Talk overview

• Motivation
• Initial studies of Massive Open Online Courses
• Phase I: Understanding learners with economic constraints
• Phase II: Understanding learners with economic constraints and those seeking employment
• Design Implications
At 23.1%, Detroit has the highest unemployment rate of the 50 largest cities in the country
Detroit

- High unemployment
- Poverty
- Inadequate schooling
- Racially segregated neighborhoods resulting from white flight*

*The large-scale migration of whites of various European ancestries from racially mixed urban regions to more racially homogeneous suburban regions.
Initial studies of Detroiters

Interviews

• Barriers to getting ahead
• Employment strategies and other strategies to “getting ahead”

Surveys

• Technology access

Participatory design based studies

• Use of social capital to get through barriers described in interviews
Education is key

Though education was seen as a way to “get ahead,” most participants lacked money for higher education or were unsure how to obtain a degree.

Many aware of paid services (e.g., Lynda.com) and for-profit universities

No mention of MOOCs
Making Connections (i.e., social capital)

Participants expressed a need to connect with people outside of Detroit ("bridging" social capital)
Predictors of upward mobility

- Less income inequality
- Less segregation
- Better schools
- Stable families
- Greater social capital

Map from: http://www.equality-of-opportunity.org/

(Chetty, Hendren, Kline, and Saez, 2013)
What do we know about MOOCs?

These courses are taken by well-educated, males, 26 or older, employed, from developed countries, and unlikely to encounter barriers related to the affordability of higher education

(Christensen et al., 2013)
What about the use of MOOCs among less advantaged populations?
San José State Udacity Plus Pilot

- Pilot ‘for-credit‘ courses
  - College algebra
  - Entry-level math
  - Elementary statistics
- More at-risk students (majority not from SJS)
- Pass rates: 23.8% – 50.5%

Sebastian’s Take

“These were students from difficult neighborhoods, without good access to computers, and with all kinds of challenges in their lives… It’s a group for which this medium is not a good fit.”

As cited on: http://www.fastcompany.com/3021473/udacity-sebastian-thrun-uphill-climb

Sebastian Thrun
Co-Founder and CEO of Udacity
Founder of Google X
How could this medium be a better fit?
Research Questions

Phase I:

• How do the demographics of learners unable to afford formal education compare or contrast to other learners?

• How does the performance and engagement of learners unable to afford formal education compare or contrast to other learners?

(Dillahunt, Wang, Teasley, 2014)
Research Questions

Phase II:

• How are learners from unexplored populations leveraging MOOCs?
  – In terms of employment
  – In terms of networking
  – In terms of “getting ahead”

• How could MOOCs be improved to address these needs?

(Dillahunt et al, in submission)
Talk overview

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• Design Implications
MOOCs at UM

- Fantasy & Science Fiction
- Internet History, Technology, and Security
- Introduction to Finance
- Model Thinking
- Securing Digital Democracy
- Social Network Analysis

Slide taken from Teasley, Lonn, and Koo’s Massive Michigan SLAM Talk, October 11, 2013
Approach

Phase I - Quantitative approach:

– Explore existing learners that could not afford a formal education and identify differences between this group and others using descriptive statistics

Phase 2 - Qualitative approach:

– Conduct interviews of financially constrained learners and those seeking employment to understand whether and how MOOCs support employment
Phase I: Analysis of Coursera
Pre-Course Surveys

- Demographics
  - Gender
  - Age
  - Highest level of education
  - Occupation
- Motivation for enrollment
Motivations for enrollment

- Cannot afford to pursue a formal education
- Extending current knowledge of the topic
- Professional development
- Supplement other college/university courses
- General interest in the topic
- Interest in how these courses are taught
- Geographically isolated from educational institutions
- Decide if I want to take college/university classes on the topic
Limitations

• Respondents may not provide accurate, honest answers
• “Affordability” is relative and may be interpreted differently among participants
• Self-selection bias
• Only accessing those that have taken one or more UM Coursera course
Two groups

Target (e.g., cannot afford)

Comparison (all others)
Study Overview

Survey 1:
Pre-course Surveys
Survey 1: Pre-course Surveys
Quantitative Analysis

Survey 2: Recruitment
Time: 3 minutes
Compensation: Raffle
Multiple drawings of $50

Phase I: Target/Non-target Comparison
### Study Overview

<table>
<thead>
<tr>
<th>Phase I: Pre-course Surveys</th>
<th>Quantitative Analysis</th>
<th>Semi-Structured Interviews</th>
</tr>
</thead>
</table>

- **Survey I:** Pre-course Surveys
- **Quantitative Analysis**
- **Semi-Structured Interviews**

- **Time:** 1-2 hours
- **Compensation:** $30
- **Method:** In-person, Skype, G+ Hangout.

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**Phase II: Employment opportunities**
Study Overview

Survey 1: Pre-course Surveys
Quantitative Analysis
Semi-Structured Interviews
Qualitative Analysis

Phase II: Employment opportunities
Findings

Phase I:
• Differences in group demographics
• Difference between group engagement and performance

Phase II:
• How does our “target” audience leverage MOOCs?
• Are they using MOOCs to network and “get ahead?”
Phase I: Data Sources

• Survey 1: UM pre-course survey data
  – Demographics
  – Motivations for taking the course
• Online activities and course performance
  – Course materials viewed
  – Videos watched
  – Forum engagement

Image from: http://sws.canterbury.ac.uk/so138/surveypost.html

Image from: http://coursera.org
Demographic Differences: Target vs. Comparison

<table>
<thead>
<tr>
<th>Out of 41,961 respondents</th>
<th>Total N</th>
<th>% response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target group (not able to afford a formal education)</td>
<td>3,812</td>
<td>9.1%</td>
</tr>
<tr>
<td>Comparison group (all others)</td>
<td>38,149</td>
<td>90.9%</td>
</tr>
</tbody>
</table>

Significance: $Z = -583.47, p < .01$

**Takeaway:** Target group significantly underrepresented
## Demographic Differences: Gender

<table>
<thead>
<tr>
<th></th>
<th>Total N</th>
<th>% response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Out of 41,646 respondents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>28,585</td>
<td>68.6%</td>
</tr>
<tr>
<td>Female</td>
<td>13,051</td>
<td>31.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Target (N=3,762)</th>
<th>Comparison (37,788)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>65.6% (N=2,467)</td>
<td>68.9% (N=26,053)</td>
</tr>
<tr>
<td>Female</td>
<td>34.4% (N=1,295)</td>
<td>31.1% (N=11,735)</td>
</tr>
</tbody>
</table>

**Takeaway:** Gender representation relatively the same across groups
Demographic Differences: Age

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total N</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-34</td>
<td>16,603</td>
<td>39.8%</td>
</tr>
<tr>
<td>18-24</td>
<td>9,461</td>
<td>22.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Target (N=3,798)</th>
<th>Comparison (37,855)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>764 (20.1%)</td>
<td>8,678 (22.9%)</td>
</tr>
<tr>
<td>25-34</td>
<td>1,690 (44.5%)</td>
<td>14,883 (39.3%)</td>
</tr>
<tr>
<td>35-44</td>
<td>768 (20.2%)</td>
<td>6,893 (18.2%)</td>
</tr>
</tbody>
</table>

**Takeaway:** 25-34 year olds majority age group across all groups
Demographic Differences:
Highest degree achieved based on ability to afford a formal education

<table>
<thead>
<tr>
<th>Degree Level</th>
<th>Target (Cannot Afford)</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some high school</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>High School</td>
<td>5.00%</td>
<td>5.00%</td>
</tr>
<tr>
<td>Some college</td>
<td>10.00%</td>
<td>10.00%</td>
</tr>
<tr>
<td>Associate’s degree (2 years of college)</td>
<td>15.00%</td>
<td>15.00%</td>
</tr>
<tr>
<td>B.S. degree</td>
<td>40.00%</td>
<td>40.00%</td>
</tr>
<tr>
<td>M.S. degree</td>
<td>35.00%</td>
<td>35.00%</td>
</tr>
<tr>
<td>Professional degree</td>
<td>20.00%</td>
<td>20.00%</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>15.00%</td>
<td>15.00%</td>
</tr>
</tbody>
</table>
Demographic Differences:
Highest degree achieved based on ability to afford a formal education

Takeaway: Target group has a statistically significant higher proportion of bachelor’s degrees than those in our comparison group

Z=4.1, p<.01
Demographic Differences:
Highest degree achieved based on ability to afford a formal education

Target = 31.8%; Comparison = 44.6%
Z-score = -15.1, p<.01

Takeaway: Comparison group has a statistically significant higher proportion of advanced degrees than our target
Demographic Differences:
Highest degree achieved based on ability to afford a formal education

Takeaway: A statistically significant portion of the target group has less than a 4-year college degree than our comparison group
Demographics Summary

• Our target group was significantly underrepresented
• Even within the target group we are still reaching the same demographics
  – Males
  – Those ages 25-34
  – Majority holders of a bachelor’s degree

Main finding: Demographics of both groups were similar to prior research findings: (well-)educated, males, 26 or older (Christensen et al., 2014)
Who are we really studying (when we study MOOC data)?
One key finding about our target population...
Engagement

Participation (e.g., watching videos, completing assessments) among our target population (94.65%) was significantly less than participation among our comparison population (96.68%)

(36.58% vs. 19.24%, z=21.07, p<.01)
Performance

• Certificate of Completion
  – Successful completion of course and assessments completed (only applicable to those courses offering certificates)

• Certificate of Distinction
  – Based on academic achievement (receiving a minimum grade)
Level of Completion based on Affordability

<table>
<thead>
<tr>
<th>Achievement Level</th>
<th>Target group</th>
<th>Comparison group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Certificate with Distinction</td>
<td>339</td>
<td>9.11%</td>
</tr>
<tr>
<td>Certificate</td>
<td>716</td>
<td>19.24%</td>
</tr>
<tr>
<td>None (e.g., did not complete)</td>
<td>2,757</td>
<td>71.65%</td>
</tr>
</tbody>
</table>

Those in the comparison group had a statistically significant higher rate of completion than the target group.

36.58% vs. 19.24%, z=21.07, p<0.01
Level of Completion based on Affordability

<table>
<thead>
<tr>
<th>Achievement Level</th>
<th>Target group</th>
<th>Comparison group</th>
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<tbody>
<tr>
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<tr>
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<td>716</td>
<td>19.24%</td>
</tr>
<tr>
<td>None (e.g., did not complete)</td>
<td>2,757</td>
<td>71.65%</td>
</tr>
</tbody>
</table>

Target group has a statistically significant higher rate of completing courses with distinction than the comparison group.

9.11% vs. 6.10%, $z=7.18$, $p<0.01$
Engagement and Performance Summary

Main findings about our target group

– Not spending as much time as comparison group watching videos

– Completing courses with significantly higher rates of distinction than the comparison group
Talk overview

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Phase II: Qualitative approach

Goals were to understand:

– How our “target” audience leverages MOOCs
– If they were using MOOCs to network and “get ahead?”
Survey 2: Recruitment

• Additional motivations
  – Increased chances for employment
  – For training purposes
  – Unable to afford a formal education

• Demographics
  – Employment status
  – Income
  – Zip code
  – Race
  – Age

Image from: http://sws.canterbury.ac.uk/so138/surveypost.html
Semi-Structured Interviews

- General participant information
- Motivations for taking MOOCs
- Deeper probing about how they used MOOCs
  - Employment
  - Networking
- Discussed possible improvements

Image: Stockfresh / Illia Uriadnikov
Phase II Data Sources

• (Recruitment) Survey 2
  – Demographics
  – Motivations

• Interview transcripts and memos
  – Thematic analysis

Image from: http://sws.canterbury.ac.uk/sol38/surveypost.html
Findings

• (Recruitment) Survey 2
• Interview Results
  – How did our “target” audience leverage MOOCs?
  – Were there signs of networking?
Survey results

<table>
<thead>
<tr>
<th>Description</th>
<th>Total N</th>
<th>% response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out of 6,535 surveys sent successfully</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveys completed</td>
<td>441</td>
<td>6.7%</td>
</tr>
<tr>
<td>Provided us with contact information to be interviewed</td>
<td>153</td>
<td>3.5%</td>
</tr>
</tbody>
</table>
Difficulties reaching our target population

- No time to interview?
- Could have infrequent access to the Internet or email may not be the best method of contact
- May dislike surveys
- ....
Our interviewees

<table>
<thead>
<tr>
<th>N = 22</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>45% Female (N=10); 55% Male (N=12)</td>
</tr>
<tr>
<td>Age Range</td>
<td>21 to 63 (M=37, s.d.=12)</td>
</tr>
<tr>
<td>Employment status</td>
<td>18 employed, 2 Seeking Employment, 1 Unemployed, 1 Not Seeking Employment</td>
</tr>
<tr>
<td>Income</td>
<td>$20K or Less (N=7); $20-30K (N=2); $30-50K (N=7); 50-100K+ (N=6)</td>
</tr>
<tr>
<td>Race</td>
<td>3 African American/Black, 2 Hispanic/Latino/Other, 4 Asian, 10 White/Caucasian, 3 Undisclosed</td>
</tr>
<tr>
<td>Occupations</td>
<td>Systems admin, Translations director, Hospital admin, IT specialist, <strong>Freelance web designer</strong>, Defense Contractors, <strong>Tech writer</strong>, home maker, lab instructor, Software Engineer, Human resources</td>
</tr>
</tbody>
</table>
Findings

• (Recruitment) Survey 2 Results
• Interview Results
  – How did our “target” audience leverage MOOCs?
  – Were there signs of networking?
Characterization of learners

• Transitioning to new fields
• Looking to be promoted in their current field/job
• Looking for new positions in their current field/job
• Looking for a refresher in their current area of work
No tangible evidence of career placement

Three responded affirmatively that MOOCs helped them shift to a new job but when probed, they were only hopeful

“Actually no, but I fully expect they will as my job search intensifies in the near future.”
Tangible benefits in *current* positions

- Enhanced credibility
- A greater understanding of how things worked in their existing companies
- Improvement in current skillsets on the job (e.g., statistics, entrepreneurial skills)
Adding MOOC-related information to resume?

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>68.2% (N=14)</td>
<td>31.8% (N=7)</td>
</tr>
</tbody>
</table>
I don’t think that right now someone could go through and spend two years on Coursera...I think they would learn as much as anyone else in a normal university setting but the way that corporate America is set up, if you walk out and show someone a list of Coursera classes that you’ve taken, that’s going to be less meaningful than an accredited university.
Summary

Great education platform that provides some benefits to those looking to strengthen their job skills. The general perception, however, is that MOOCs are not accepted/respected among employers.
Talk overview

• Motivation
• Initial studies of Massive Open Online Courses
• Understanding learners with economic constraints
• Understanding learners with economic constraints and seeking employment
• Design Implications
How do we improve?
Categories of Improvements

Courses

Course Content

Provider/Platform
Central theme: Communication/Networking

• Soft skills such as communication (courses)
• Evidence of skills (e.g., project and portfolio-based courses) (content)
• More collaborative work (courses + content)
• Improved networking features (platform/provider)
• A persistent networking community (platform/provider)
“…I think that the biggest thing that's missing from the online experience is the opportunity to sit down and maybe work on projects together.”
Did networking/communication occur among our interviewees?
How did you learn about MOOCs?

- 27.3% (N=6) learned about MOOCs through someone in their networks (e.g., friends, co-worker, church)
- 72.7% (N=16) learned about MOOCs through mailing lists and websites
Use of Coursera’s social features

- Only 27.3% (N=6) were frequent forum posters (e.g., at least 5 times per course)
- No one
  - Participated in Meetups
  - Took courses with friends
  - Used MOOCs for networking*

*Though many elaborated that the concept of networking via MOOCs had never occurred to them
A lack of posting

- **Personal preference**: something about the learner prevents the learner from posting.
- **Group dynamics**: Something about the group dynamic prevents the learner from posting.
- **The medium**: Something about the forums, messages, etc., prevents the learner from posting.
- **Course expectations**: The requirements do not encourage the learner to post.
Summary

MOOC social features are underutilized; MOOCs are not perceived as a platform for connecting to others.
The potential

Tangible benefits in *current* positions

• Enhanced credibility
• A greater understanding of how things worked “on the job”
• Improvement in current skillsets on the job (e.g., statistics, entrepreneurial skills)
Connecting via MOOCs

I think *have something so that people can really link to other people besides a message board...*
Tawanna Dillahunt

I'm passionate about learning and would love to connect with other Ann Arborites or Detroiters interested in taking a course together. I'd be up for taking a course in Data Science, Startup Engineering, Model Thinking, Business Courses, you name it—as long as it's doable :).
Former cashier at Trader Joes in Ann Arbor
Former GM employee
Currently a first line GM Manager

I'm passionate about learning and would love to connect with other Ann Arborites or Detoiters interested in taking a course together. I'd be up for taking a course in Data Science, Startup Engineering, Model Thinking, Business Courses, you name it—as long as it's doable :).
Learners in your area looking for mentorship

Tawanna Dillahunt

All star Mentor
Provides timely feedback

Learners in your area looking for mentorship

Sharon W
Flint, MI
Connect

Renee S
Southfield, MI
Connect

Aaron K
Detroit, MI
Connect
Coursera Specializations

Specializations
Master a skill with a targeted sequence of courses
Apply it in a final project

Data Science
Johns Hopkins University

Entrepreneurship: Launching an Innovative Business
University of Maryland, College Park

Digital Marketing
University of Illinois at Urbana-Champaign

Data Mining
University of Illinois at Urbana-Champaign
Coursera Specializations

Specializations
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Apply it in a final project

Renee S.
Southfield, MI

Entrepreneurship: Launching an Innovative Business
University of Maryland, College Park

Digital Marketing
University of Illinois at Urbana-Champaign

Aaron K.
Detroit, MI
Potential

• Potential to connect non-homogenous groups
  – Connecting highly educated with less educated groups and vice versa
  – Increases exposure

• Existing MOOC learners could provide references to those with limited connections

• Opportunities to advise and offer mentorship, which could be resume boosters
What other hidden opportunities exist in Massive Open Online Courses?
Thank you!
Questions?

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Pablo Quinones
Ph.D. in SI

Tawanna Dillahunt
(PI)

Stephanie Teasley
(Co-PI)

Bill & Melinda Gates Foundation