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Ambiguous Credentials: How Learners Use and Make Sense of Massively Open Online Courses

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ABSTRACT

Researchers have investigated the demography and styles of engagement of those who enroll in MOOCs but have lent little attention to how learners navigate MOOCs' ambiguity as academic certifications. Analyzing semi-structured interviews with 60 people who devoted substantial time to at least one MOOC between 2014–2017, we find that people use MOOCs to build skills for application at work and home, build relationships, navigate life transitions, and enhance formal presentations of self, at the same time that they disagree on the meaning of MOOC completions as official academic accomplishments. Our findings build theory on the multi-dimensional character of credential prestige that can inform educational social scientists and credential providers in an increasingly complicated post-secondary ecosystem.

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What good is a MOOC? The question is controversial and does not have a straightforward answer. Originally devised as novel means for democratizing teaching and learning, massively open online courses were given a business model by Stanford computer scientists and their startup, Coursera, in 2012, and subsequently received a flurry of media attention, a nonprofit East Coast provider (EdX), and millions of enrollments. Yet the value of MOOCs, especially in comparison to conventional college courses, has never been clear. On the one hand, MOOCs feature professors and branding from the most respected universities in the world, and completers receive certificates officially documenting their accomplishments. On the other hand, MOOCs do not come with formal academic credits that can accumulate to accredited baccalaureate and graduate degrees.

Researchers have amply documented variable styles of engagement with massively open online courses (e.g., Evans et al., 2016; Kizilcec et al., 2013), noted modest overall rates of MOOC completion (e.g., Perna et al., 2014), and recognized the uncertain exchange value of MOOC certifications in labor markets (e.g., Reich & Ruipérez-Valiente, 2019). Yet only minimal attention

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has been paid to how learners[1] make their own sense out of MOOCs, define the value of these offerings, and put them to use in their daily lives. Doing so remains salient in light of the ongoing proliferation of new forms of educational certifications in the US postsecondary ecosystem (Kamenetz, 2010; Kirst & Stevens, 2015; Olneck, 2018). New conceptual tools as well as fresh empirical knowledge of how people make sense of online learning opportunities are needed but scarce at present.

This paper makes two primary contributions. The first is theoretical. We develop a framework for conceiving of credential prestige as multi-dimensional, with institutional prestige and prestige of credential type simultaneously influencing the meaning and value of academic certifications. MOOCs are useful empirical objects for building theory, because they occupy a contradictory space at the intersection of these two dimensions: they are low-prestige credentials from high-prestige schools. We theorize that this dissonance (Stark, 2011) affords both opportunity and risk for learners.

The second contribution is empirical. We pursue an open-ended research design to document how people use and make sense of MOOCs as ambiguous learning opportunities. We make no *a priori* assumptions about what uses and definitions of MOOCs are appropriate or best. Instead, we inductively examine data from open-ended interviews we collected with sixty adults who had engaged with a substantial portion of at least one massively open online course offered by Stanford University during the years 2014–2017. In these interviews, learners talked to us about what motivated them to enroll in a MOOC, why they sustained participation in this voluntary activity, and what value they gained from their participation. Our findings reveal plural utilization strategies simultaneous with substantial variance in understandings of MOOCs as credentials. People use MOOCs to build skills for application at work and elsewhere, build relationships, navigate life transitions, and enhance formal presentations of self, even while they disagree on the meaning of MOOC completion as an official academic accomplishment.

Our findings have implications beyond the MOOC phenomenon to higher education research, policy, and practice broadly. While their moment in the media spotlight was short, massively open online courses are only one variant of a growing stream of learning opportunities and attendant certifications vying for the attention of adult learners. As the ecology of postsecondary education grows more varied and complicated, credentials of ambiguous value are becoming ubiquitous. Careful attention to how adult learners respond to this ambiguity can inform the design, governance, and study of novel educational opportunities going forward.

Background and prior work on MOOC learners

Devised originally by Canadian educator-researchers as a tool for democratizing teaching and learning (Daniel, 2012), massively open online courses made

headlines in 2012 when two Stanford University computer science professors created a business for purveying MOOCs, Coursera. Coursera built on the "freemium" concept in which initial offerings are provided at no or very low cost in order to build a customer base (Reich & Ruipérez-Valiente, 2019). Harvard, MIT, and Berkeley followed soon thereafter with the creation of EdX, a consortium devised as a nonprofit alternative to Coursera for schools seeking to develop their own MOOC offerings (Carey, 2016).

Progenitors of Coursera and EdX made some spectacular statements about the promise of MOOCs and other digitally mediated educational resources to change the basic organization of higher education. They claimed that MOOCs would democratize postsecondary access by radically lowering the cost of academic instruction per student and eliminating the necessity of physical classrooms (Auletta, 2012; Heller, 2013; Waldrop, 2013). Yet because they have neither exclusive admissions nor formal academic credit, the value of MOOCs as academic credentials is unclear. MOOCs are offered by recognized universities, often taught by famous professors, and structured like credit-bearing online offerings: with readings, lectures, homework, and assessments. They even are referred to as "courses" just like their credit-bearing counterparts. At the same time, MOOCs are open to all comers, charge modest or no tuition, and offer certificates rather than legally recognized credits and degrees. This is why the value of these academic offerings as markers of their owners' social status, skills, or employability remains uncertain (Olneck, 2018).

Nevertheless, millions of people have consumed hundreds of MOOC offerings purveyed by many of the most prestigious universities in the world. These offerings are only one of a wide variety of educational opportunities vying for attention and enrollments in an increasingly complex postsecondary ecology (Kamenetz, 2010; Scott & Biag, 2016; Stevens, 2015). Many have worried that opportunities for deceptive and predatory business practices have expanded apace with this complexity (Cottom, 2017; Holland & DeLuca, 2016; Mettler, 2014). With their zero- or very low-cost delivery models, MOOCs and their providers have largely avoided that particular criticism. Yet they have not escaped the critical gaze of academic researchers.

Prior research on MOOC learners has focused on four broad topics: learner demographics, rates of persistence and completion, styles of engagement, and motivations. We briefly summarize each in turn.

Tempering early enthusiasm that MOOCs might substantially equalize access to postsecondary learning opportunities, research has consistently found that those who take advantage of MOOCs are disproportionately male, White or Asian, college-educated, and reside in countries with well-developed economies (Dillahunt et al., 2014; Glass et al., 2016; Hansen & Reich, 2015). Prior researchers also have consistently confirmed that MOOC completion rates are modest (Ho et al., 2014), even while they challenge the notion that completion is an appropriate benchmark for assessing the benefits

or limitations of MOOCS (DeBoer et al., 2014; Kizilcec et al., 2013; Vu & Fadde, 2014).

Prior work also suggests that people participate in MOOCs in variable ways. Analyzing data from three Stanford MOOC offerings in computer science, Kizilcec et al. (2013) identified four types of MOOC learners: "completers," "auditors," "samplers," and "disengagers." While minimally participating samplers and disengagers comprised the largest proportions of learners, auditors (who consumed a substantial amount of course material), and completers (who submitted the majority of assessments) together comprised approximately 20% of those enrolled. Subsequent research on sixteen MOOCs offered through Coursera by the University of Pennsylvania distinguished between "sequential" versus "user-driven" progression strategies, with the former consuming material in the order in which it is presented, and the latter sampling course material in orders of their own choosing. On this study's measure of high completion ("final grade 80 or above") no course did better than 12%; yet much larger proportions "accessed any lecture" (median = 42% of registrants) and "attempted first quiz" (median = 21% of registrants) (Perna et al., 2014) In short, consistent minorities of MOOC learners lend hours of time and attention to these offerings even when they fall short of completion.

Several researchers answered the encouragements to move beyond observation of persistence to "intentional collection of data that enable examination of relevant and meaningful dimensions of users' course experiences and outcomes" (Perna et al., 2014, p. 429). They have queried the enrollment motivations of MOOC learners and observed their relation to subsequent patterns of course engagement (Kizilcec & Schneider, 2015; Wilkowski et al., 2014). Other qualitative studies suggest that people derive a variety of utilities from MOOCs: gaining training in particular skills for their jobs (Littlejohn et al., 2016); practicing English-language skills (Uchidiuno et al., 2016); and connecting with other people who have similar interests (Veletsianos et al., 2015). While their findings are suggestive, these studies are based on very small interview samples or confined to those who are enrolled in a particular course. A study based on interviews with 92 people enrolled in four EdX courses by Veletsianos et al. (2016) goes furthest in expanding researchers' conceptualization of how people integrate the experience of taking MOOCs into the spatial and temporal exigencies of their lives. However, this work focuses on the activity entailed in engaging with MOOCs, not with the purposes to which users put these offerings. We note also that prior qualitative studies focus on the time during which learners are actively engaging with MOOC offerings. While such a focus is important, especially for questions of pedagogy and user-interface design, full understanding of the value of postsecondary coursework becomes evident to learners only long after coursework has concluded (Chambliss & Takacs, 2014). The research presented here was intentionally

designed to elicit retrospective accounts that might capture this additional value.

A fuller understanding of how learners utilize and make sense of MOOCs over time can provide tractable insight for researchers, education providers, and policymakers at a time of turbulence and change in the ecology of postsecondary education. MOOCs are but one type of a burgeoning array of ambiguous credentials targeting adults that include bootcamps, micro-degrees, badges, and certifications of work experience (Olneck, 2018; Stevens & Gebre-Medhin, 2016). Whether or not these new forms constitute reasonable replacements or substitutes for more conventional forms of postsecondary education, fuller knowledge of how people understand these offerings, and put them to use in their lives can inform their design, governance and study.

Conceptual framework: Two dimensions of credential prestige

The contemporary United States is a "credential society" in which occupational opportunities and social prestige are distributed substantially through conferral of formal educational certifications (Collins, 1979/2019; Meyer, 1977). Employers use educational credentials as legitimate bases for sorting applicant pools, excluding particular kinds of people, and enabling worker advancement and promotion (Brown, 1995). Individual men and women use these same credentials to assess others as potential friends, lovers, and marital partners (Mare, 1991; Smith et al., 2014).

Colleges and universities are crucial credential brokers. Together with K12 schools, they retain a near-exclusive monopoly on the provision of credentials that are officially recognized by governments as legitimate bases of discrimination in hiring and employment (Baker, 2014; Meyer, 1970). Yet by no means are all postsecondary credentials equivalent in meaning or prestige, which vary simultaneously along two dimensions.

First, credential prestige varies directly with the prestige of the schools conferring them. Historically, school prestige has had a widely agreed-upon metric: admissions selectivity. Simply put, the larger the proportion of students denied the opportunity to earn admission to a school's flagship programs, the more prestigious and valuable credentials conferred by those schools are considered to be (Labaree, 2012; Stevens, 2009). Yet admissions selectivity in a few programs is hardly the whole of institutional prestige, which has additional indices including a school's research productivity, endowment size, and national or international reputation, all of which are often integrated into formal rankings purveyed by third-party organizations such as *USNews* (Bastedo & Bowman, 2010; Espeland & Sauder, 2016). In the U.S., intercollegiate athletics also are implicated in prestige hierarchies, with league affiliation signifying relative prestige comparability (e.g., the Ivy League, the Big Ten [Lifschitz et al., 2014]). In sum, schools themselves have multifaceted reputations that together comprise the relative

prestige conferred by their names (e.g., Penn State, Harvard, University of Phoenix).

Second, prestige varies by credential type. Many schools purvey a long roster of credentials: Undergraduate, masters, and doctoral diplomas; diplomas and certificates from "extension" and "continuing education" programs; and "executive education" offerings of wide variety may provide different amounts of prestige and exchange value. It often is the case that schools purveying some credential programs with highly competitive admissions also have other programs with modest or no admission requirements. For example, admission to the undergraduate program conferring the degrees officially called "Artium Baccalaureus" (A.B.) and "Scientiae Baccalaureus" (S.B.) from Harvard College is one of the most competitive in the world, with an acceptance rate for the class of 2023 was under 5%.[2] By contrast, admission to the undergraduate program conferring the degree officially called "Bachelor of Liberal Arts" (ALB) from Harvard Extension School requires only successful completion of a few preliminary courses; these courses admit all of those willing to enroll and pay fees. As the Extension School web site's admissions page makes clear in bold lettering: "**Our courses are open — no application required to enroll**."[3]

While educational social scientists have extensively considered the first dimension, they have devoted considerably less attention to the second dimension, in which credentials conferred by the same schools are variably selective and have different meanings and status. Despite a small but growing empirical literature on earnings returns to sub-baccalaureate credentials (see Stevens et al., 2018 for a concise review), there has been even less work on the uses and meanings learners lend to such credentials.

To inform such inquiry, we offer a conceptual matrix in which credentials vary on two axes simultaneously, as represented in Figure 1. The horizontal axis of the figure represents the prestige of the school conferring credentials. This is the phenomenon sociologists call horizontal stratification: credentials conferred by different schools carry variable prestige and returns (Bastedo & Gumport, 2003; Gerber & Cheung, 2008). Variation on this dimension may be measured as continuous or categorical, via a host of different metrics (school type, admissions selectivity, ranking, athletic league affiliation, e.g.); The vertical axis represents prestige of degree type. Variation on this dimension is categorical, with different kinds of degrees carrying different kinds of prestige. As in our Harvard examples above, where the prestige A.B. and S.B. degrees from Harvard College is different from the prestige of the ALB from Harvard Extension, schools may purvey sub-baccalaureate or professional certificates that carry different prestige than the flagship BA/BS, MA/MS, and Ph.D. programs.

Thinking about these two dimensions of variation simultaneously yields novel insight. First, it makes it possible to recognize that scholars know

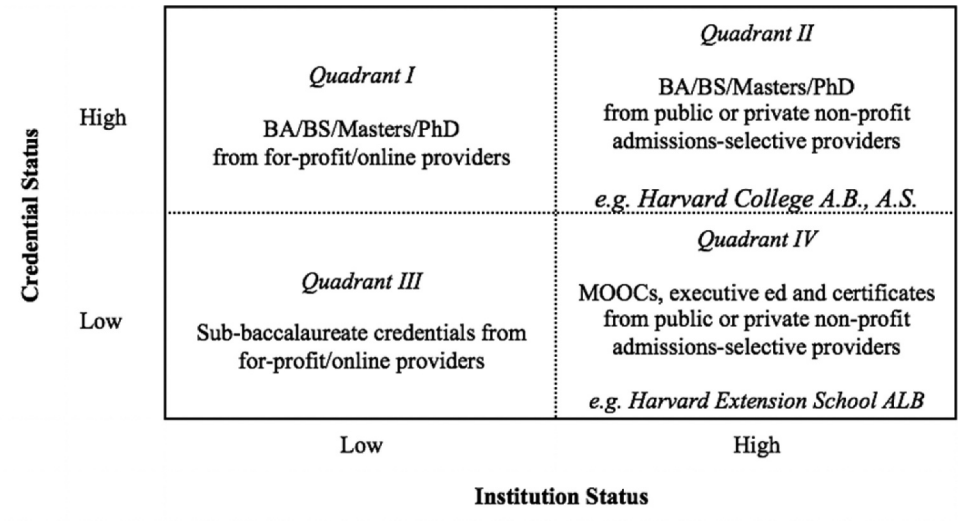

Figure 1. A credential typology.

considerably more about the value and meaning of credentials in some quadrants than they do in others. For example, there has been copious research on how students experience and variably benefit from BA/BS degrees from (lower-prestige) for-profit, often online schools (e.g., Cottom, 2017; Deming et al., 2012; Eaton, 2020; Mettler, 2014), and from elite colleges and universities (e.g., Brint et al., 2020; Brint & Yoshikawa, 2017; Katchadourian & Boli, 1994; Rivera, 2016). There is also important nascent scholarship on how students experience and variably benefit from lower-prestige certifications from lower-prestige schools (Holland & DeLuca, 2016). This category includes certifications from coding boot camps, which have recently captured national attention as a novel means of entering well-compensated technical occupations independently of traditional college training (e.g., Wilson, 2017). Yet programs in the fourth quadrant (lower-prestige degrees from higher-prestige schools) have received substantially less scholarly attention. Here we include the rapidly proliferating fully online professional MA/MS degrees from schools such as USC, Georgia Tech, Penn State, and the University of Illinois (Goodman et al., 2019), as well as the MOOC certifications under inquiry in this paper. We suspect that research on programs in this category will prove to be especially important going forward, as the COVID pandemic and changes in the financial environments of traditional colleges and universities continue to encourage the development of multi-platform delivery and business models (Aucejo et al., 2020; Gumport, 2019).

Second, this conceptualization of prestige enables us to theorize why MOOCs and other novel credentials from higher-status institutions might have ambiguous utilities and meanings. The *Cambridge Dictionary* defines ambiguity as "a situation or statement that is unclear because it can be

understood in more than one way."[4] We theorize that the simultaneously high status of the elite schools that provide them and the low status of the credentials they confer makes the experience and benefit of MOOCS ambiguous for learners because MOOCs can be understood in more than one way: as elite credentials or mere pieces of paper; meaningful educational experiences or discretionary amusements. Further, the dissonance created by these contradictory prestige signals creates both opportunities and risks for MOOC learners. As is true in any context characterized by contradictory value signals (Stark, 2011; Zuckerman, 1999), the ambiguity of MOOCs is both an opportunity and a risk. On the one hand, it enables people to creatively make sense of, and find uses for, MOOCs in their daily lives (cf. Swidler, 1986). On the other hand, the ambiguity means that learners may overestimate the prestige and exchange value of MOOC credentials to others (cf. March, 1978).

In the analysis below, we focus on one case of credentials that fall within this fourth quadrant of the prestige matrix: MOOCs offered by Stanford University.

Research design, data, and methods

Our empirical inquiry seeks to discern (a) the range of utilities users find in MOOCs (b) the range of ways in which users make sense of MOOC certifications as credentials. We conscientiously devised an inductive research program to capture the uses and meanings people attach to MOOCs "in the wild" of their everyday lives. We opted for a semi-structured interview design that enabled us to ask open-ended questions about the uses and meanings learners give to their MOOC experiences. We made no presumption that MOOC learners would share our theorization of MOOCs as ambiguous, or that we would discover any particular or preponderant uses and meanings of MOOCs in the wild. To avoid leading questions, we refrained from asking people to make comparisons between MOOCs and conventional college courses, or to assess the labor-market or prestige value of MOOC certifications. To ensure the creation of space for negative as well as positive comments, we specifically asked people about problems or disappointments they had with their MOOC experiences. We left ample room in the interview protocols for respondents to take the conversation in multiple directions. Our interview protocol is available in the Appendix.

From the universe of all those who have invested substantial time engaging with massively open online courses, we sought to define a research population with the following characteristics. First, we wanted the population to include only those who had voluntarily invested substantial time in at least one course. Voluntary and substantial investment would indicate that people were deriving sufficient value from the offering to lend attention to it over time. Second, we wanted a population that included participants engaged in a variety of MOOC subjects, so as to capture the widest possible range of potential

applications and meanings people lend these courses. Third, we wanted a population of adults, so as to diminish the likelihood that MOOC participation was coerced (by parents or teachers, for example). Finally, to avoid spurious comparisons, we wanted the population to comprise those living under broadly similar economic, political, and cultural conditions, even while allowing for participant variation by age, gender, and ethno-racial identity.

To define the research population, we began with all of those reporting an age over 18 and resident in the state of California when they had enrolled in at least one no-fee MOOC offered by Stanford University between 2014–2017 (N = 12,184). We reasoned that this group would encompass a wide demographic range as well as variation in substantive interest, since Stanford offered more than 300 free-service MOOCs during these years. We further constrained the research population by including only those who had viewed at least 30% of the videos included in course material to recruit our sample. While researchers have identified a number of ways to measure engagement in online learning environments (e.g., Richards, 2011), we reasoned that video viewing constituted at least a minimal and cleanly measurable metric of engagement.

To derive a research sample, we randomly selected 100 persons from the research population every four to five days, and sent recruitment solicitations via e-mail seeking appointments for digitally mediated interviews. We offered each respondent a modest ($25) compensation. Interviews were digitally captured and transcribed verbatim via a two-stage process in which an initial AI-based transcription service was corrected and refined by a human researcher. Ongoing inductive analysis brought us to a point of theoretical saturation (Glaser & Strauss, 1967/2017; Rowlands et al., 2016) around the 40th interview. To ensure saturation, we continued with randomized recruitment until we had completed 60 interviews.

The demographic characteristics of our sample are presented in Table 1. While data limitations prevent us from assessing the demographic representativeness of our sample relative to the research population, sample characteristics broadly comport with other empirical observations of MOOC learners. They are highly educated, are of relatively high socioeconomic status, and are disproportionately White or Asian and male.[5] Interviewees reported having enrolled in 133 Stanford MOOC offerings, with 42 interviewees enrolling in multiple

Table 1. Demographic characteristics of interview sample (N = 60).

Age	29 or younger (8), 30–55 (41), 56 or older (11) range: 23–73
Mean Age	42 years
Gender	M (35), F (25)
Race	White (34), Asian (18), Hispanic/Latino (4), Mixed (2), Other/Skip (2)
Income	$50 K or less (13), $51-$100 K (15), $101 K+ (23), Skip (9)
Education	Some college (3), Bachelors (24), Postgrad (33)

courses. A complete list of MOOCs for which our respondents reported enrollment is provided in Table 2.

All interviews were conducted by three trained researchers during a two-month period in the summer of 2018. We often probed interviewees for follow-up information on their initial responses to questions, or to obtain further clarification or context. This enabled us to gain insights on the rationales and meanings that drove learners' behaviors and shaped their perspectives.

Our analytic strategy was grounded and inductive (Charmaz & Belgrave, 2007), allowing themes and codes to emerge as the analysis progressed. First, two researchers independently developed a set of preliminary codes based on careful initial readings of the transcriptions. Each researcher then applied their initial coding scheme to ten interviews (17% of total) to assess which codes were present in multiple interviews, as well as to add new codes as necessary. This process yielded approximately 50 codes. The research team subsequently condensed the scheme to comprise eight overarching thematic codes. All 60

Table 2. Stanford MOOCs reported as enrolled, by number of respondents.

Course Name	Times Taken
How to Learn Math	17
Computer Science 101	12
Environmental Physiology	10
Scientific Writing	10
Statistical Learning	10
Statistics in Medicine	7
Relational Databases	7
Principles of Economics	6
Introduction to Databases	6
Engineering/Networking	5
Stocks and Bonds	5
SQL	4
Adventures in Writing	4
Introduction to the Natural Capital Approach	4
XML	3
Convex Optimization	3
Relational Algebra	2
Reservoir Geomechanics	2
Open Knowledge	2
Engineering/Compilers	2
Global Health	2
Medicine/Molecular Foundations	2
Medical Education in the New Millennium	2
Nuclear Terrorism	2
Probability and Statistics	2
International Women's Health and Human Rights	2
Introduction to Geology	1
Engineering/Nano	1
Quantum Mechanics	1
English/Digging Deeper	1
Poverty	1
Palliative Care	1
Philosophy/Language, Proof, and Logic	1
Statistical Reasoning	1
Staying Fit	1

interviews were then coded according to this scheme by the two researchers working in close collaboration.

Findings

Table 3 provides a summary of our analytic coding. The table presents distributions of codes by respondents' demographic characteristics, in rows of reported age, gender, education level, income, and ethno-racial identification. Columns present distributions of the purposes and meanings of MOOCs reported in interviews. Because we observed no strong demographic pattern or variation in interview responses, we present qualitative results along the columnar dimensions of MOOC utilization and meaning, which vary substantially. Results are reported under two conceptual umbrellas: plural utilization and credential ambiguity.

Plural utilization

Respondents reported putting MOOCs to a wide variety of uses in their lives. We grouped these uses into three general categories: building capacities for paid work and elsewhere, enhancing relationships, and navigating transitions. We attend to a fourth use — the enhancement of formal presentations of self — in the subsequent section.

Building capacities for paid work and elsewhere

The majority of our respondents (N = 49) reported using MOOCs to build their professional capacities. Among those who sought to enhance work-relevant skills was Patrick, age 28, who reported enrolling in MOOCs on data science while he was enrolled in graduate school, an investment that he believes paid off in his job search:

> During [job] interviews, I was able to show them that I know data science. That's how I got hired. Even though I did not have a degree in data science, with my experience and MOOCs, I was able to get a job.

Tomas, age 29, with his own business and no college degree, also reported using MOOCs to acquire skills in data science:

> Because my career is based on keeping up to date with current techniques and trends and the latest tools, all of that comes from understanding the basics of how things work. None of that would be possible without a little bit of Computer Science 101 [a course in statistical learning and SQL].

We were not surprised that fully half those reporting utilization of MOOCs to build skills for work (N = 49) had enrolled in engineering courses (N = 24). The Stanford MOOC offerings that first made headlines in 2012 were created

Table 3. Reported uses and Credential Value of MOOCs, by Demographic Characteristics (N = 60).

		Professional capacity building	Personal capacity building	Building relationships	Navigating transitions	Thought of MOOCs as college course	Mentioned certification /accreditation	Certificate does not have value	Certificate has value	Include on LinkedIn/ resume	Do not include on LinkedIn/ resume	Total Count
Total Cases		**49**	**36**	**24**	**22**	**9**	**21**	**3**	**18**	**36**	**24**	**60**
Gender	Female	20	15	10	10	2	7	0	7	11	14	**25**
	Male	29	21	14	12	7	14	3	11	25	10	**35**
Age Range	<30 years old	6	4	3	4	1	3	2	1	6	2	**8**
	30-55 years old	38	23	18	16	8	16	1	15	23	18	**41**
	56+ years old	5	9	3	2	0	2	0	2	7	4	**11**
Education Level	<Bachelors	2	1	1	1	2	3	1	2	1	2	**3**
	Bachelors	17	17	9	8	2	9	2	7	15	9	**24**
	Postgraduate	30	18	14	13	5	9	0	9	20	13	**33**
Income during course	Under 50K	12	8	6	8	2	5	1	4	8	5	**13**
	50-100K	11	8	5	4	1	5	1	4	9	6	**15**
	101-200K	18	10	8	8	2	6	1	5	11	7	**18**
	200+K	3	3	3	2	2	1	0	1	3	2	**5**
	Skip	5	7	2	0	2	4	0	4	5	4	**9**
Race/Ethnicity	White	29	24	15	11	4	14	1	13	17	17	**34**
	Asian	14	10	8	8	3	2	0	2	12	6	**18**
	Hispanic/Latino	3	1	0	1	0	3	2	1	4	0	**4**
	Mixed	2	1	1	1	1	1	0	1	1	1	**2**
	Other/Skip	1	0	0	1	1	1	0	1	2	0	**2**

by engineering faculty specifically to give a wide audience access to training in applied knowledge and technical skills. Yet engineers and data scientists are by no means the only respondents who reported utilizing MOOCs to help them at work. Alan, age 31, a schoolteacher, was one of a large number of our respondents (N = 18) who reported enrollment in a MOOC designed to support teaching and learning in mathematics:

> I was really hoping just to get some ideas of how to conduct my math classroom because I was a first-year teacher. I had just finished my credentialing program as a teacher … So I thought I'd take this course, I would learn some strategies, what works and what doesn't work, some things that I can implement in my classroom the very first few weeks as a teacher.

Oana, age 36, who grew up overseas and was completing a postdoctoral fellowship in California when enrolled in Stanford MOOCs, explained how a course on writing made her feel "a little bit more confident with writing" and empowered her in her understanding of how to write well. Regarding a different MOOC, in statistics, she said:

> I just need to have an understanding of statistics in my current work. So definitely having good basics. Good background when I finished up my [postdoc] at [name of hospital] - I definitely use that in my work.

A majority of respondents (N = 39) also reported their MOOC experiences as useful beyond the realm of paid work. People used MOOCs to aid their management of personal finances, improve their physical fitness, build parenting skills, explore new interests, and care for sick family members. For example, Brad, age 50, a computer programmer, said that he used insights from a math-education MOOC to assist his children. "From [name of MOOC professor], helping my kids with a growth mindset for math. I did a bunch of the tricks that she talks about." Adam, age 24, a professional teacher, explained how a MOOC he took on finance helps him both at work and at home:

> I've certainly used it in practical discussion and in discourse and debate with friends and family, and even people in educational settings. Some of the fundamental principles in that class have helped me to defend positions that I personally hold, and have actually allowed me to educate others … . if you want to talk about free-market economics with seventh and eighth graders, there have been fundamental principles that have helped me demonstrate points in those classes.

Sherwin, age 73 and retired, reported taking a MOOC on palliative care to assist him in service to his dying wife. Beyond that, Sherwin believed that the lessons he learned would be useful to him again in the future:

> The thing with palliative care, we're all getting old. And some of us probably would benefit from palliative care … The information I learned in it is going to be with me, you know, for the rest of my life. And, and I may be in that situation where somebody else may be giving me care. And, and I may need to think about how to frame my mind on how to get through the difficult situations in my life.

Enhancing relationships

Skills are not the only utilities people derive from MOOCs. Respondents also reported using MOOCs to strengthen interpersonal relationships. Elizabeth, a health systems trainer who reported her age as "over 45," told us that she enrolled in a MOOC on medical writing with others in her professional association:

> I used to be a member of the American Medical Writers Association, and there were a few other people [I knew who] took that course as well. So, we kind of did a little, we did our thing. And we had a chat room on Yahoo so that we could give our opinions of how the course was going, and what we thought of [the instructor's] techniques and so forth.

Derrick, 53, a tax analyst, told us about how a MOOC on the topic of poverty and inequality helped him navigate difficult political conversations with one of his coworkers.

> I have a co-worker who is a massive Trump supporter and I'm not. And after taking the American poverty and inequality course, I heard him say something about how it's just disgusting that people who are low-income would have kids. I said, 'Well, you know, I just took a course about this. And the number one reason why people in poverty, according to Stanford, have children, when they're practically destitute, is they want hope.'

Some reported utilizing MOOCs to enhance interpersonal relationships in their private lives. Katie, age 41, a computer programmer, reported enrolling in an introductory-level engineering course with her father in order to help him build his computer literacy:

> I'm an IT professional. I'm a programmer. And my dad's retired. I told him, I'd take that class with him to kind of get him, you know, he was sort of befuddled by computers. And I said that we would take that together, and I'd be there to answer questions.

The tone of Katie's recollection indicated that the shared experience had additional benefits for her relationship with her father: "I thought it was really good … And my dad and I had a good time."

Beyond strengthening existing relationships, some respondents told us that their MOOC experiences precipitated new relationships. For example, Micky, a 52-year-old entrepreneur living in San Francisco, connected with someone who has remained a business partner through a MOOC in which they were mutually enrolled:

> There's one person in particular. We're evaluating going into business together. This is a gentleman, I believe he's an Associate Professor down at [name of major university] in signal processing. He and I met through this online course, the TA had requested that I release my homework and he and I established a rapport. Since then we have been teaming on a variety of financial programming applications. And this is now two years later.

Navigating transitions

Over a third of our interviewees reported using MOOCs to assist them in navigating transitions they were facing in their lives. For example, Oana, the postdoctoral fellow we introduced earlier, explained how MOOCs helped her return to paid work.

> Especially if you are trying to re-enter the workforce, so let's say if [you are] a mother like in my case. When I was going back to work after kids grew a little older, it was a very cost-effective way to upgrade my skills. It's something that you can do while you are working because sometimes people want to change their careers and they don't find the time or they can't just take time off to do a course at school. So, doing those types of courses is really good for them, I think.

Erin, age 35, another mother who described her occupation as "nonprofit coordinator," explained how taking MOOCs helped her decide whether and how she might pursue graduate school:

> I work full time and I have children. So, if I was going to be doing any sort of master's coursework, it would be online. So being able to have that sort of practice experience of doing this type of education online. If I can be successful at it here, it's highly likely that I will be successful at it in a degree program.

Kara, age 27, who went through a career transition, reported similarly:

> I was working in education, not as a teacher and not as a data person. And I wanted to get into data education. So, I must have been using that [course] to see what it was like, and also just to build my skill set, so that it could apply to those kinds of jobs. Recently, I took that other analytics course, while I'm working as a data analytics person to expand my knowledge of data analytics.

In a more general statement Tomas, the independent businessperson quoted earlier, attributed a great deal of value to MOOCs in assisting in his personal and professional development:

> It's night and day. Imagine I was a child then and [now] I'm a full-grown adult. I was working for other people before, I was living with my parents in a small apartment, trying to make my way in the world. As of today, I now run a company, [company name]. I do finance analysis, inventory control, supply chain, and any kind of data analysis that any company would need. I own a car, a home. I live my whole life just pulling data and analyzing it and putting in the right format for these companies. It's everything that I do throughout the day.

The findings presented in this section indicate that learners use MOOCs to pursue a wide range of purposes. While MOOC creators might have expected that people would use MOOCs to enhance work-relevant skills, learners find several additional applications: making new professional connections and solidifying existing ones, deepening relationships with family members, and navigating life transitions. This insight comports with the notion that ambiguous situations create opportunities

for novel action (Stark, 2011). People used MOOCs for many purposes beyond developing skills that might have exchange value in labor markets.

The ambiguity of MOOCs as credentials

While the uncertainty associated with MOOCs as credentials creates opportunities for creative utilization, it also brings risk for those who might seek to use them as formal academic certifications. If people invest time and energy in MOOCs on the premise that such investments will be rewarded in labor markets, they may find they are mistaken when they look for work. Additionally, disagreement about the prestige and value of such certifications among the general public may trigger disputes and embarrassment about what counts as a worthy educational accomplishment. Our interviews left little doubt about the ambiguity of MOOCs as legitimate academic credentials. Evidence for this ambiguity took several forms.

In order to avoid leading questions, our interviewers purposefully refrained from asking respondents to compare MOOCs with conventional college courses or degrees. Nevertheless, well over a third of our respondents (N = 27) voluntarily equated MOOCs they had taken with conventional college courses (N = 9) or said that certifications earned in the course had official value (N = 18).

Syman, age 62, who described his occupation as "working from home," made an explicit comparison between his MOOC experience and his college years:

> I wasn't a good student in college. And I was so proud, taking a course from Stanford. And until the last moment, I was hoping I'm going to pass it, you know, and I'm going to make a good grade, that kind of thing. And when I passed it, and I got the certificate, I still have the certificate. I'm proud of it. It was mainly because it was a Stanford course that I really enjoyed it.

Elizabeth, the health systems trainer quoted above, expressed her satisfaction with the documentation she received for the course on science writing she completed, telling us:

> I have the paper to back it up, I have a certificate, it's in black and white. I think that's also important to mention, that if someone gets something they can print at the end of it to show that they actually took it and didn't just say they took it.

Elizabeth contrasted this course with another one, in medical education, that she did not complete:

> I didn't finish that course. Because I was having technical difficulties, and then doing catch up for some of them and then I wasn't able to finish at the end. So I failed.

Describing her work in the second course as failure, Elizabeth again implies that she takes completion of MOOC offerings very seriously.

Derrick, the tax analyst quoted above who had completed multiple Stanford MOOCs, said he was discouraged by the "disclaimer" listed on his MOOC

certificates. "It almost kind of diminishes any effort you've actually done to actually get a certificate," he said. When the interviewer asked him further about the disclaimer, Derrick replied by reading from the certificate itself:

> *'Please note: Some online courses may draw material from courses taught on campus, but they are not equivalent to on-campus courses. This statement does not affirm that this participant was enrolled as a student at Stanford University. It does not confer a Stanford University grade, course credit or degree and it does not verify the identity of the participant.'*

The fact that Derrick had the certificate on hand to read to us suggests the importance he lent to it, even while the certificate itself documented the ambiguity of its own value as a credential.

Yet over a third of our respondents (N = 24) indicated that they did not list MOOCs in public self-presentations, and some of them specifically emphasized that they did not think such listings would be appropriate. Denise, a 35-year-old consultant, did not consider the certificate she earned in the course important, saying:

> It doesn't matter if a person completes it, right? If I'm a professional, why would I care about a certificate or degree? It doesn't give me anything. I'm doing it purely for learning purposes.

When we asked Trey, a 31-year-old male programmer living in an artist community in San Francisco, who reported enrolling in one Stanford MOOC (and several others from different schools) about whether he listed these offerings on his resume or LinkedIn profile, he said:

> I don't list any of them, actually. I just take the skills that I learned from them and just use them in my work. I let my work speak for itself. I don't place a ton of value in the credentials of those online classes. Because I didn't sign up for them to get any kind of certificate. I signed up for them so that I could improve my skills. And then if that's the case, I just let my skills speak for themselves.

We also here quote from Tomas, the 29-year-old business owner mentioned above who had taken an introductory- level computer science course:

> I've never really thought to give credit to the education side of it, or consider that as part of a true certification, mainly because I didn't pay for, I didn't pay for anything, I did get the certificate, but I haven't shown it or used it. I don't have a computer science degree . . . .

Kyle, a 29-year-old product manager for a financial technology firm, explained that while the certificate has no value to him, he believed that such documents might have value to others:

> Friends [who are enrolled in these] courses like having some sort of certification. I know, it sounds kind of cheesy, because I don't really need a certification to tell me that I've taken or completed a course. But it does help others. So they can put something on their resume or have some sort of hard proof that they've taken the class. For me, I could care less.

Distinguishing between others who might value such things, and himself, Kyle implied that it is beneath him to claim MOOC certifications as valuable credentials.

The findings reported in this section have two implications for our overall analysis. First, they confirm the notion of ambiguity as an opportunity for creative action. Given their explicit association with a prestigious university, low barriers to entry, status as "courses" and provision of certificates (however ambiguous), MOOCs are highly accessible assets for public presentation. Because no hard rules or even strong norms govern the assembly of resumes or web profiles, people are at liberty to include their MOOC experiences and certificates as part of these public presentations of self. Our interviews suggest that many MOOC learners do just that.

Second, these findings affirm the notion of ambiguity bearing risk. The value of MOOCs and their certifications in labor markets and as marks of accomplishment in the general culture remains unclear and unmeasured, even while some learners are imputing value to these certifications and investing time and effort in their accrual. Yet others went out of their way to tell us that they did not think of MOOC certifications as legitimate credentials. As we might expect in society that allocates opportunity and prestige on the basis of formal academic credentials generally, the relative value of particular kinds of credentials from specific schools is a meaningful concern for many. Learners risk disappointment or embarrassment if they find that their own estimation of the meaning and value of MOOCs is discordant with audiences who think otherwise.

Discussion and conclusion

MOOC credentials are ambiguous because they convey contradictory status signals: they are low-prestige credentials from high-prestige schools. Our respondents gave ample evidence that MOOCs have ambiguous prestige. While some of our respondents paid explicit deference to the prestige of Stanford as the MOOC provider and listed MOOC certifications in public presentations of self, others emphatically dismissed the credential value of MOOCs altogether. This ambiguity created opportunities for learners to make use of MOOC offerings in a wide variety of ways. Our respondents used MOOCs to learn to care for dying loved ones, try out potential career paths, and strengthen family relationships, for example. The technology itself imposes few restrictions on how it might be used. The MOOCs whose utilization we considered in this paper are free of cost and available to learners virtually anytime and literally anywhere with a broadband internet connection. This has enabled learners to deploy the technology in ways that its creators might not ever have imagined.

Yet the ambiguity of MOOCs as credentials is also a glass half-empty. Because MOOCs have no official currency as formal credentials, learners may invest in these offerings in the belief that they will get more return for their time and effort than may actually accrue to them in labor markets. This has been a major concern of those studying online academic offerings, particularly those of for-profit providers (Cottom, 2017; Deming et al., 2015; Holland & DeLuca, 2016). Without any prompting from interviewers, over a third of our respondents (N = 21) somehow raised the topic of MOOCs as academic credentials and nearly as many (N = 18) thought that MOOC credentials had some kind of exchange value. Nine respondents indicated that they thought of MOOCs as college courses. At the same time others volunteered to us that MOOCs should not be equated with conventionally accredited academic programs. What some are proud to own as university-branded accomplishments others call "cheesy" — suggesting considerable room for misunderstanding, crossed signals, and embarrassment in a society that invests so much meaning in the attainment of postsecondary degrees.

Our findings have relevance for social scientists of educational credentialing and providers of alternative educational credentials. We briefly consider lessons for both of these groups in turn.

Most educational social science is organized around the presumption that postsecondary credentials have values that can be assessed empirically: whether by returns in labor earnings (Chetty et al., 2017), or to other measurable outcomes such as physical health and longevity (e.g. Hout, 2012). This social science relies on a vast measurement infrastructure for which accredited baccalaureate diplomas are the essential units of analysis. Even while the ecology of postsecondary credential provision has continued to grow and diversify, measurement regimes have not developed mechanisms for accommodating systematic observation of other kinds of credentials. We suspect that this lacuna of measurement is part of the reason why early social-science research on MOOCs began from the presumption that MOOCs were variants of conventional college courses and thus amenable to similar assessments of persistence and completion. This remained the case even while other MOOC researchers consistently pointed out the problems of comparing MOOCs to conventional college courses and called for new measures of value for MOOCs (DeBoer et al., 2014; Kizilcec et al., 2013; Perna et al., 2014).

The matrix of credential prestige outlined in this paper provides a roadmap for more careful specification of the meaning and value of different kinds of certifications purveyed by the same schools. Specifically, it suggests that apprising massively open online courses with the same metrics social scientists use for flagship product lines — admissions selectivity, persistence, and labor market returns — limits and may even distort how academic certifications are understood by social scientists. Our work offers an empirical starting point for developing new measures for capturing the value of academic credentials with

more subtlety. Such measures might build on the four MOOC utilities we discovered from our interviewees: building skills for home and work, sustaining and making relationships, navigating life transitions, and enhancing formal presentations of self. We can readily imagine the development of survey measures, for example, that could capture these utilities among credential seekers.

Our work also offers lessons for providers of novel postsecondary credentials. First, the range of uses to which our interviewers reported putting free MOOC offerings suggests that people find a plurality of values in these novel educational opportunities. It is not all about getting a credential or getting a job. Providers of novel postsecondary credentials might do well to recognize a wider range of utilities and specifically target their offerings to particular kinds of uses. In doing so they might make positive contributions to a postsecondary ecology which, many worry, is ever more narrowly focused on employment, earnings, and prestige (Binder et al., 2016; Deresiewicz, 2015). Especially if offerings are available free or at very low cost, providers might also demonstrate to a growing chorus of skeptics of both for-profit (Cottom, 2017; Mettler, 2014) and elite nonprofit (Zaloom, 2019) education that providing educational opportunities is a civic endeavor, not just a business.

At the same time, our work encourages providers to recognize the considerable ambiguity that surrounds novel postsecondary offerings. That these offerings lack clearly agreed-upon meanings provides opportunity for creative use, but also puts users at risk of over- or mis-investing time and effort in credentials with little exchange value. How providers address this ambiguity may have downstream consequences for their reputations that are hard to fully foresee.

For example, Reich and Ruipérez-Valiente (2019) recently demonstrated a categorical shift in the MOOC space in recent years, with the majority of MOOC providers now putting most of their offerings behind a paywall and encouraging users to purchase bundles of courses leading to named certifications. Our findings in this paper suggest that this "pivot" toward explicit credentialing may be a mixed blessing for the ongoing evolution of the postsecondary ecosystem. On the one hand, it reduces ambiguity by explicitly commoditizing MOOCs and creating a new category of postsecondary credential—the MOOC certificate—whose value might be systematically assessed, measured, and ultimately collectively understood. On the other hand, history may come to define the MOOC phenomenon as a new twist on an old game of winner-take-all academic capitalism (Frank & Cook, 2010; Slaughter & Rhoades, 2004). What began as a gift, given by some of the world's most prestigious and wealthy universities, free of charge to all comers, may very soon come to be seen as yet another way to make money.

Finally, we recognize that an important part of the value of academic credentials for learners is the value that employers impute to those same

credentials and reward in labor markets. The negotiation of that value between learners, employers and schools has been an essential dynamic of education politics in the United States for 150 years (Brown, 1995; Groeger, in press; Labaree, 2012). Our own modest inquiry here focused exclusively on how learners make sense of novel credentials. The question of how employers in a range of occupational domains make sense of these same credentials is equally important and would reward future scholarship. So too would ongoing theorization about the matrix of credential prestige: a complicated domain in which educational consumers, credential providers, and employers jostle with one another for relative advantage in times — like ours — of turbulent change.

Notes

1. Throughout this paper, we refer to those enrolled in MOOCs as "learners" to distinguish them from students, who are defined by a relationship with schools in which effort and tuition are exchanged for grades and legally recognized academic credit.
2. https://college.harvard.edu/admissions/admissions-statistics. Accessed 12 July 2020.
3. https://www.extension.harvard.edu/registration-admissions. Accessed 12 July 2020.
4. https://dictionary.cambridge.org/us/dictionary/english/ambiguity.
5. It may also be the case that those who volunteered for interviews with us may be systematically different from those who did not. For example, these learners may have been more impacted by their experiences with MOOCs. We thank an anonymous reviewer for raising this caution.

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Appendix. Interview guide

Opening Script

Hi, this is [name] from Stanford University. Is this [name]?

Wonderful, thank you so much for making the time to have a conversation with me today. This interview will take about 30 minutes. If you need to take a break for any reason, I am happy to pause until you are ready to start again.

When you wrote back to us about this interview, we gave you information describing your participation and asking for your consent. Do you have any questions about that for me now?

Okay, great. We also asked about recording the interview — is that still okay? If so, I'll go ahead and begin the recording now.
First, I want to make sure I have the right information on the courses that you have taken. It looks like you took **Course name** in **YEAR** (and . . ., if more than one). Is that right? Are we missing anything? (Note: If respondent mentions multiple courses, ask them to select up to three that are most prominent in their memory.)

(I) **Motivation**
  (a) How did you hear about this opportunity?
  (b) How did you come to enroll in (course name)?
  (c) Do you remember what you were hoping to get out of the course?

(II) **Comparisons**
  (a) Have you taken advantage of any other learning opportunities like this?

(III) **MOOC Learner User Experience**

(a) Rhythms and routines
   i. When did you do course related activities? (once a week, every day, after work, etc.)
   ii. Where did you engage with the course? (If at home, did you have a particular space? etc.)
   iii. How did you engage with the course (all electronically, did you take notes, etc.)?
   iv. Over what length of time did you complete the course? (did you move through it very quickly, over a series of months etc.)
   v. Did you go through the course sequentially (in the order provided) or did you skip around based on the material you were most interested in?
   vi. Did you use any technological/social media platforms beyond the Lagunita platform for course-related activities?

(b) Pedagogical experiences
   i. Were there any specific teaching techniques that you found particularly effective? Any techniques that you found particularly ineffective?
   ii. How did the course assess your learning? How helpful or effective do you think this was for you? How could the assessments have been improved?

(c) Recollections of instructor(s)
   i. Do you remember the name of the instructor(s)?
   ii. How did you interact with the instructor(s)?
   iii. Do you recall if the class had a Teaching Assistant(s)/Mentor(s)/Other facilitator in addition to the lead instructor?
   iv. If yes, how did you interact with the TA(s)?

(d) Recollection of other learners
   i. Do you recall having interactions with other learners in the class?
   ii. If yes, could you talk about that?
   iii. Did you ever interact with other learners outside of the course website?

(e) Continued engagement
   i. Did you continue to keep in touch with anyone from the course after it concluded?
   ii. Did you engage with anyone in your personal network about the course (e.g. friends, family, etc.)?
   iii. Do you know of others in your personal network or community who use moocs?
   iv. Can you tell me about a particularly memorable experience from the course?
   v. Are there specific ways in which you think the course could be improved?

(IV) **Value Added**

(a) Have you made practical use of anything you learned in the course? What was it, and how?
(b) Do you list the course on your resume, LinkedIn profile, or other social media? If yes, how do you list it? If no, could you talk more about that?
(c) Did the courses disappoint you in any way?
(d) If you had not had access to this MOOC, where would you have gotten this knowledge?

(V) **Concluding Questions**

(a) Would you take advantage of more learning opportunities like this? Why or why not?
(b) Would you recommend this MOOC to others? If so, what kind of person would you recommend this MOOC to?
(c) If Stanford or some other university were to offer more opportunities like this moving forward, what advice would you have?

(VI) **Demographic Information**

I have just a few more questions for you, and these are more demographic in nature. I'll start with a broader question which is, can you tell me a little bit about the stage of life you were in when you took this course and then the stage of life you are in now? This can be occupational, or however you'd like to answer this question. (Go through questions below depending on what they address in the first question.)

(a) What is your occupation? What was your occupation at the time you took the course?
(b) Where did you reside at the time of the course?
(c) What is your household composition? What was it at the time you took the course?
(d) What is your highest level of formal education? What was it at the time of the course?
(e) What are your parents' highest levels of education?
(f) How do you identify racially?
(g) What is your age?
(h) What range does your household income fall into, and what was your income range at the time you took the course? (Give options: <50 K, 51–100 K, 101–200 K, over 200 K)

Those are all of my questions. Is there anything else you would like to tell me about your experiences with MOOCS or any questions you have for me regarding this study or anything else?