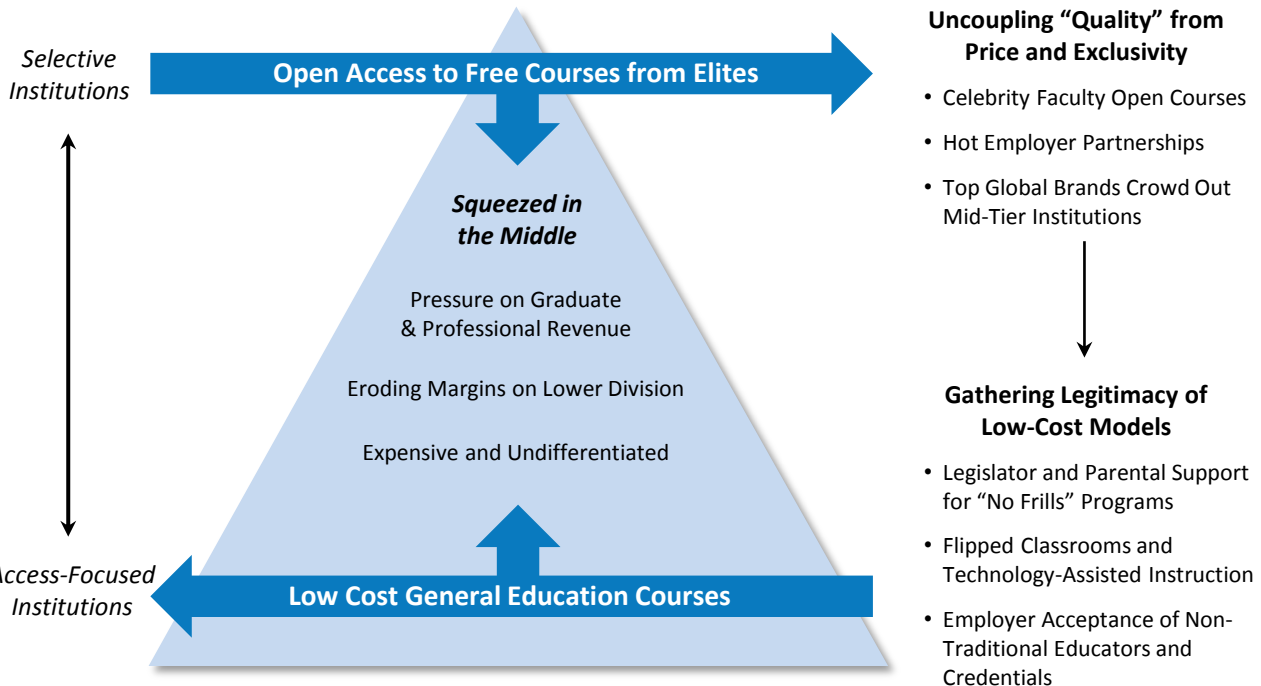
Leverage Technology in Pedagogy

- Apply “quality at scale” tools and techniques to improve and expand existing hybrid or fully online courses



Upsetting the Balance

New Models Threaten Incumbents from Both Ends of the Spectrum

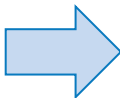


What Disruption Looks Like

Emerging Models Indicate Potentially Dramatic Shifts in Higher Education

New Educational Models

- Large-Scale Learning Platforms
- Differentiated Instructional Roles
- Automated Assessment
- Adaptive Learning
- Easy Credit Transfer
- Employer-Relevant Competencies



Industry Disruption

Consolidation

A handful of platforms attract the majority of students

Commoditization

Free content and courses make it impossible to sell expensive versions

Unbundling

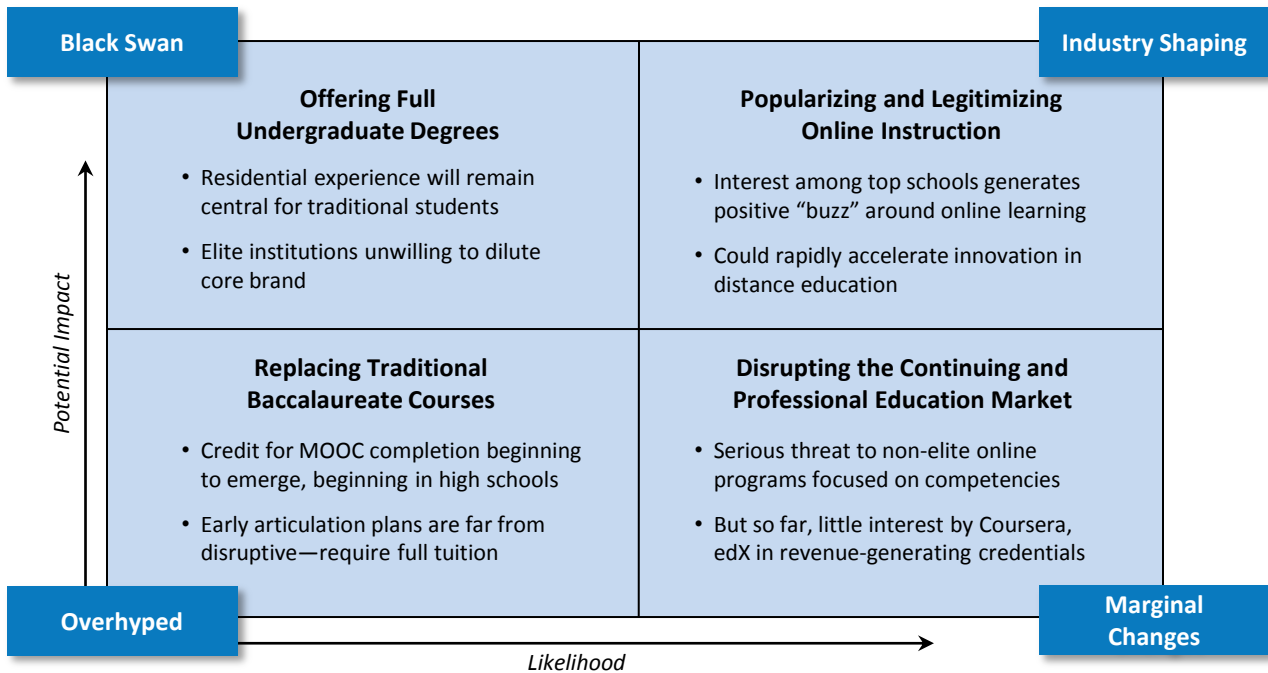
Content creation, content delivery, assessment, and credentialing performed by different people and different organizations

Disintermediation

Students no longer see universities as an essential path to learning and career success. Instructors can reach students directly without need for universities

Overhyped or Truly Disruptive?

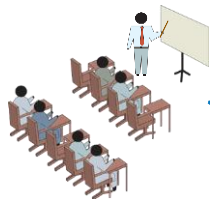
Forecasting the Potential Impact of MOOCs on Higher Education



Inactive Learning, in Person and Online

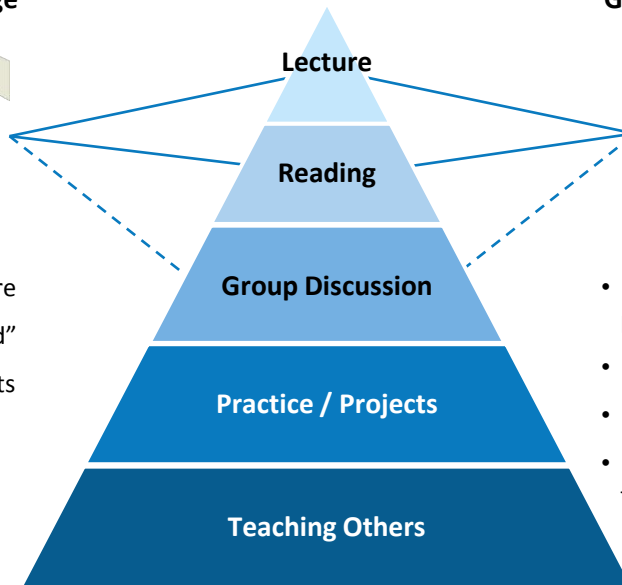
Few Benefits from Static Content Delivery

“Sage on the Stage”

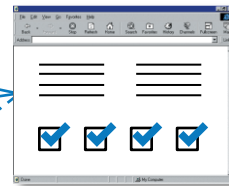


- 1-2 hours of lecture
- No way to “rewind”
- Physical constraints of classroom
- Students play passive role

Less Engaging



Generic Online Course



- Readings and homework posted online
- No forum for interaction
- Email correspondence
- No additional value from technology

More Engaging

Hard to Generalize about “MOOC Quality”

Course Sophistication and Development Costs Vary Widely

The Boring Lecture in Bits

xMOOC



PowerPoint slides



Recorded lecture audio



Limited examination
(Midterm + Final multiple choice)

The Seminar at Scale

cMOOC



Live videoconferencing with small group discussion



Khan Academy-style mini-lectures



Active discussion forums,
Facebook groups, and Twitter
feeds moderated by TAs and
community leaders



Independent and group activities



Adaptive learning modules
powered by analytics



Local study groups

A Cure for Baumol's Cost Disease

"Live Performance" Economics Ignore Scaling Effects of Technology



Can Musicians Be More Productive?

- More capital per worker
- Increased labor skill
- Better management
- Improved technology
- Economies of scale

The "Unbundling" of Faculty Roles



In House

Outsourced



Open Source



	Content Creation	Content Delivery	Learning Assessment	Student Support
In House	Professional Course Designers	Lecture Capture	Independent Competency Tests	Peer Tutors
Outsourced	Publisher "Course in a Box"	Adaptive Learning Technologies	Outsourced Grading	On-Demand Advising
Open Source	Open Educational Resources	iTunes U	Massive Open Online Courses	Online Peer Advising



Crowd-Sourced Student Support

Incentivizing Heads of the Class to Help Others in a Class of 160,000+


Thrun's A.I. Class Discussion Board

 **Can someone recommend**
15 prerequisite materials to read before
 **the start of the class?**

 **13**  *A: Try the Khan Academy lectures.*
Answered by [AISuperFan](#)

 **-4**  *A : Look it up on Wikipedia.*
Answered by [WalesJ](#)

Asked by [JWilson](#)



Great Answer

Good Answer

Pundit

1,527 Karma

2

Reward Badges Motivate Quality Contributions

- *Good Answer: Answer voted up 25 times*
- *Great Answer: Answer voted up 100 times*
- *Pundit: User has left 10 comments*

1 **Peers Vote Both Questions and Answers “Up” or “Down” Based on Usefulness**

Karma History

Recent Activity Feed



3

Real-Time Dashboard Provokes Progress Over Time, Daily Activity

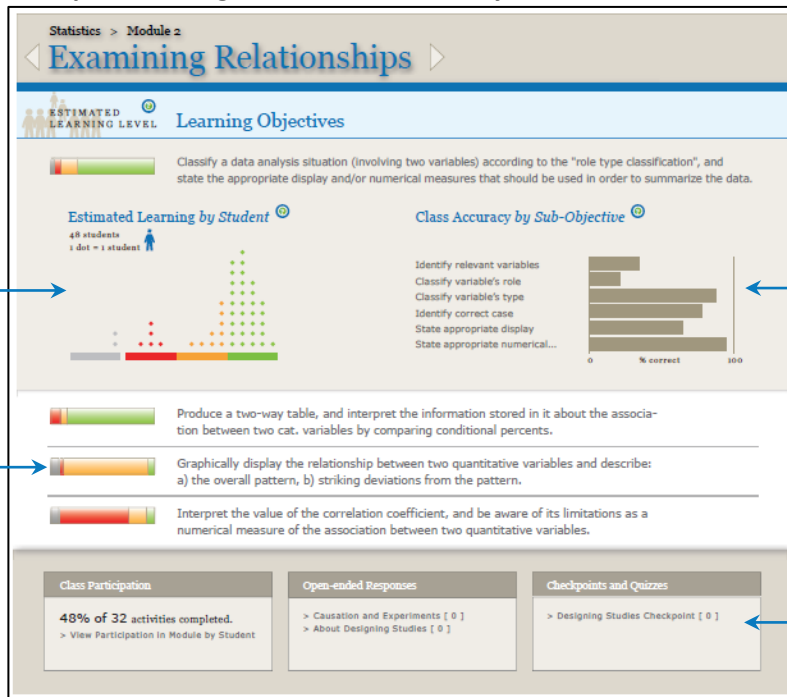
“Moneyball” for Education

Instructor Dashboards Provide Real-Time Outcome Data, Predictive Analytics

Carnegie Mellon



Open Learning Initiative Introductory Statistics Dashboard



Predictive map of overall learning outcomes

Accuracy distribution by sub-objective

Performance distribution for each objective

Participation by assignment category

Source: Candace Thille, "Changing the Production Function in Higher Education," American Council on Education, March 2012.

Game-Based Learning on the Horizon

Motivating and Educating a Generation of Gamers

6 Million Years

Total worldwide playtime

10 Million Players

Currently subscribed



200 Million Minutes

Total playtime per day

1 Billion Downloads

Since 2009

Built-in Assessment

- Players must solve problems, coordinate teams, and develop mastery to “beat the game”
- Completion signifies known competencies and objective achievements

Contextual Learning

- Players learn by doing, not reading or watching
- Puzzles placed in compelling, intuitive narrative
- Crowd-sourced “theorycrafting” for serious players

Motivating Progression

- Games must be accessible and fun, yet challenging
- Huge amount of data used to calibrate incentives
- “Experience points” and items provide social recognition

Source: James Paul Gee, “Games and 21st Century Learning,” *Games for Learning Institute*, May 6, 2009; Jane McGonigal, “Be a Gamer, Save the World,” *The Wall Street Journal*, Jan 22, 2011.

Course-Sharing Consortia

Comprehensiveness Achieved by Combining Offerings Online

Lowering the Cost and Risk of Launching Online Programs

Online Consortium of Independent Colleges & Universities (OCICU)

- New Ventures of Regis University provides online infrastructure
- Course design, maintenance, and faculty training included

Taking Niche Offerings to Scale Without Sacrificing Breadth

*New Paradigm Initiative
Associated Colleges of the South*

- Courses broadcast via teleconference; remote students participate in real time
- Declining viability of language departments a key catalyst



Departments offer many sub-scale courses



Yet colleges still struggle to afford breadth



Chinese



Physics



Art History



Biology



Arabic



Shared
Course
Portal

The Platform Wars

Big Data Fueling Emerging Market for Education's "Google Equivalent"



Blackboard



Class2Go



Next-Gen Learning Platform

- Course administration
- Multimedia content delivery
- Live collaboration tools
- Real-time performance data
- Predictive analytics
- Adaptive assessment
- Automated advising

The Power of a Platform

"It's hard to predict who will win the platform wars, but it's easy to predict that someone will. The costs of building an online platform are negligible... The rewards of building the winning platform are vast, as Instagram found when it was bought by Facebook for \$1 billion."

Kevin Carey, New America Foundation

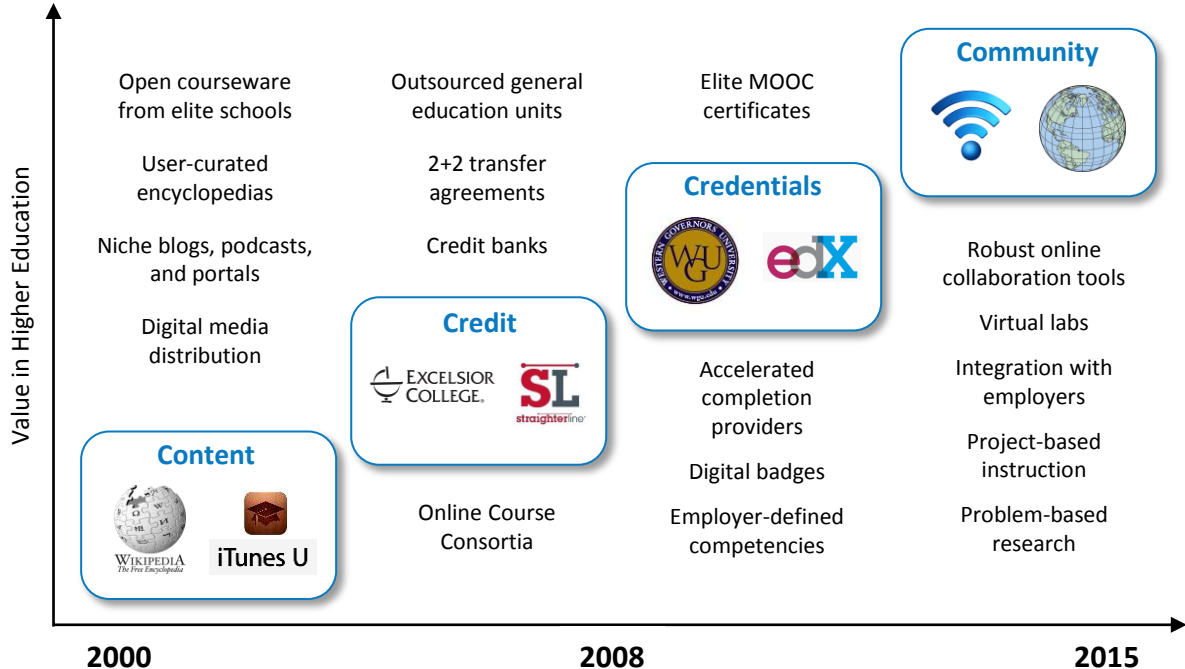
How Many Providers Do We Need?

"In 50 years, there will be only 10 institutions in the world delivering higher education and Udacity has a shot at being one of them."

Sebastian Thrun

No Longer a Monopoly Market

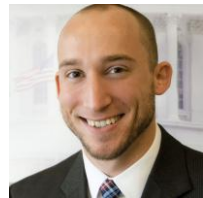
Incumbents Losing Control Over Previously Exclusive Territory





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