SCHOOL OF INFORMATION
UNIVERSITY OF MICHIGAN

Unlocking the Hidden Potential of Massive Open Online Courses

Tawanna Dillahunt,
Assistant Professor in UMSI
+ many collaborators

SLAM | November 21, 2014

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

(U.S. Department of Labor Statistics, 2013)

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

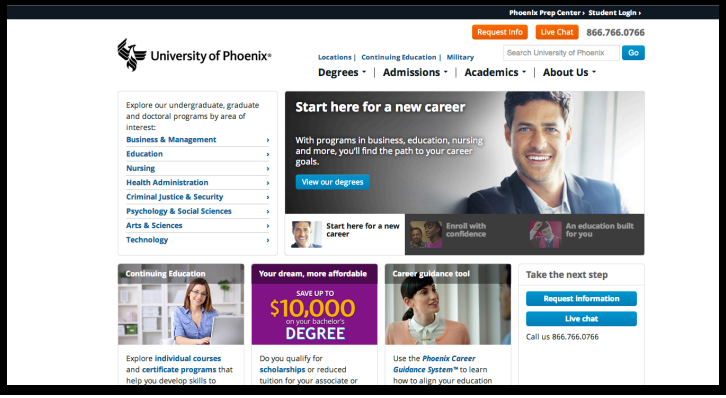
Participatory design based studies

- 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



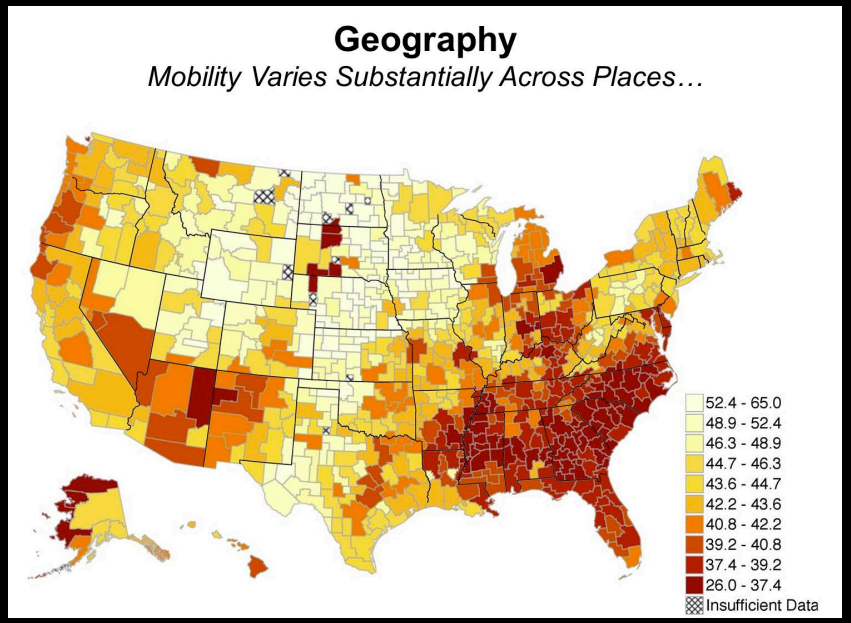
No mention of MOOCs

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)

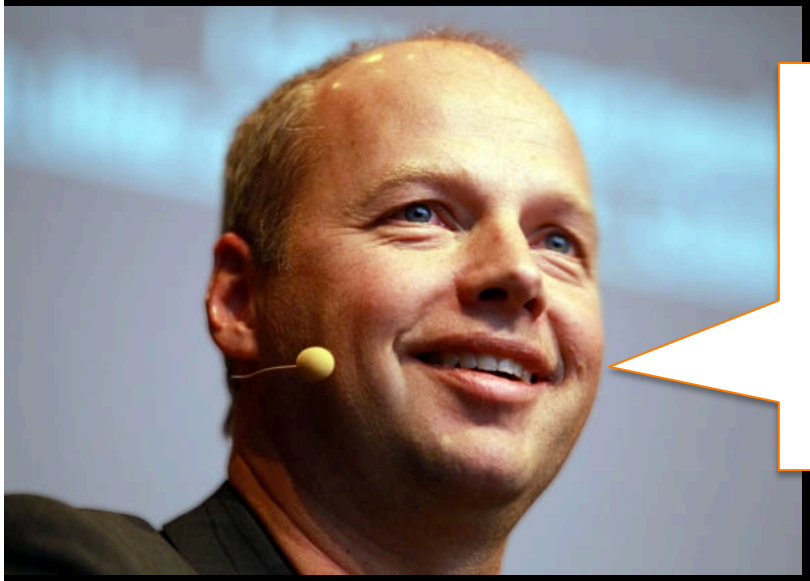
What about the use of MOOCs among less advantaged populations?

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%

From: Straumsheim, C. (August 28, 2013) "Boost for Udacity Project. Inside Higher Ed. http://techpresident.com/news/24190/san-jose-state-profit-online-experiment-fails

Sebastian's Take



Sebastian Thrun
Co-Founder and CEO of Udacity
Founder of Google X

"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

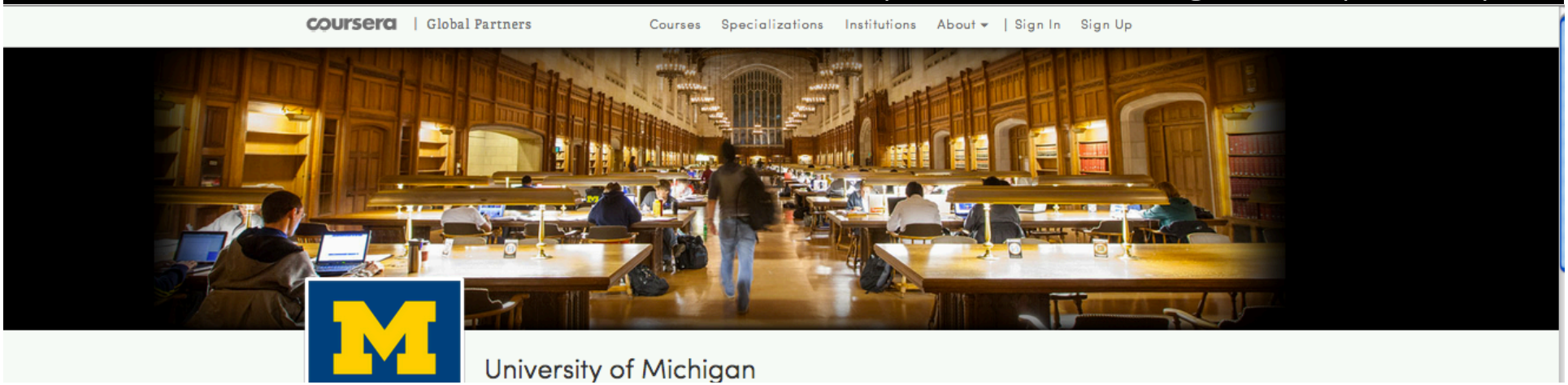
How could this medium be a better fit?

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)

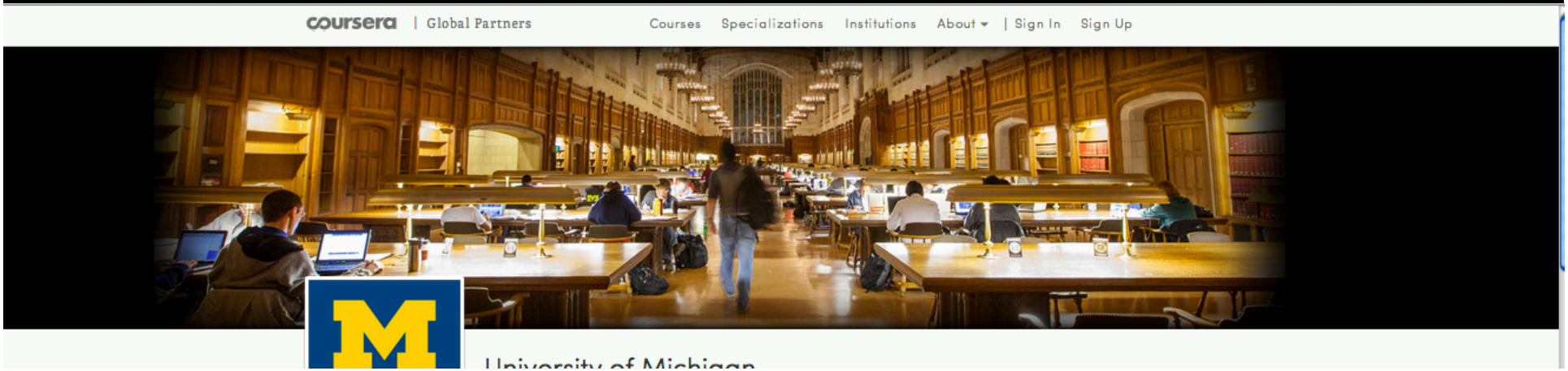


Research Questions

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*)



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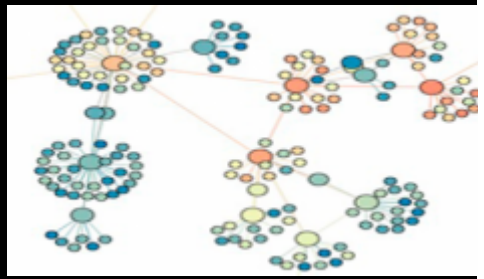
MOOCs at UM

- 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

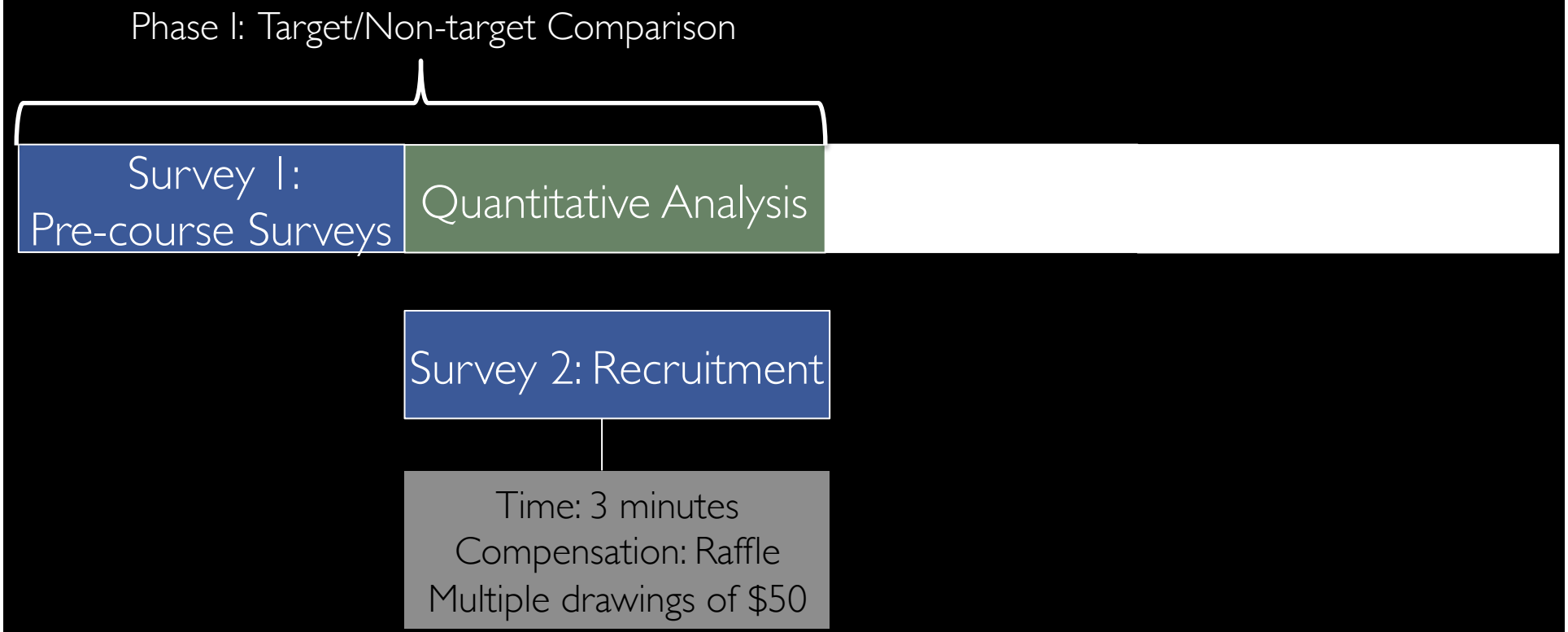
Target (e.g., cannot afford)

Comparison (all others)

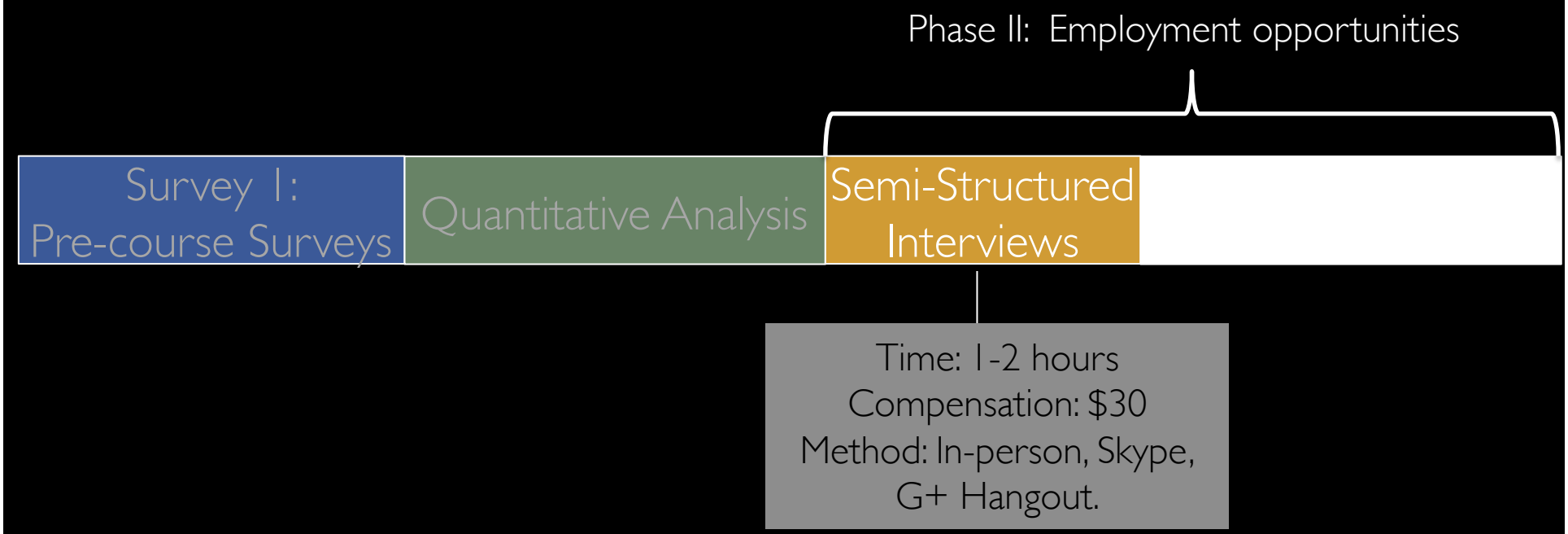
Study Overview

Survey 1:
Pre-course Surveys

Study Overview



Study Overview



Study Overview

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

Out of 41,961 respondents	Total N	% response
Target group (not able to afford a formal education)	3,812	9.1%
Comparison group (all others)	38,149	90.9%
Significance	Z=-583.47, p<.01	

Takeaway: Target group significantly underrepresented

Demographic Differences: Gender

Out of 41,646 respondents	Total N	% response
Male	28,585	68.6%
Female	13,051	31.3%

Out of 41,550 respondents	Target (N=3,762)	Comparison (37,788)
Male	65.6% (N=2,467)	68.9% (N=26,053)
Female	34.4% (N=1,295)	31.1% (N=11,735)

Takeaway: Gender representation relatively the same across groups

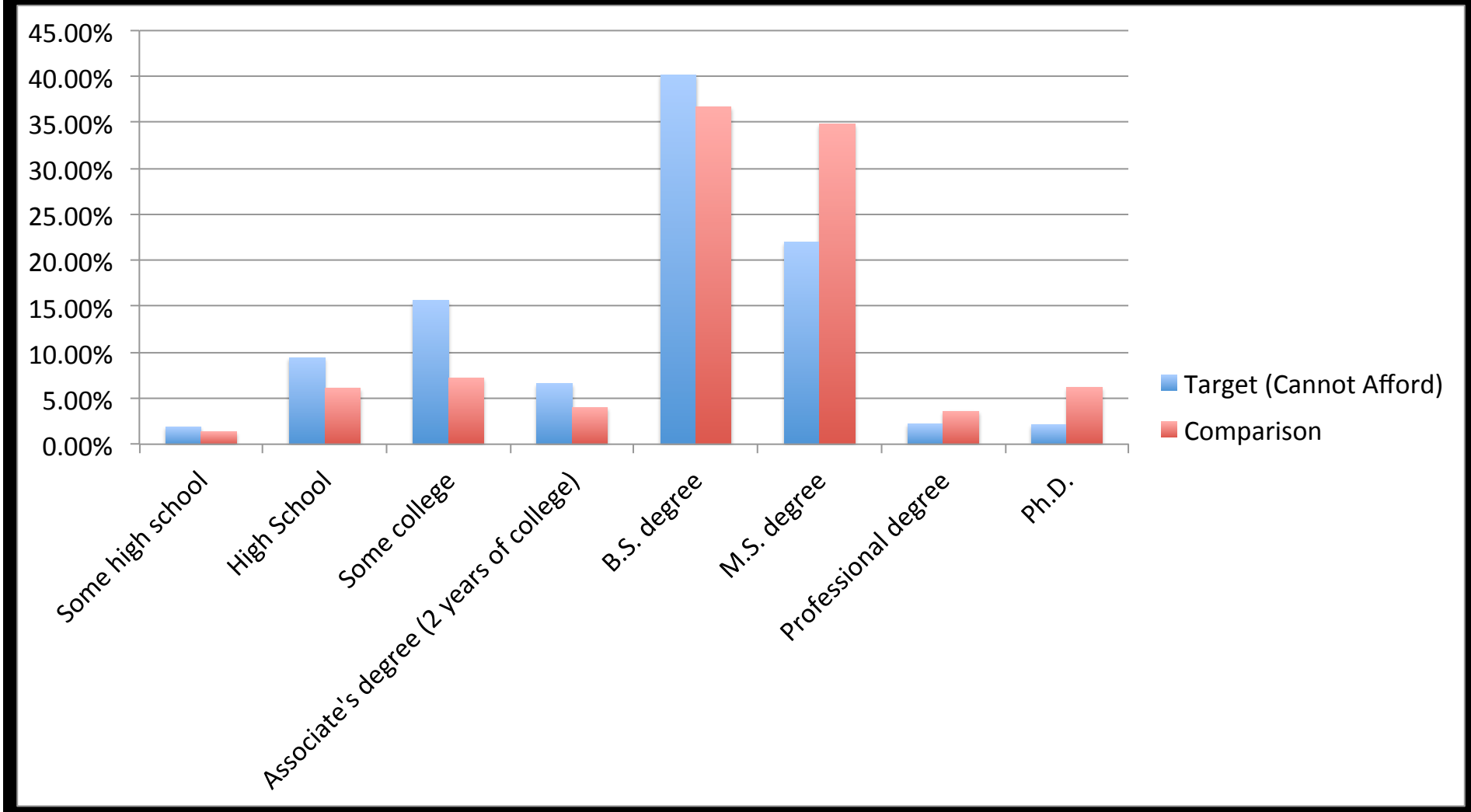
Demographic Differences: Age

Out of 41,734 respondents	Total N	% response
25-34	16,603	39.8%
18-24	9,461	22.7%

	Target (N=3,798)	Comparison (37,855)
18-24	764 (20.1%)	8,678 (22.9%)
25-34	1,690 (44.5%)	14,883 (39.3%)
35-44	768 (20.2%)	6,893 (18.2%)

Takeaway: 25-34 year olds majority age group across all groups

Demographic Differences:
Highest degree achieved based on ability to afford a formal education



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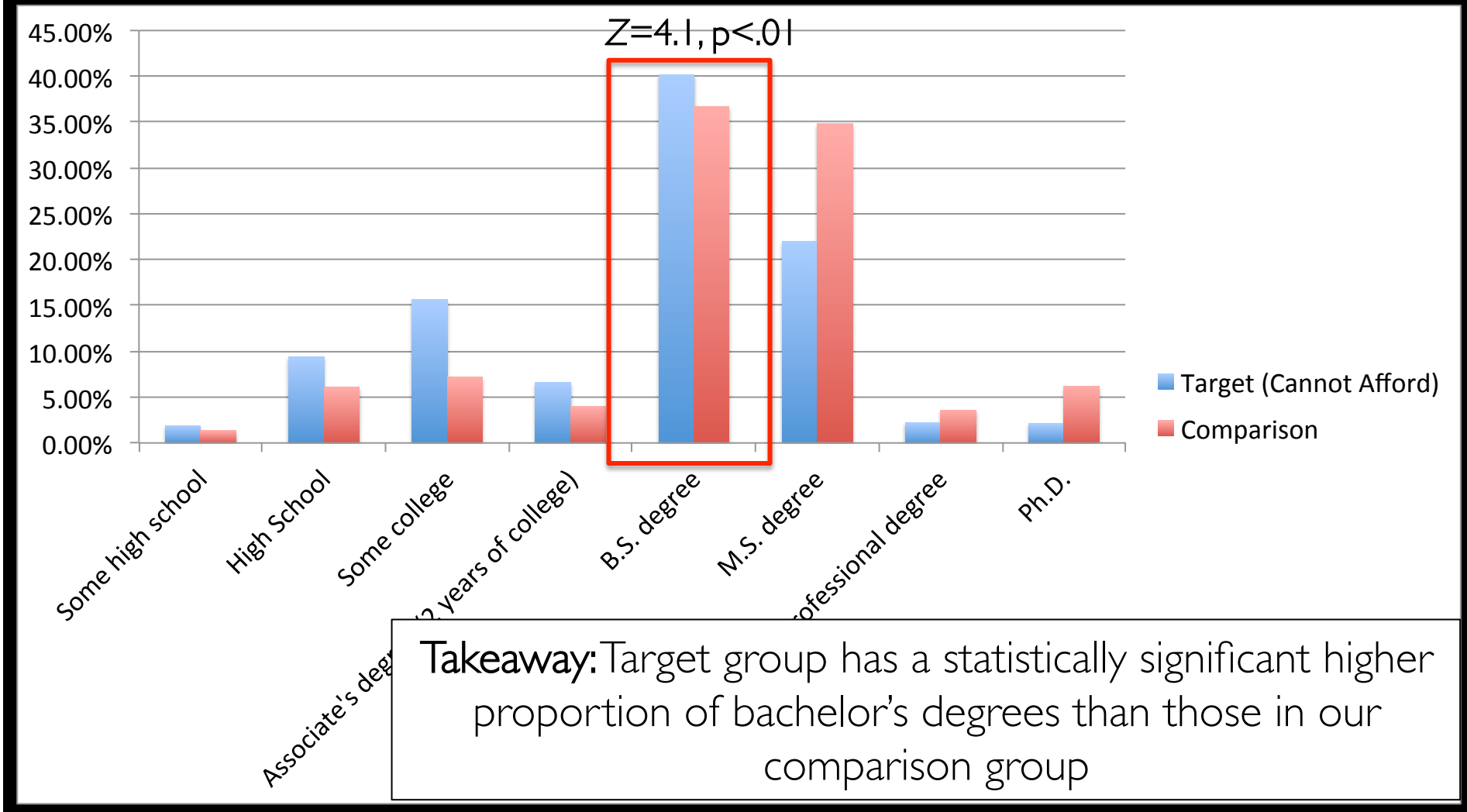
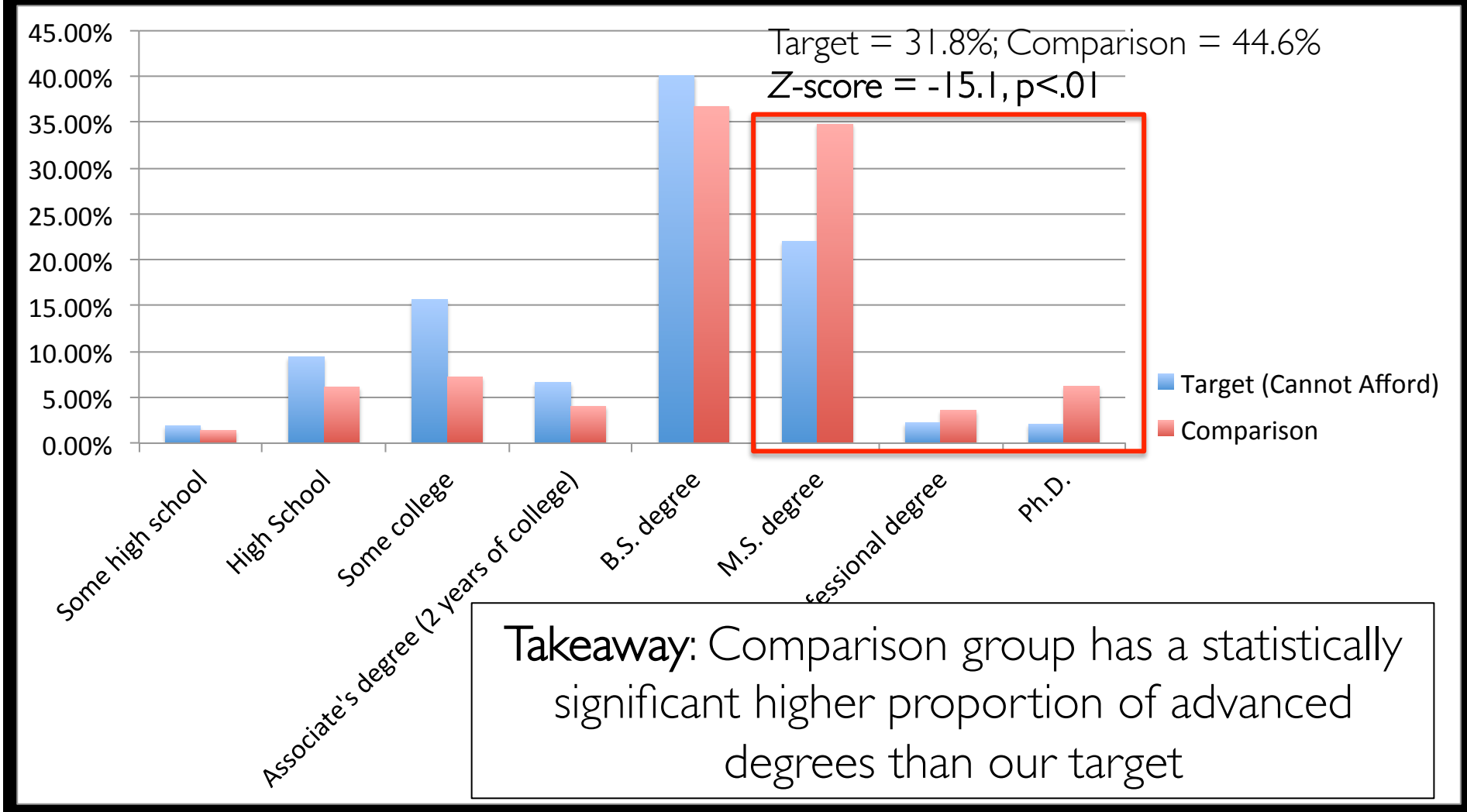


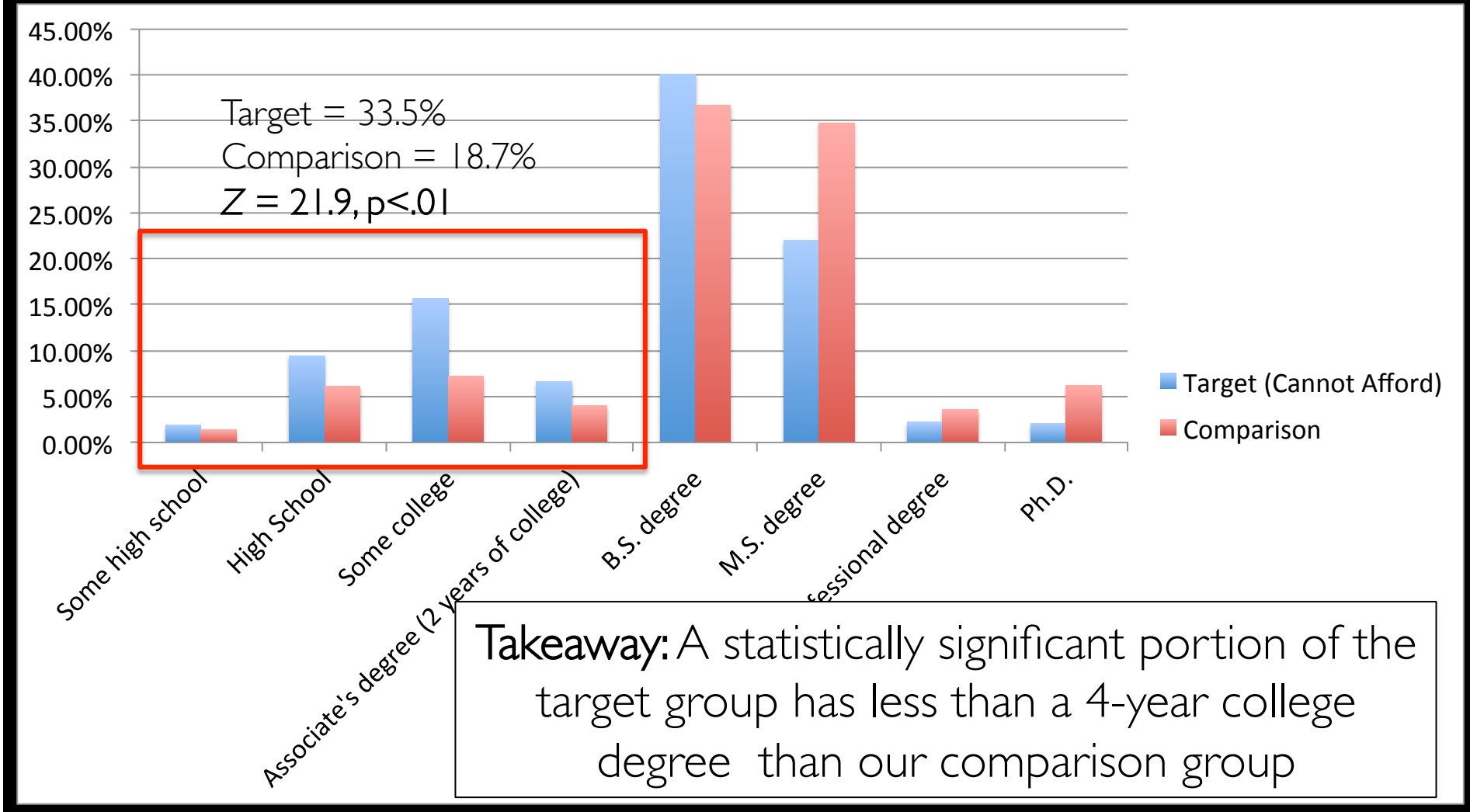
Takeaway: Target group has a statistically significant higher proportion of bachelor's degrees than those in our comparison group

Demographic Differences:
Highest degree achieved based on ability to afford a formal education



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



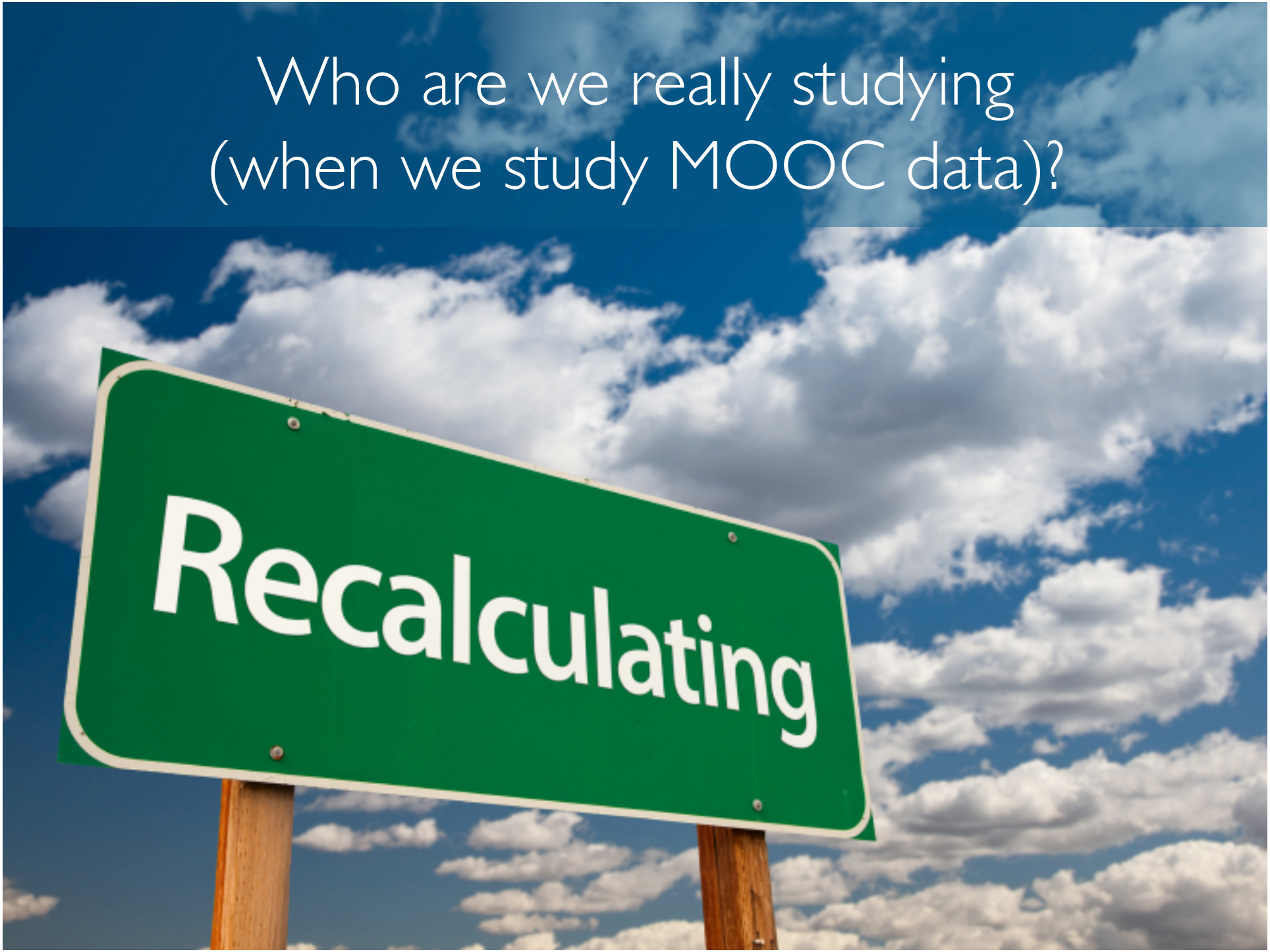
Takeaway: A statistically significant portion of the target group has less than a 4-year college degree than our comparison group

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)

coursera
coursera.org

MARCH 06, 2014

Statement of Accomplishment

WITH DISTINCTION

TAWANNA DILLAHUNT

HAS SUCCESSFULLY COMPLETED THE UNIVERSITY OF MARYLAND, COLLEGE PARK'S ONLINE OFFERING OF

Developing Innovative Ideas for New Companies: The First Step in Entrepreneurship

This course explores how to identify and evaluate opportunities based on real customer needs, develop solid business models, and create successful companies.

DR. JAMES V. GREEN
MARYLAND TECHNOLOGY ENTERPRISE INSTITUTE
UNIVERSITY OF MARYLAND

PLEASE NOTE: THE ONLINE OFFERING OF THIS CLASS DOES NOT REFLECT THE ENTIRE CURRICULUM OFFERED TO STUDENTS ENROLLED AT THE UNIVERSITY OF MARYLAND, COLLEGE PARK. THIS STATEMENT DOES NOT AFFIRM THAT THIS STUDENT WAS ENROLLED AS A STUDENT AT THE UNIVERSITY OF MARYLAND, COLLEGE PARK IN ANY WAY. IT DOES NOT CONFER A UNIVERSITY OF MARYLAND, COLLEGE PARK GRADE; IT DOES NOT CONFER UNIVERSITY OF MARYLAND, COLLEGE PARK CREDIT; IT DOES NOT CONFER A UNIVERSITY OF MARYLAND, COLLEGE PARK DEGREE; AND IT DOES NOT VERIFY THE IDENTITY OF THE STUDENT.

Level of Completion based on Affordability

Level of completion based on affordability

Achievement Level	Target group		Comparison group	
	Count	Percentage	Count	Percentage
Certificate with Distinction	339	9.11%	2,274	6.09%
Certificate	716	19.24%	13,645	36.58%
None (e.g., did not complete)	2,757	71.65%	22,230	57.33%

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

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Certificate	716	19.24%	13,645	36.58%
None (e.g., did not complete)	2,757	71.65%	22,230	57.33%

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

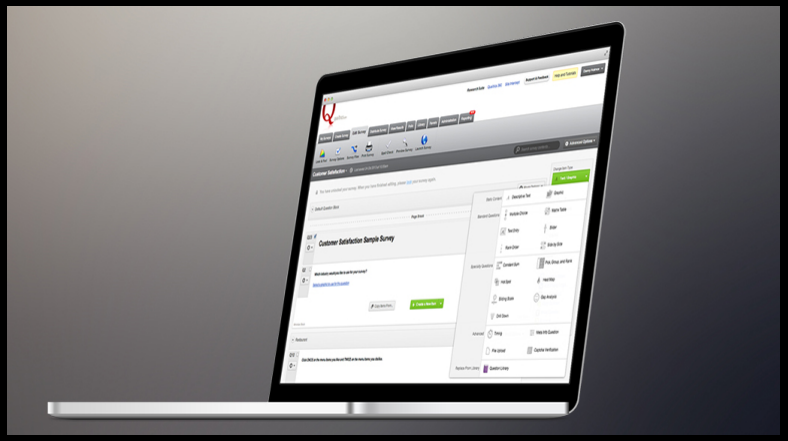


Image from: http://sws.canterbury.ac.uk/sol38/surveypost.html

Semi-Structured Interviews

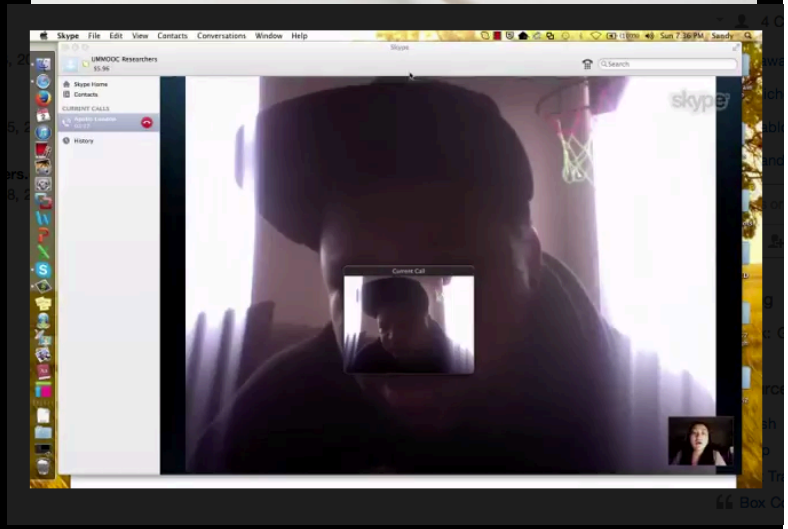
- General participant information
- Motivations for taking MOOCs
- Deeper probing about how they used MOOCs
  - Employment
  - Networking
- Discussed possible improvements

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

Out of 6,535 surveys sent successfully	Total N	% response
Surveys completed	441	6.7%
Provided us with contact information to be interviewed	153	3.5%

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

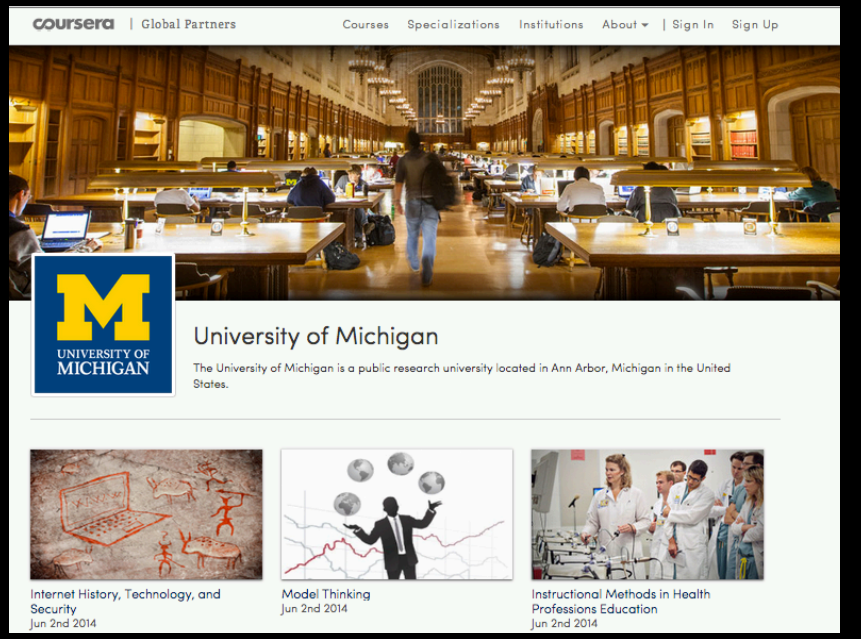
N = 22	Details
Gender	45% Female (N=10); 55% Male (N=12)
Age Range	21 to 63 (**M=37**, s.d.=12)
Employment status	18 employed, **2 Seeking Employment, 1 Unemployed, 1 Not Seeking Employment**
Income	**$20K or Less (N=7); $20-30K (N=2);** $30-50K (N=7); 50-100K+ (N=6)
Race	3 African American/Black, 2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

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?

No	Yes
68.2% (N=14)	31.8% (N=7)

Why not?

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

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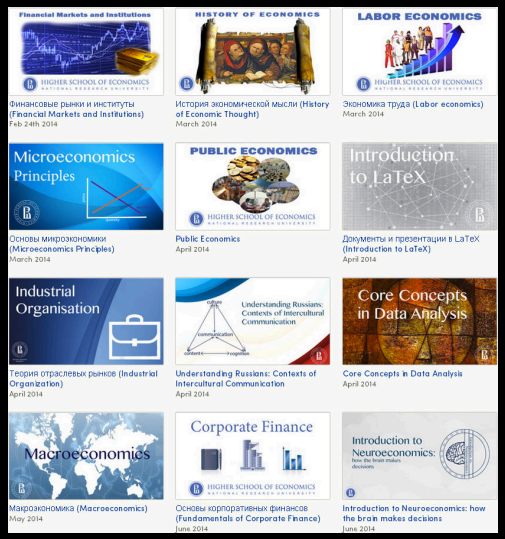
How do we improve?

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)

Takeaway

"…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?

Quinones **& Dillahunt, under review**

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*

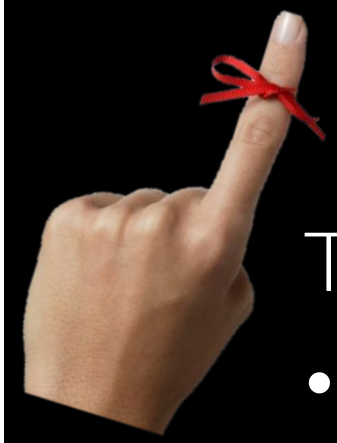
*Though many elaborated that the concept of networking via MOOCs had never occurred to them

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*...

Edit Profile

Tawanna Dillahunt

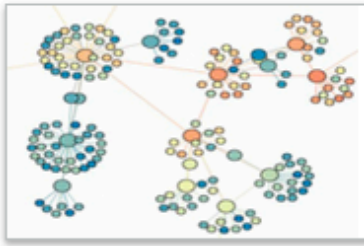
Ann Arbor, MI

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 :).

My Courses

Statistics One

Sep 3rd 2012



Social Network Analysis

Oct 7th 2013

A Beginner's Guide to Irrational Behavior

Mar 25th 2013

A Beginner's Guide to Irrational Behavior

Mar 11th 2014

Developing Innovative Ideas

Startup Engineering

coursera Courses Specializations Institutions About | Tawanna Dill...

Former cashier at Trader Joes in Ann Arbor
Former GM employee
Currently a first line GM Manager

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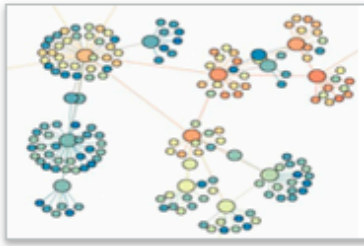

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Startup Engineering

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Tawanna Dillahunt

Ann Arbor, MI

All star Mentor

Provides timely feedback

Edit Profile

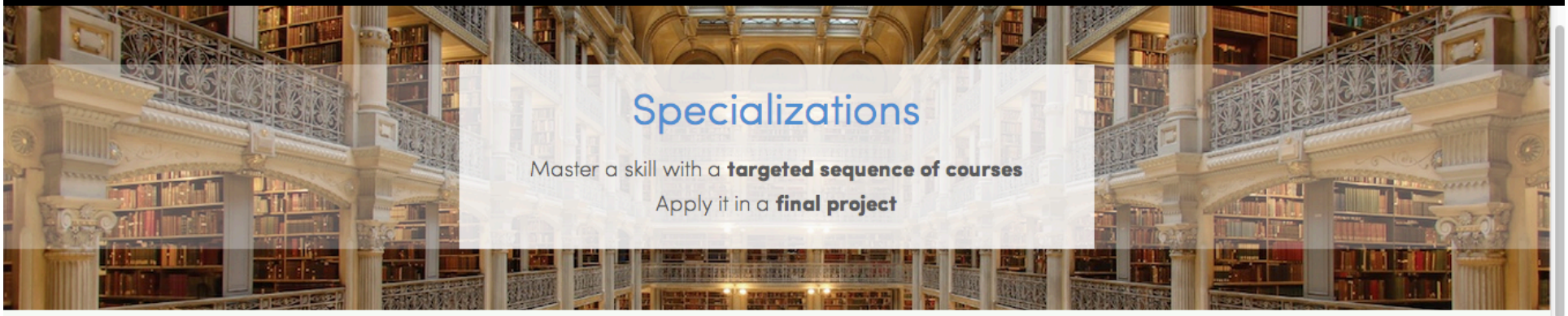
Learners in your area looking for mentorship

Sharon W
Flint,MI
Connect

Renee S
Southfield,MI
Connect

Aaron K
Detroit,MI
Connect

Coursera Specializations



Data Science

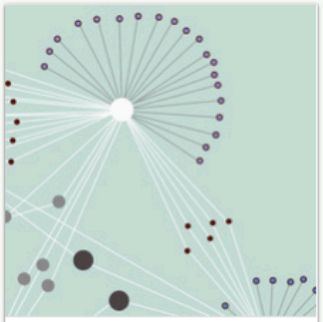
Johns Hopkins University

Entrepreneurship: Launching an Innovative Business

University of Maryland, College Park

Digital Marketing

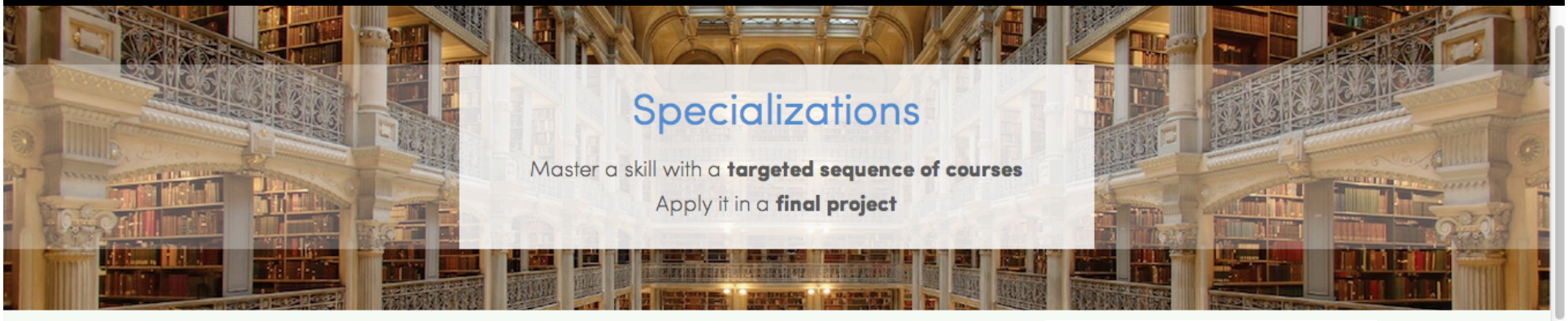
University of Illinois at Urbana-Champaign



Data Mining

University of Illinois at Urbana-Champaign

Coursera Specializations



Renee S.
Southfield,MI

Entrepreneurship: Launching an Innovative Business

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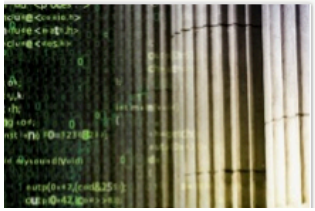
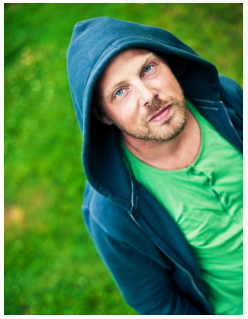
Digital Marketing

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

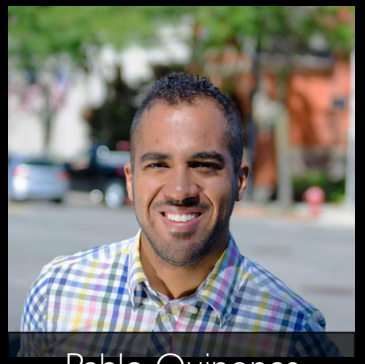

What other hidden opportunities exist in Massive Open Online Courses?

Thank you!
Questions?

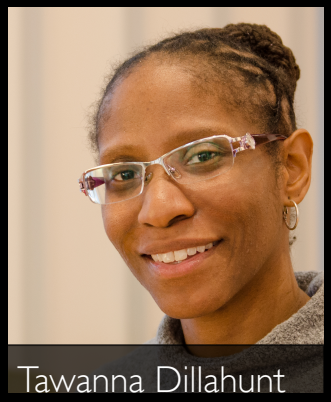
Michelle Fiesta
MSI

Brian (Zengguang) Wang
M.S. Applied Statistics

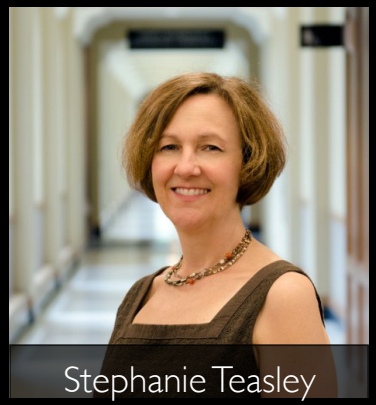
Sandy Ng
(Future MSI)



Pablo Quinones
Ph.D. in SI



Tawanna Dillahunt
(PI)



Stephanie Teasley
(Co-PI)

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