Model Thinking: Demographics and Performance of MOOC Students Unable to Afford a Formal Education

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ABSTRACT

Massive Open Online Courses (MOOCs) are seen as an opportunity for individuals to gain access to education, develop new skills to prepare for high-paying jobs, and achieve upward mobility without incurring the increasingly high debt that comes with a university degree. Despite this perception, few studies have examined whether populations with the most to gain do leverage these resources. We analyzed student demographic information from course surveys and performance data of MOOC participation in a single course. We targeted students who stated that they were motivated to take the course because they "cannot afford to pursue a formal education," and compared them to the group of all other students. Our three key findings are that 1) a higher percentage of non-traditional enrolled students are in this population than the comparison population, 2) in an independent t-test, a statistically significant portion (28%) of this group has less than a 4-year college degree versus 15% of the comparison group, and 3) the completion rate between both groups are relatively equal.

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Learning analytics; MOOCs; education; affordability

ACM Classification Keywords
H.5.m. Information interfaces and presentation: Misc.

INTRODUCTION
To an increasing extent, a college education is key to upward mobility [3]. Economic success is heavily dependent on one's ability to *afford* a college education [4]. Massive Open Online Communities (MOOCs) are seen as an opportunity to gain access to education and professional development, develop new skills to prepare for high-paying jobs, and achieve upward mobility without incurring the increasing debt that comes with a university degree [2].

Although MOOCs are seen as one possible path toward upward mobility, few studies have examined whether and/or *how* the populations with the most to gain leverage these resources. In fact, Christensen et al., found that "The individuals the MOOC revolution is supposed to help the most—those without access to higher education in developing countries—are underrepresented among the early adopters" [1].

In this project, we focused on individuals who may have limited access to higher education due to affordability. This study investigates similarities and differences between the demographics and performance of these students and others. We present our preliminary analysis of the University of Michigan's Model Thinking course (https://www.coursera.org/course/modelthinking). We provide results comparing and contrasting student motivation combined with demographic data such as age, gender, and occupational and educational background. We contribute a preliminary analysis of the demographics and performance of this as yet unexplored group in the context of MOOCs. Our ultimate goal is to understand if MOOCs could be a platform for economic mobility among low-income or economically distressed populations.

METHOD
Links to online surveys were submitted to all registered students at the end of the university's MOOCs offered in the winter of 2013. We conducted an initial analysis of this survey data. Specifically, we analyzed demographic questions such as age, gender, highest level of education achieved, motivations for taking the course, and current occupation. Our goal was to separate our data based on
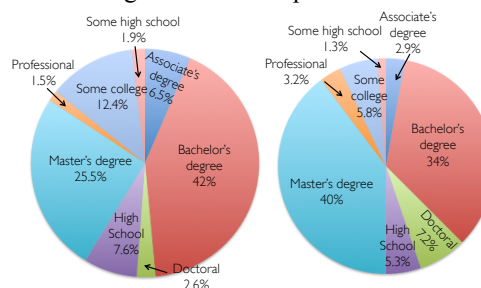

Figure 1 Highest Level of Education Achieved- Left: Target group (N=647); Right: Comparison Group (N=6,044). A Levene's t-test of unequal variances (equal variances not assumed in SPSS) show the proportions of these two groups (target, 28%; comparison, 15%) to be statistically significantly different (F(1,6690)=212.43, p<.01).

student motivations for taking the courses. Specifically, we sought to gain a better understanding about those students who responded that they "cannot afford to pursue a formal education" when asked about their motivations for taking the course. We wanted to compare these students to others in terms of demographics and performance based on student course completion and participation.

We analyzed data from Model Thinking, a ten-week long course with an advertised workload of 4-8 hours per week. The course aims to help students become better thinkers and to prepare them for advanced courses. We selected the course for analysis because it had recently been offered, had one of the highest number of survey responses and could attract students with a wide variety of educational backgrounds. In addition, the course did not require textbooks and did not list course prerequisites.

RESULTS
In total, 38,411 students registered to take the MOOC. Of these, 23.3%, 20%, 17.4%, and 20.8% responded to the questions of gender, age, highest level of education achieved and current occupation respectively. In total, 15.7% (n=6,044) answered the question regarding their motivations for taking the course and highest education achieved. Of these, 10.7% (N=647) represented our target population, which we defined as those students who reported taking the class because they "cannot afford to pursue a formal education."

Demographic Comparisons
Gender representation was relatively the same across the two groups: 69.6% were male and 30.4% were female (of those that responded to this question). Twenty-five to thirty-four year olds make up the majority age group across both groups: 46.6% of our target population and 40.9% of our comparison population. Eighteen to twenty-four year olds have the second highest percentages across both groups. Of those that responded to the employment question, only 18.8% of those responding to this question in our target group indicated that they were students while 29% of those in the comparison group indicated that they were students (n.s.). Like other studies [1], the majority of students from our total population were from the U.S.; there were no other significant differences between the two groups (e.g., average age, gender, level of education).

While only 15% of the comparison group has less than a 4-year college degree, this is true of 28% of our target group. A Levene's t-test of equal variances (equal variances not assumed in SPSS) show the proportions of these two groups to be statistically significantly different ($F(1,6690)=212.43$, $p<.01$) (Figure 1).

Performance Comparisons
Approximately 10.7% (N=4,091) of the 38,411 registered students completed the course and earned a statement of accomplishment. Approximately 5.7% (N=2,176) of these students also completed the survey and 62.8% (N=1,368) indicated their motivations for taking the course. On average, in a further analysis of these students (i.e., 62.8%), there was no significant difference in course completion between our target and comparison groups. In fact, there was approximately a 30% completion rate across *both* groups. Though not statistically significant, interestingly, those students in our target group with some high school education had a higher percentage completion rate (41.7%) than any other sub-population except doctoral students unable to afford a formal education (see Table 1). There were no significant differences between groups in the rate of video viewing or forum participation.

CONCLUSION
In summary, we find that 1) a higher percentage of our target population are non-students, 2) a statistically significant number of this group has less than a 4-year college degree versus the comparison group and 3) though the completion rate of our target group is the same as that of the comparison group, those with some high school have higher than average completion rates.

We plan to extend our analysis to Michigan's other MOOC courses to understand whether our findings generalize across others. We will also interview targeted students to better understand their experiences taking this MOOC as well as others. We will explore the ways in which students' experiences with MOOCs have affected, or may affect employment or potential employment for students who feel they can not afford more traditional forms of higher education. This work will provide a basis for understanding what types of courses are needed to increase employment opportunities for economically disadvantaged populations.

Degree type	Target	Comparison
Some high school	41.7% (N=5)	23.4% (N=18)
High school	32.7% (N=16)	30.3% (N=96)
Some college	22.5% (N=18)	23.9% (N=83)
Associate's degree (2 years of college)	26.2% (N=11)	28.7% (N=50)
Bachelor's degree (BA/BS, 4 years of college)	29.8% (N=81)	29.9% (N=626)
Master's degree	33.9% (N=56)	36.9% (N=884)
Professional degree (MD, JD)	10% (N=1)	23% (N=45)
Doctoral degree	47.2% (N=8)	37.9% (N=165)
Average completion rate	30.3%	32.6%

Table 1 - Percentage earning a certificate by degree

REFERENCES
1. Christensen, G., Steinmetz, A., Alcorn, B., Bennett, A., Woods, D., Emanuel, E. The MOOC Phenomenon: Who Takes Massive Open Online Courses and Why? (November 6, 2013).
2. Kossoff, J. (2013, March 21). Can MOOCs Really Help You Get a Job? *Simply Hired Blog*. Retrieved on 6/26/2013, http://goo.gl/QXAnM.
3. McMurrer, D. and Sawhill, I. (1996). How Much Do Americans Move Up and Down the Economic Ladder? Washington, DC: Urban Institute.
4. Waldron, K. Access to college means access to economic mobility for America's underserved. (2007). *Diverse Issues in Higher Education*. 24(2).