MOOCs
and other “faster horses”

Jörn Loviscach
“If I had asked people what they wanted, they would have said faster horses.”

Attributed (mistakenly?) to Henry Ford
Ich tippe hier mal was, damit man mich was tippen sieht.
London School of Journalism, 2009
http://youtu.be/E_eB6-Jrm3M
Who Am I?
Daten für Mitarbeitende
Mit wenig Aufwand
Typische Fehler beim
Homebanking
Das bieten deutsche
Bürgenhilfe per Web
Surfen statt Beobachten
BeOS für Internet
Linux-Einstiegsbuch
Software-Praxis
Multithread
Der Navigator
PCs selbst vernetzen
Pentium II mit 333 MHz
Fax, Scanner, Drucker in einem
Kombis mit Mankos
Wechsler, Jukebox, CD-ROM-Server
Hunderte CDs im Zugriff
Auf die Software kommt’s an
Audio-CDs brennen
Bilddateien verwalten
Inverted Classroom Model

• Students work with videos before class

• Face-to-face time devoted to practicing and discussing
Differential Equations in Action

Class Summary
In this course you will examine real world problems -- rescue the Apollo 13 astronauts, stop the spread of epidemics, and fight forest fires -- involving differential equations and figure out how to solve them using numerical methods.

What Should I Know?
You'll need a basic knowledge of programming for this course, around the level of CS 101 or equivalent. You'll also need to understand trigonometry at the high school level, as well as basic vector algebra. This class will primarily involve solving equations numerically rather than analytically, but some exposure to calculus and physics at the level of PH 100 wouldn't hurt.

What Will I Learn?
By the end of this course, you'll develop an intuition for the use of differential equations in the applied sciences. You'll also learn how to build mathematical models for systems of differential equations. Along the way, you'll learn how to translate mathematical expressions into Python code, and solve some really cool problems.

Course Instructors
Jörn Loviscach
Instructor
Miriam Swords Kalk
Instructor
xMOOC

• Video lectures interspersed with automated quizzes
• Automated homework & exams
• Forum

• Free of charge
• No formal requirements
xMOOC = PPT + MC + ε · Web 2.0

Is that it?
Does It Make Sense?
To open door

1. Wait for ‘Door unlocked’ sign above door

2. Lower window

3. Open door using outside handle
Lecture, Practice, Homework?
Lecture, Practice, Homework?

„Ich bestimme, dass an allen höheren Lehranstalten die Dauer der Schulstunde allgemein auf 45 Minuten festzusetzen ist.“

August von Trott zu Stolz, 1911
(Secretary of Education, Prussia)
Lecture, Practice, Homework?

• Still the same pattern
• But shorter lectures:
  15 min. (Coursera & others)
  2-3 min. (Udacity)
Lecture, Practice, Homework?

Explaining is like stealing.
Can we explain without stealing?
Lecture, Practice, Homework?

Socratic approach?

http://rosalind.info
Lecture, Practice, Homework?

• Discovery learning
• But: can’t invent STEM from scratch
• Scaffolding required!
Drowning in the Masses?

Mario Habenbacher [manipulated], CC BY 2.0
http://www.flickr.com/photos/neo_ii/4050922108/
Drowning in the Masses?

- Few users post messages on the forum.
- Most don’t even *look* once.
Drowning in the Masses?

• Are the instructors or teaching assistants available on the forum?

• Mean / maximum time to take care of (≠ answer) a question in a substantial way?
Drowning in the Masses?

MITx 6.002x: Circuits & Electronics
Data: http://tech.mit.edu/V132/PDF/N34.pdf
Drowning in the Masses?

Underused:
• Ask when stuck
• Learn by teaching

http://forums.udacity.com/questions/15001469/formula-for-heat-equation-in-6-11#cs222
Drowning in the Masses?

Social learning

http://p2pu.org
Deadlines?

• Less procrastination
• More focused discussions
• Higher media impact
Deadlines?

- Excludes users with daytime jobs, caregivers
- Excludes users who need to brush up pre-requisites
- Pressure (detrimental to deep learning)
Deadlines?

• Mastery learning
• Customized deadlines
Cut and Dried?

Taijo Fujii, CC BY 2.0
http://www.flickr.com/photos/t_trace/2324550892/
Cut and Dried?

• Lots of stuff taught because it’s in the books.
• Lots of stuff not taught because it’s not in the books.
Cut and Dried?

Tell a story!

Unit 1 - Houston We Have a Problem
Unit 2 - Houston We Have a Solution
Unit 3 - Contagion
Unit 4 - Responsible Fishing
Unit 5 - Antilock Braking Systems
Unit 6 - Wildfire
Unit 7 - Advanced Applications of Numerical Methods
Cut and Dried?

Touch whichever subject is needed

Welcome • Two Types of Friction
Will It Stay • Wheel Slip • Stop Time
 Computing Mu • Braking Equations
Wheel Slip Equilibria • Calculating Slip
The Big Idea • Pumping the Brake
Controlling Slip • P Controller
Hydraulic Brakes • Estimating Velocity
Further Complications • Torque
Psychology • Conclusion
Cut and Dried?

• Problem-based learning
• Project-based learning
Low Expectations?

• “Disengagement Compact” (George Kuh)

• Low expectations & little scaffolding → poor outcomes
Low Expectations?

Evening classes or university-level education?

http://www.google.com/insidesearch/landing/powersearching.html
Low Expectations?

• No-brainer multiple choice tests?
• No quizzes that are puzzling?
• Recipes but no explanations?
• Pseudoteaching and pseudolearning?
• No time to catch up → low prerequisites?
Low Expectations?

(Deep) Learning is arduous, but discovering and inventing are fun!
Flow (Csikszentmihalyi)
A Lone Sage on the Stage?

Piotr Drabik, CC BY 2.0
http://www.flickr.com/photos/drabikpany/7873494188/
A Lone Sage on the Stage?

https://www.udacity.com/course/ma008
A Lone Sage on the Stage?

From Week 4 onwards, homework assignments also include giving answers in the form of algebraic expressions. The rules of forming the expression are the same as that of 6.002x.

After the due date of an assignment has passed, the solutions can be found on the same page as the assignment. You can still submit answers after the due date but they won’t be graded.

A rudimentary version of discussion forum mirror is now available in the right hand side navigation. Previously, only those students who had an account at MITx could access the discussion forum. Now, even those students who lack an account at MITx can access the forum. They can’t post questions and comments yet but this functionality is to come in some time. Currently, access is limited to just viewing.

Homework deadline for Week 1 has been extended till July 15 due to unavailability of the discussion forum for everyone. Discussion forum will be made available to everyone (including those not having account at MITx) so that everyone is following at the same pace.
A Lone Sage on the Stage?

Lessons & instructors from real life

https://www.udacity.com/course/cs291
Testing, testing?

Exams are graded, as are certificates.
Testing, testing?

- Grades become more important than what you have learned.
- Extrinsic reward → “efficient” shallow learning
- Evasion to “easier” subjects/graders
- Grade inflation
- Cheating
Testing, testing?

• Focus on individual work
• How to test what’s important?
Testing, testing?

- Udacity & edX: proctored exams with Pearson VUE
- Udacity: exams at San Jose State University
- Coursera “Signature Track”: typing pattern as biometric marker
- Academic Partnerships: MOOC2Degree
Testing, testing?

• Formative rather than summative evaluation
• Teaching without a safety net
Testing, testing?

Portfolios

http://www.udacity.me/
http://talent.colum.edu/
How do I get from A to B?
Why do I want to go to B?
Is B the right destination anyway?
Who Needs Universities?

Is there something that Google, Facebook, YouTube, Wikipedia, Coursera, edX and Udacity can’t do in the long run?
Who Needs Universities?

What if Google “bought” Stanford University and Princeton University?
Who Needs Universities?

What if educators can do without universities?

https://www.khanacademy.org/
http://www.udemy.com/
Who Needs Universities?

• What if the pieces are really modular?
• What if the pieces can be remixed* at will?

* The pieces of most current xMOOCs cannot be remixed!
Who Needs Universities?

Udacity CS222 Students

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Who Needs Universities?

MOOCs are open to everybody?
Yes, ...
Who Needs Universities?

MOOCs are open to everybody?
Yes, given an internet connection, enough spare time, awareness, interest, motivation, the ability to communicate, an independent mind.
Who Needs Universities?

MOOCs are open to everybody?
Yes, given an internet connection, enough spare time, awareness, interest, motivation, the ability to communicate, an independent mind.

Do schools foster these?
Does society foster these?
Conclusion

• Existing institutions perpetuate their old model.
• New players *could* experiment.
• But often they miss the chance.
Conclusion

• Existing institutions perpetuate their old model.
• New players *could* experiment.
• But often they miss the chance.
• Will the public take notice?
It has worked once ...
www.j3L7h.de