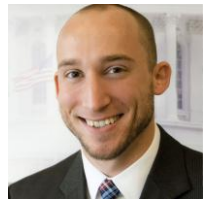# The Promise and Perils of Innovation

Competitive Challenges to the Traditional Higher Education Model

Part I: Innovations in Delivering Quality Instruction at Scale

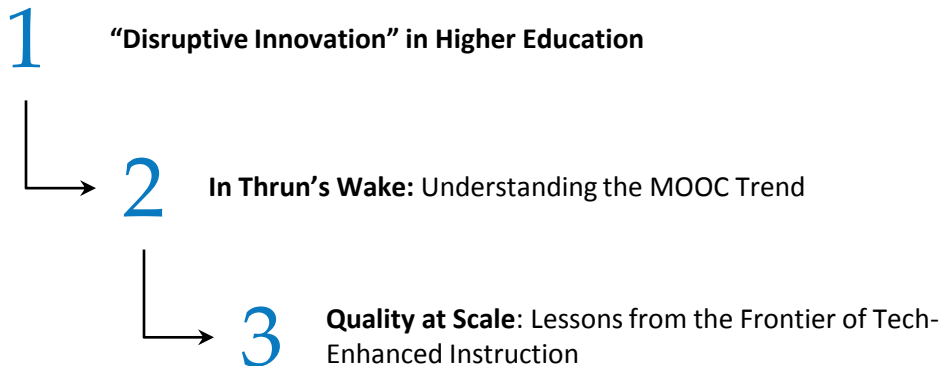**Part II: Defining Your Institution's Value in the Face of Disruption**
Thursday, September 20, 1–2 p.m. ET

Colin Koproske
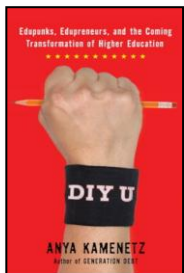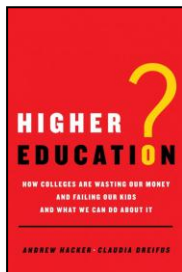Consultant
KoproskC@Advisory.com

Road Map for Discussion

1 **"Disruptive Innovation" in Higher Education**

2 **In Thrun's Wake:** Understanding the MOOC Trend

3 **Quality at Scale**: Lessons from the Frontier of Tech-Enhanced Instruction

Disruption Fatigue
Who Knew that Innovation Could Sound So Familiar?

Required Reading at Board Meetings and Planning Retreats
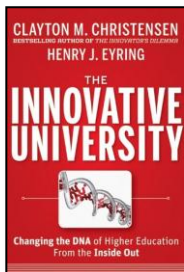
The Conventional Litany of the Broken University Business Model

- Uncontrolled cost increases

- Graduates lack critical skills

- Resistance to pedagogical innovation

- Irrelevant scholarship

- Tenure protects faculty from accountability

- Undergraduate tuition subsidizing faculty research

- Traditional universities captive to the prestige arms race—real change will come from radical, low-cost models

"The Status Quo Is Unsustainable"
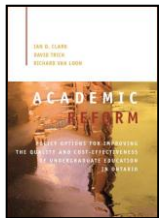
The Case for Government-Led Reform in Ontario

A Consistent Message Emerges

- Refocus incentives on teaching
- Expand online course offerings
- Create three-year degrees
- Operate year-round
- Tie funding to outcome metrics
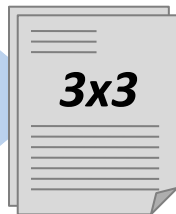- Simplify credit transfer across colleges and universities

Academic Reform
Policy Options for Improving the Quality and Cost-Effectiveness of Undergraduate Education in Ontario
(October 2011)

3x3

3 Cubed
PSE Institutions as Centres of Creativity, Competency, and Citizenship Equipped for the 21st Century
(Leaked February 2012)
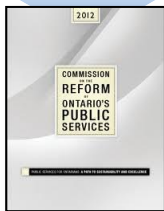
Commission on the Reform of Ontario's Public Services
(February 2012)

The Incumbent's Dilemma

Certain Downside, Speculative Upside for Exiting Prestige Arms Race

Clayton Christensen in a Nutshell:

"Be More Like BYU Idaho"

- 🚫 End tenure
- 🚫 Dismantle departments
- 🚫 Refocus research on pedagogy
- 🚫 Switch to fully online degrees
- 🚫 Enroll the marginally qualified
- 🚫 Reduce number of programs
- 🚫 Scale back merit-based aid
- 🚫 Cut back big-time sports

I'm Certainly Not Going First

"I understand that as an organization we could be a lot more efficient. But if I tried to make some of the changes that are being recommended, the accreditors would be all over me, I'd have a faculty revolt, and pretty quickly, I'd be out of a job."

Provost
Public Research University

Featured Models of Efficiency Impossible to Emulate
Nascent Small-Scale Publics Built from Scratch

New STEM-Focused Institution Fills Unmet Need at Low Cost

HARRISBURG UNIVERSITY OF SCIENCE AND TECHNOLOGY

- Opened in 2005

- Single 16-story building

- No sports, gym, or dorms

- No tenure; 12-month contracts

- No departments

"From the beginning we decided we didn't want this to be a traditional institution, because we in business who had been involved with other higher education institutions felt that everything took too long."

Chair of Planning Committee

Mayo Clinic Partner Becomes Learner-Focused System Branch

UNIVERSITY OF MINNESOTA
ROCHESTER
Driven to Discover℠

- Opened in 2008 to serve nearby Mayo Clinic

- First class of 57 undergrads in 2011

- No departments

- Differentiated faculty model separates curricular design, teaching, and targeted projects

"The bad news at the beginning was that we had no faculty; the good news was that we had no faculty."

Chancellor Stephen Lehmkuhle

Not In Our League

Startups Hardly Look Like a Threat to Established Universities

- Peer-to-peer learning
- Unaccredited
- Non-profit, tuition-free
- 1,300 students

- Pay-by-the-course Gen Ed
- Unaccredited
- For-profit
- $99/month plus $39/course
- 38 entry-level college courses

- Free video micro-lectures
- Unaccredited
- Non-profit, tuition-free
- 3,000+ lectures available

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*

Google™

+

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

190

Enrolled Students   Countries

*From
Announcement
to Launch*:
2 months

A Seminar at Scale

New Teaching Technologies and Social Models Essential to Course Design

Relatively Common ⟶ **Still Rare**

Instructional Videos	**Automated Assessment**	**Peer-to-Peer Academic Support**	**Student-Designed Tools**

Instructors Thrun and Norvig record traditional lectures and post online

Students' homework, quizzes, and exams graded by computer

Students post and answer thousands of questions on various message boards

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

Source: Tamar Lewin, "Instruction for Masses Knocks Down Campus Walls," *The New York Times*, March 4, 2012.

Parting Ways Over Assessment

Thrun and Stanford Differ Over Credentialing

Open to All, But Winnowing the Elite
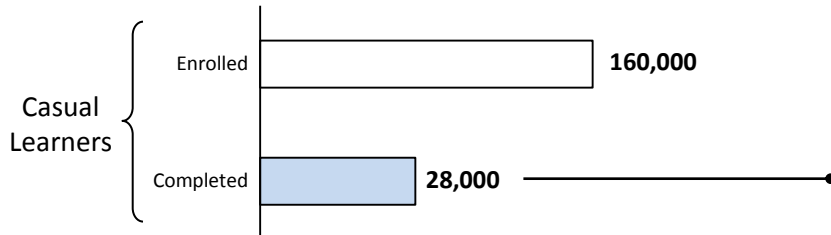
Connecting to Industry

Certificates of Completion

Students completing class can add certificate to CV

Casual Learners
- Enrolled: **160,000**
- Completed: **28,000**

World-Class Talent
- Resumes Requested: **1,000**
- Perfect Scores: **248** (None from Stanford students)
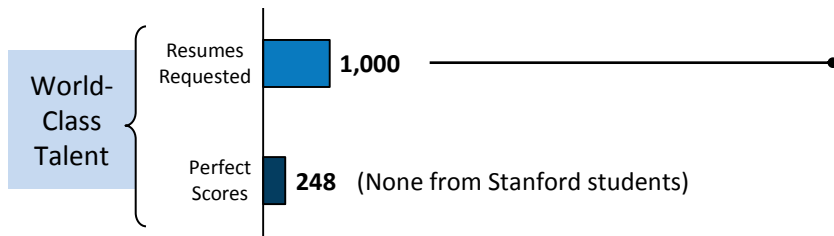
Employer Introductions

Top student resumes passed along to employers

A Venture Capital-Backed Startup
Your Revenue Model Is Thrun's Loss Leader

UDACITY

A MOOC Incubator

- Private company founded by Dr. Thrun and funded by Charles River Associates

- Infrastructure, instructional design, and business services for global MOOC courses

- Eleven STEM courses now available; eight more by end of 2013

- Taught by prominent faculty on leave from prestigious traditional universities

An Inverted Revenue Model

- Courses are <u>free</u>

- Assessment and certificates are <u>free</u>

- Revenue may come from value-added services to students and employers:

  ➢ Premium Tutoring

  ➢ Authenticated Credentials

  ➢ Lead Generation

Imagining a Multi-Million-Dollar Human Capital Search Opportunity

| **1,000**
Students | ✖ | **$100,000**
AI Starting Salary | ✖ | **10-30%**
Recruiter Commission | **=** | **$10M-$30M** |

A Tipping Point

From Inspiration to Fruition in Only a Year

July 2011
Thrun and Norvig announce that their Stanford AI course will be open to anyone

January 2012
Two Stanford professors found Coursera; Venture capital firms invest $16 M

July 2012
Coursera expands to 16 universities and 100+ courses

March 2011
Thrun sees Salman Khan speak at TED

December 2011
MIT announces "MITx"

Thrun gets venture capital to create Udacity

May 2012
MIT and Harvard announce "edX" – free online courses and certificates

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

…Or for Higher Education?

"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

Source: Steven Leckart, "The Stanford Education Experiment," *Wired Magazine*, April 2012.

The Incumbent Response
New Venture Offers Elite Universities a New Platform

coursera

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"

- No money exchanged in partnerships; Coursera serves primarily as central web portal

The Start of a Larger Conversation

"This is good news. Experimentation with new initiatives in technology use is an important part of the substantive inquiry that will help inform the University's academic leaders about the best course of action in this area. The Board of Visitors' primary interest is in promoting the highest order of excellence in our students' learning and enrichment, especially in a resource-constrained environment."

Helen Dragas
Rector, UVA Board of Visitors

Sustainable Business Model or Marginal Revenue?

| Secure Assessment | Tuition Sharing | Lead Generation | Ads |

| Tutoring | Screening Tests | Certificates | Enterprise Platform |

Nominal Revenue ← → *Potentially Lucrative*
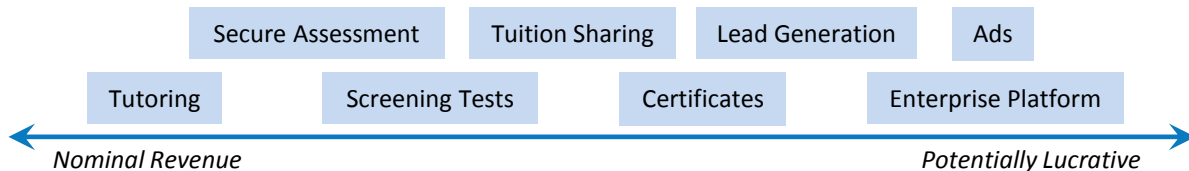
Envisioning the Current MOOC Market
Key Differences Emerge in Aim and Structure

	coursera	**edX**	**UDACITY**
Initial Funding	$22 M in Venture Capital	$30 M from Harvard $30 M from MIT	$5 M in Venture Capital $200 K from Thrun
Course Structure	Fixed terms Automated assessment Lectures + quizzes	Fixed terms Plans for automated assessment Lectures + quizzes	Self-paced Automated assessment Pearson testing centers
Student Engagement	MeetUp gatherings Considering peer assessment	Class discussion boards Wikis	Active peer support forums Q&A Sessions
Scale	16 University partners 100 K students in pilot course	UC Berkeley first additional partner; seeking more 122 K students in pilot course	Focus on STEM and industry 160 K students in pilot course
Employer Partnerships	None	None	Career Placement Program Silicon Valley connections 20 official partners

Overhyped or Truly Disruptive?

Forecasting the Potential Impact of MOOCs on Higher Education

Black Swan | **Industry Shaping**

Potential Impact

Offering Full Undergraduate Degrees

- Residential experience will remain central for traditional students
- Elite institutions unwilling to dilute core brand

Popularizing and Legitimizing Online Instruction

- Interest among top schools generates positive "buzz" around online learning
- Could rapidly accelerate innovation in distance education

Replacing Traditional Baccalaureate Courses

- Credit for MOOC completion beginning to emerge, beginning in high schools
- Early articulation plans are far from disruptive—require full tuition

Disrupting the Continuing and Professional Education Market

- Serious threat to scalable, online programs focused on competencies
- So far, little interest by Coursera, edX in revenue-generating credentials

Overhyped | **Marginal Changes**

Likelihood

Source: Education Advisory Board interviews and analysis.

Disruption from Above, Then Below
New Models Will Threaten Incumbents from Both Ends of the Spectrum

Selective Institutions

Growth of High-Quality Online-Only Curriculum

Squeezed in the Middle

Pressure on Graduate & Professional Revenue

Eroding Margins on Lower Division

Expensive and Undifferentiated

Unbundling of General Education

Access-Focused Institutions

Uncoupling "Quality" from Price and Exclusivity

- Celebrity Faculty Open Courses
- Hot Employer Partnerships
- Top Global Brands Crowd Out Mid-Tier Institutions

Gathering Legitimacy of Low-Cost Models

- Legislator and Parental Support for "No Frills" Programs
- Flipped Classrooms and Technology-Assisted Instruction
- Employer Acceptance of Non-Traditional Educators and Credentials

The Burning Platform

Economic Conditions Accelerating the Rise of Alternatives

The Unpleasant Economic Realities

- State budget cuts
- Federal budget pressure
- Soaring student debt
- Bankruptcy rates rising
- Falling home equity
- High graduate unemployment

The Threat You've Feared:
Regulation

- Caps on Tuition and Fees
- Limits on Collective Bargaining
- Faculty Productivity Mandates
- Performance-Based Funding
- Academic Program Elimination
- Forced Articulation

The Real Threat:
Irrelevance

- Governors launching charter universities and other alternatives
- Venture philanthropists funding alternative projects
- Non-traditional students flocking to for-profit universities
- Traditional undergraduates opting for community colleges
- Faculty launching educational technology startups

Disruptive Competition and Incumbent Innovation
Pressures on the Traditional Higher Education Business Model

		Traditionalists Believe…	*But Innovators Show…*
1	**Quality at Scale**	*Quality means small courses with tenured faculty*	*Academic rigor is possible in large-scale settings*
2	**Competing on Convenience**	*We should not treat students like customers*	*Students increasingly demand flexibility and affordability*
3	**Integrating Academic and Career Preparation**	*Degrees represent mastery of a discipline*	*Degrees can represent employer-relevant competencies*
4	**Problem-Focused Research**	*Curiosity-driven disciplinary research is most fruitful*	*Grand challenges can only be solved by multidisciplinary collaboration*

How Will Disruption Manifest?

Pressures on the Traditional Higher Education Business Model

1 **Quality at Scale**

Elite institutions and faculty rapidly legitimize technology-intensive, globally scalable instructional models

2 Competing on Convenience

3 Integrating Academic and Career Preparation

4 Problem-Focused Research

Disruptive Competitors:
- Elite Open Course Credentials
- Signature Online Master's Programs
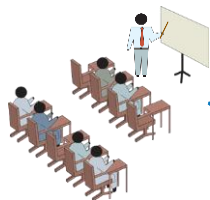- Prestigious Online Undergraduate Universities

Incumbent Responses:
- Flipped Classrooms
- Adaptive Learning
- Learning Analytics
- Course-Sharing Consortia

Inactive Learning, in Person and Online
Few Benefits from Static Content Delivery

Less Engaging

"Sage on the Stage"

Generic Online Course

Lecture

Reading

Group Discussion

Practice / Projects

Teaching Others

- 1-2 hours of lecture

- No way to "rewind"

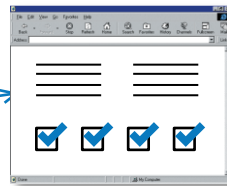- Physical constraints of classroom

- Students play passive role

- Readings and homework posted online

- No forum for interaction

- Email correspondence

- No additional value from technology

More Engaging

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

	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

Making the Most of Large Classes

How Ontario's Best Faculty Approach High-Capacity Instruction
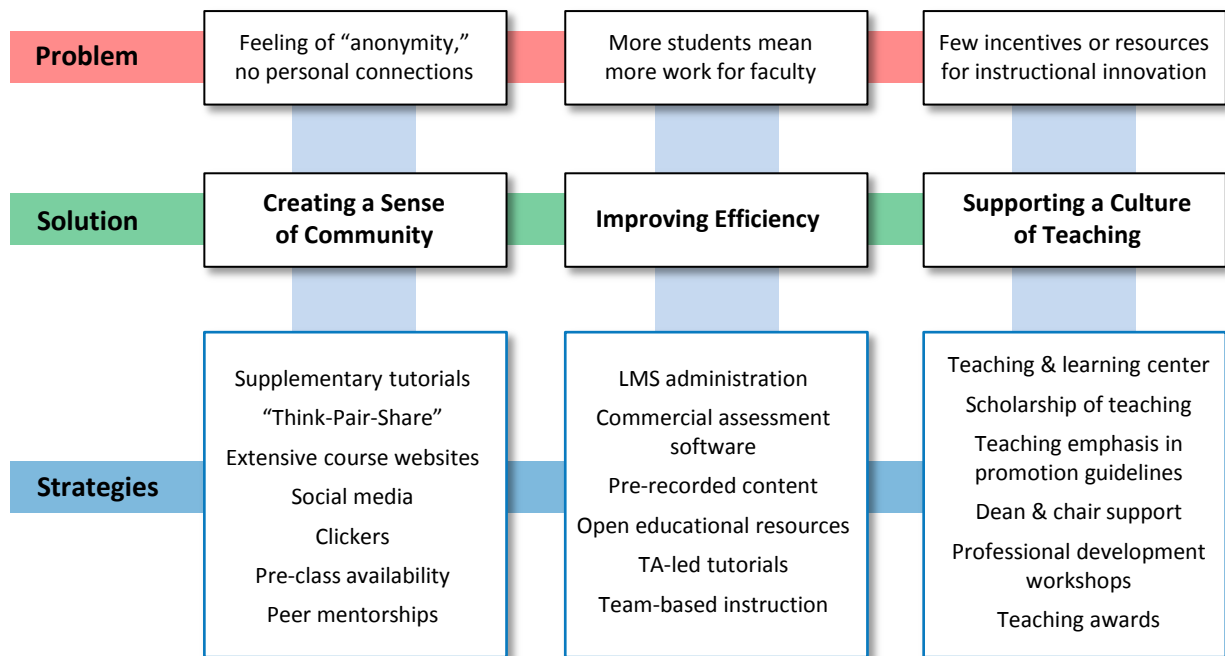
Problem	Feeling of "anonymity," no personal connections	More students mean more work for faculty	Few incentives or resources for instructional innovation
Solution	**Creating a Sense of Community**	**Improving Efficiency**	**Supporting a Culture of Teaching**
Strategies	Supplementary tutorials "Think-Pair-Share" Extensive course websites Social media Clickers Pre-class availability Peer mentorships	LMS administration Commercial assessment software Pre-recorded content Open educational resources TA-led tutorials Team-based instruction	Teaching & learning center Scholarship of teaching Teaching emphasis in promotion guidelines Dean & chair support Professional development workshops Teaching awards

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

👍 **15** 👎 **Can someone recommend 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 Question

Good Question

Pundit

1,527 Karma

(2)

Reward Badges Motivate Quality Contributions

- *Good Question: Question voted up 25 times*
- *Great Question: Question 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

Source: Education Advisory Board interviews and analysis.

Winning on All Fronts with Course Redesign

Alternative Model Expands Capacity, Improves Quality, and Costs Less

Faculty

TAs and Peer Mentors

Pre-Reading	Pre-Quiz	Lecture	Practices	Problem Solving	Homework

Embedded Videos — *Pre-Lecture Prep* — *e-Tutor* — *Mini-Tests* — *e-Tutor*
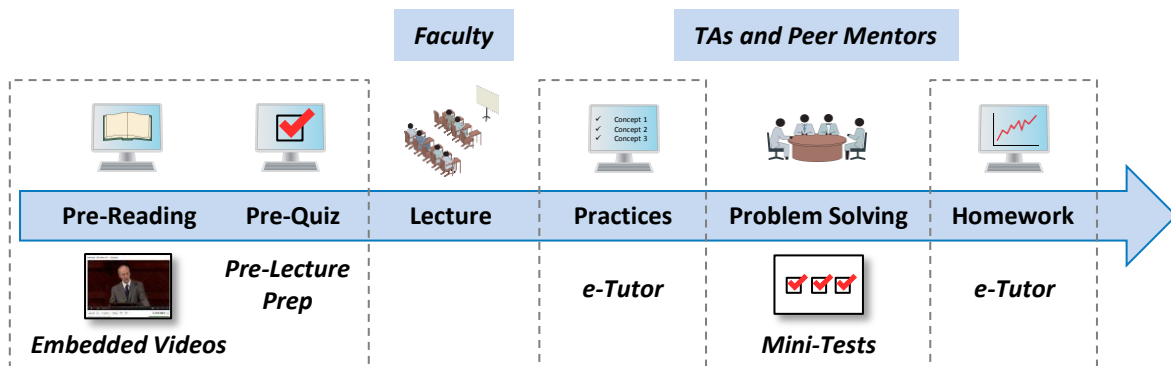
12% Reduction in DFW rate

45% Increase in enrollment cap

31% Cost savings per student

Few Excuses Left

Course Redesign Gaining Traction Across Institutional Types and Disciplines

"I always thought I was a pretty good lecturer, but … I had come to a realization that even my most successful students weren't retaining a lot of the material I'd covered from one course to the next."

Elizabeth Alexander
Texas Wesleyan History Professor

Physics

- Clickers and frequent feedback opportunities keep students on track
- Students grouped based on answers to questions

English

- From 3 hours to 1 hour in class per week
- Additional time spent in one-on-one sessions, peer tutoring, and multimedia lessons

History

- Historical Methods class won "Radically Flexible Classroom" award
- Movable furniture and tech-enabled classrooms facilitate group work

Math

- Emporium model: 1 hour in class, 2 hours in large computer lab
- Significantly improved completion and retention rates
- 19% instructional cost savings

"Do our students actually *learn* during class, or do they simply feverishly scribble down everything we say, hoping somehow to understand the material later?"

Eric Mazur
Harvard Physics Professor

Incentivizing Pedagogical Change
Three Lessons in Encouraging Faculty to Improve Their Courses

① Provide Centralized Instructional Design Support

Typical Problem:
- Multiple, duplicative services
- No integration of tech & instructional design expertise

Exemplar Model:
- Center for Teaching & Learning combines tech and pedagogy staff
- Staff directly involved with course design at all levels

UNC CHARLOTTE

② Focus on New Hires to Create Culture of Innovation

Typical Problem:
- Political capital spent trying to convert eternal skeptics
- Research remains the priority

Exemplar Model:
- Faculty Development Institute focuses on new hires
- 100s of short courses available on every facet of teaching

VirginiaTech

③ It's Not About Technology. It's About Assessment.

Typical Problem:
- Faculty recoil at "online" and "machine-aided" teaching
- Wasteful tech investments

Exemplar Model:
- Faculty required to submit self-assessment studies yearly
- Agnostic about end product; experimentation encouraged
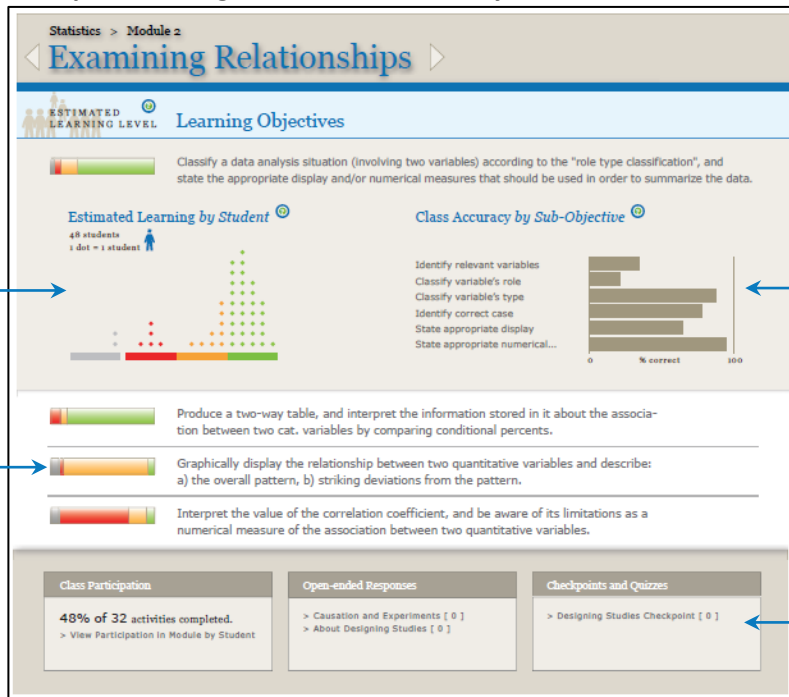
THE UNIVERSITY OF ALABAMA

"Moneyball" for Education

Instructor Dashboards Provide Real-Time Outcome Data, Predictive Analytics

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

Aiming Higher than Equivalence

"While continuing to study the impact of online learning on completion is important, the question to be answered is not 'is online education as good as (or better than) traditional education?' but rather, 'how can the technology be used most effectively to support and accelerate colleges' efforts to dramatically increase student progress and completion?'"

Candace Thille
Director, Open Learning Initiative

A Change of Heart

"I have been on record for some time as being skeptical about the likely effects on productivity in higher education of various new technologies… But the evidence...about the work at Carnegie Mellon has caused me to rethink my positions."

William Bowen
President Emeritus, Princeton University

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

Transforming Commodity Courses

Breaking the Cost/Capacity Curve With Self-Paced Learning

Adaptive Software Promotes Engagement and Provides Analytics

KNEWTON
Adaptive Learning Platform™

Activity-Based Learning
Short, engaging, "real world" problems to solve

Achievement Points
Uses game-like badge system to track progress and motivate students

Automated Assessment
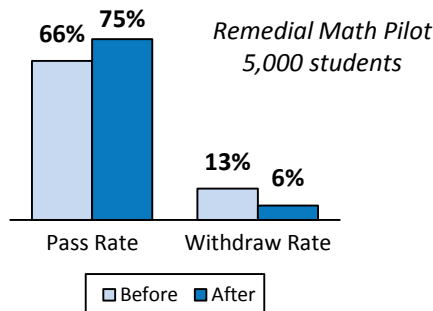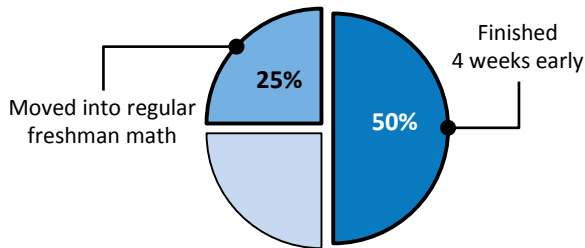Built into activities and diagnostic exams, which adapt to performance

Performance Dashboards
Instructors focus face time on biggest stumbling blocks

Dramatic Improvement in Remediation Results

Moved into regular freshman math — **25%**

Finished 4 weeks early — **50%**

Remedial Math Pilot 5,000 students

Pass Rate: Before 66%, After 75%
Withdraw Rate: Before 13%, After 6%

☐ Before ■ After

Source: Bruce Upbin, "Knewton Is Building the World's Smartest Tutor," Forbes Magazine, Feb. 22, 2012.

The Platform Wars

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

APOLLO GROUP

Bb Blackboard

PEARSON

Next-Gen Learning Platform

- **Course administration**
- **Multimedia content delivery**
- **Live collaboration tools**
- **Real-time performance data**
- **Predictive analytics**
- **Adaptive assessment**
- **Automated advising**
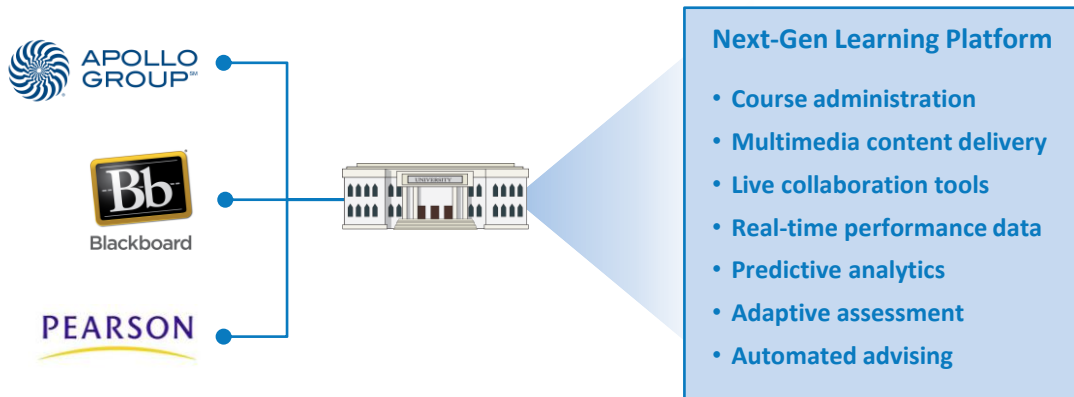
The Power of a Platform

"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—Instagram, the mobile photo-sharing platform, had nine employees at the beginning of this year. They were just another group of young people gathered around a table staring at MacBook Airs. 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

Source: Kevin Carey, "Revenge of the Underpaid Professors," The Chronicle of Higher Education, May 20, 2012.

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

Shared Course Portal

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

OCICU
Online Consortium of
Independent Colleges & Universities
Managed by New Ventures of Regis University

83 Institutions

ASSOCIATED COLLEGES OF THE SOUTH

16 Institutions

Chinese   Physics   Art History   Biology   Arabic

Source: Leigh Brown Perkins, "A New Paradigm For Learning," *Rollins Magazine*, March 2012.

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Part I: Innovations in Delivering Quality Instruction at Scale

Part II: Defining Your Institution's Value in the Face of Disruption
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- Competing on Convenience
- Integrating Academic and Career Preparation
- Problem-Focused Research

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