Considerations of Massively-Open Online Courses (MOOCs) in Medical Physics Education

Mark Oldham PhD,
Professor, Radiation Oncology,
Associate Professor, Biomedical Engineering,
Duke University Medical Center, Durham NC
Sources for this presentation

MOOCs.com
Massive Open Online Courses
Created by @alexcusack

TED
Watch
Read
Attend
Participate
About

1700+ talks

Find just the right talk:
Topics

DUKE CIT
Center for Instructional Technology
Leadership in Teaching with Technology

Teaching at Duke

What We Do

Teaching Excellence at Duke

Online Education Leadership
Outline

• What is a MOOC?
  – Rationale: the nook for MOOC?
  – Who, How and Why?
  – Different MOOC types

• MOOCs and medical physics?
  – Enhance current graduate/residency programs?
  – Continuing education?
  – Latest business models
  – Accreditation and practical training?
What is a MOOC?
Massive Open Online Course
Rationale?

- Quality education en-masse!
- Enable wave of innovation.
- “in fifty years the world will have only ten universities”?
  – S Thrun, Udacity Founder
Origin and timeline of (some) MOOC providers
Major MOOC Providers

Major Providers

- COURSERA
  - Started by Stanford computer science professors Andrew Ng and Daphne Koller in April 2012. For profit
  - 5+ million students
  - 532 courses
  - 107 partner schools
  - Students from 190 countries

- EDX
  - Started by Harvard and MIT in May 2012. Non-profit
  - 1.65 million students
  - 125 courses
  - 30 partners
  - 225 countries and territories

- UDACITY
  - Started by Sebastian Thrun and Peter Norvig in February 2012. For profit
  - 1.8 million students
  - 33 courses
  - 16 partners
  - 190 countries
PROS & CONS OF MOOCs

- Flexible
- Diverse range of subjects
- Open to anyone
- Free

- No credit
- Lack of hands on learning
- 100,000+ to 1 student/teacher ratio
- Dropout rates of up to 90%

brought to you by

TOP100ONLINECOLLEGES.ORG
MOOCs – what’s out there?

1200+ courses available

- Humanities: 20%
- Engineering: 5.1%
- Math & Stats: 6.6%
- Education & Teaching: 8.6%
- Health & Medicine: 11%
- Science: 11%
- Business & Management: 15%
- Comp. Sci & Prog: 16%
- Social Sciences: 5.7%
MOOCs – who’s taking them?

User Demographics (via Coursera)

35, the median age of students enrolled with Coursera.

Employment Status

- 73.3% Unemployed or Retired
- 62% Employed
- 13% Male
- 10% > 60
- 40% < 30

Education levels:

- 27% High School
- 37% Have B.S. Degree
- 28% Have Master’s Degree or Profession
MOOCs – who’s taking them?

Prior education level

- Less than high school: 1%
- High School/GED: 4%
- Some college: 11%
- Two-year college degree: 7%
- Four-year college degree: 30%
- Master’s degree: 34%
- Doctorate: 10%
- Professional degree (M.D., J.D.): 3%

Demographics of people taking MOOCs on Canvas Network
MOOCs – who’s taking them?

Where students are coming from (via Coursera)
as of August 2012
Why take a MOOC?

**Why MOOCs?**

- Knowledge to get degree: 13.2%
- Specific skills to do job better: 43.9%
- Specific skills to get a new job: 17%
- Curiosity: 50%

* (Those surveyed could pick more than one answer)

**Employment**

- 6.6% Unemployed
- 12.4% Self Employed
- 6.8% Retired
- 17.4% Student
- 6.9% Employed Part Time
- 50% Employed Full Time
Different flavors of MOOCs

1. **xMOOC**
   - The most common type of MOOC, organized around a central professor and core curriculum.

2. **cMOOC**
   - "Connectivity" MOOCs resemble graduate seminar courses; course materials provide a starting point for student discussions with the core of the learning coming from student-to-student interactions.

3. **DOCC**
   - Distributed Online Collaborative Courses are courses in which the same core course material is distributed to students at multiple institutions, but the exact administrations of the material can vary. Students can also engage with each other across institutions via the online component.

4. **BOOC**
   - Big Open Online Courses are similar to MOOCs but limited to a smaller number of students; typically 50.

5. **SMOC**
   - Synchronous Massive Online Courses differ from xMOOCs in that the lectures are broadcast live, requiring students to log in at specific times in order to hear the lectures.

6. **SPOC**
   - Small Private Online Courses are similar to BOOCs, in that the class sizes are limited, but the student-teacher interactions are more closely modeled after traditional classroom interactions. SPOCs are similarly referenced in the "flipped classroom" model.

7. **Corporate MOOCs**
   - MOOC courses designed for employee training or continuing education typically subsidized or uniquely accredited by employers.
MOOCs and Medical Physics?

- Domestic (US)
  - Recruitment
    - Introduce Medical Physics earlier (School/Univ?)
  - Enhance Training
    - Graduate/residency programs – democratize
      - Allow MOOC credits?
    - Maintenance of Certification?
      - Compliment SAMS etc
      - MOOC certification? Testing? Grading?

- International?
  - Greater flexibility
Accreditation and practical training?

- MIT - Continuing Education units (CEUs)
  - Nationally recognised
  - $495, 4 week, 30 days

- Stanford – surgery CME online course
  - [http://online.stanford.edu/course/sonodoc-cme-sp2014](http://online.stanford.edu/course/sonodoc-cme-sp2014)
  - Local supervision training
Practical training?

- The U. of Edinburgh has a Master's in surgical science.
- The practicum component supervised by the student's on-site location.
How to build a MOOC?


- Duke video production kit description and documentation for using it: http://vital.oit.duke.edu/
Summary

- **MOOCs**
  - Driving forces – flexible access and low cost
  - Flexible, all aspects rapidly evolving
- **Potential for Medical Physics**
  - Domestic and international
  - Diversify educational offerings
  - Accreditation and practical training
    - Maybe feasible with creative models
Thank-you!

• Giving education away for free is a really good idea, but … here has to be a business model that actually works.  
Sebastian Thrun (Udacity)

• We aren’t about replacing physical schools. … if lectures happen in the students’ own time and pace then you can do a higher order activity in the classroom: more conversation, more problem solving, more projects.  
Salman Kahn (Kahn Academy)

• “We need a way to integrate education much more deeply into the fabric of our lives in a lifelong way,” she says. “And that’s what we’re doing.”  
Dahne Koller (co-founder of Coursera)