Meredith A. Lewis. Learning Styles, Motivations, and Resource Needs of Students Enrolled in a Massive Open Online Class. A Master's Paper for the M.S. in L.S degree. April, 2014. 68 pages. Advisor: Jeffrey Pomerantz

Massive Open Online Classes (MOOCs) have stormed the online education landscape over the past five years and show no sign of disappearing. Though studies have been done about the characteristics of online or distance education students, the characteristics of MOOC students are less known to researchers beyond demographics and participation statistics. Likewise, the implications of MOOC's for librarians who will need to support this new community of are widely unknown. A survey of learning preferences, motivations, and resource needs and uses of MOOC students in the University of North Carolina at Chapel Hill's Metadata MOOC in Fall 2013 determined that, though learning preferences exist, participants enrolled in this course were predominantly Independent and Participant with similar needs across learning styles despite different learning preferences. Participants are also motivated by professional interest and intellectual curiosity and would welcome additional materials in order to further explore MOOC topics.

Headings:

> Massive open online classes
>
> MOOCs
>
> Distance education
>
> Learner characteristics

LEARNING STYLES, MOTIVATIONS, AND RESOUCE NEEDS OF STUDENTS
ENROLLED IN A MASSIVE OPEN ONLINE CLASS
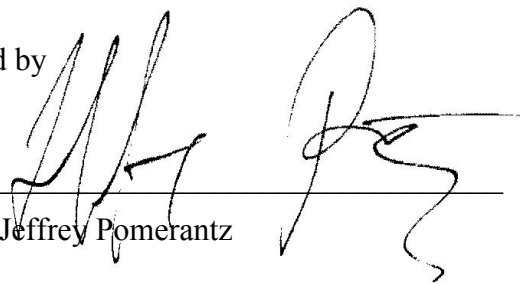
by
Meredith A Lewis

A Master's paper submitted to the faculty
of the School of Information and Library Science
of the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements
for the degree of Master of Science in
Library Science.

Chapel Hill, North Carolina

April 2014

Approved by

_____

Advisor: Jeffrey Pomerantz

Table of Contents

Introduction

Massive Open Online Classes (MOOCs) are simultaneously an innovation and disruption in the landscape of online higher education. MOOCs are relatively new to the online education scene; the first course considered a MOOC was created by the University of Manitoba in 2008 with 25 students enrolled in "Connectivism and Connectivist Knowledge" for college credit and 2,300 students enrolled digitally at no cost (EDUCAUSE, 2011). However, the first MOOC that drew widespread attention to the format was Stanford University's "CS221," a 2011 MOOC on artificial intelligence that enrolled 160,000 students (Mahraj, 2012). In general, MOOCs are collaborations between a university and a course-hosting platform, such as Coursera, edX, or Udacity, which provides students access to course materials and supports the infrastructure for the thousands of students. Universities, often those with name recognition to help garner attention both for their course and the platform, create courses using video lectures, often incorporating in-video quizzes to check for understanding. Frequently individual units and assignments have deadlines for completion, but viewing the lectures and completing course assignments is self-paced according to the individual participant. Collaborative elements are incorporated into the course platform through discussion board conversations; students also utilize of social networking to interact with their classmates. Unlike traditional classes, there may be thousands to tens of thousands of students signed up for each course and from all over the world.

MOOCs are lauded for their ideal of open access to higher education for all with an internet connection, and yet derided for their low completion rates and perceived lack of rigor and efficacy. The average MOOC has between a 5 and 10% completion rate marked by achieving a certificate of completion at the end of the course, but for a course that enrolls thousands, the implication of what this actually signifies is still undecided (Kay, Diebold, & Kummerfeld, 2013). Despite the high perceived dropout rate, some colleges see MOOCs as a way to expand their for-credit offerings to a wider audience than a traditional program might reach and for a fraction of traditional tuition fees. In January 2014, the Georgia Institute of Technology offered the first MOOC-style Master of Science in Computer Science, which could reach up to 10,000 students annually. The planned tuition will be $6,600, compared to the on-campus tuition cost of $45,000 (Lewin, 2013). In addition, the American Council on Education (ACE) has evaluated and recommended several MOOCs for transfer credit: Developmental Math, College Algebra, Elementary Statistics, and Introduction to Computer Science (American Council on Education, 2013; Kolowich, 2013). Though this does not necessarily indicate that all MOOCs will one day be accepted as a substitute for college credit, it does indicate this format is becoming more widely accepted in some academic contexts.

Though MOOCs are relatively new, students have been learning off campuses for hundreds of years. Distance learning reaches back to correspondence courses by mail, but, with the advent of the internet, has become increasingly popular for learners, traditional and non-traditional in age and motivation alike. Over 20% of undergraduates in 2008 reported enrollment in at least one online class, up from 8% enrolled in 2000 (Radford, 2011). Since participation in online education is steadily increasing in primary

and secondary school-aged individuals, future students enrolled in higher education will likely have participated in some form of online learning and will expect continued access to online classes both within higher education and other educational scenarios (Queen & Lewis, 2011). However, not all students enrolled in online courses are prepared for the differences in the learning environment; many studies address the characteristics of successful online learners, including their learning preferences, technological competency, and autonomy. In addition, since learning does not take place face-to-face, additional resources and support mechanisms may need to be added to the digital learning environment to support students intellectually.

Understanding the learning preferences and other qualities of successful online students can help information professionals and teaching staff encourage best practices, whether they are teaching or supporting an online education environment. Exploring this within the context of a MOOC will allow for similar development in-practice and further the literature available in an emergent educational format. The purpose of this study is to gain a greater understanding of the students enrolled in MOOCs by surveying the population of the University of North Carolina at Chapel Hill's Metadata course, hosted by Coursera and launched in September 2013. This study will seek to answer the following research questions:

1. What is the general demographic makeup of the students enrolled in the UNC Metadata MOOC, and how does it compare to other large-scale survey populations?

2. What are the dominant learning preferences of participants enrolled in this MOOC?

3. How do participants' learning preferences affect their participation, motivation, resource use, attitudes about learning, and challenges faced while enrolled in the UNC Metadata MOOC?

If MOOCs are to remain a part of the future of higher education, being able to connect to the literature in existence and discover similarities and differences between traditional online learners and MOOC learners to meet the potentially new needs of a MOOC community is essential.

Selection of Grasha-Riechmann Student Learning Style Scale

There are numerous learning styles surveys available and tested in academic environments; more narrowly, there are many learning styles surveys that have been administered to online students. The Grasha-Riechmann Student Learning Styles Scale (GRSLSS) was selected for several reasons: 1) it was developed to measure learning preferences of adults, undergraduate and above; 2) it has been tested and validated across various populations (Hruska & Grasha, 1982), including online populations (Diaz & Cartnal, 1999), which is important in a MOOC, where the student population is incredibly diverse; 3) it measures cognitive and affective behaviors of students instead of perceptual (James & Gardner, 1995), focusing on students' interactions amongst their peers, the instructors, and learning in general (Diaz & Cartnal, 1999). The GRSLSS also has a teaching styles survey that instructors can complete to see how their instruction matches or conflicts with their learners so they can adapt and diversify to meet more learner's needs, which is an interesting area for future study. The learning styles scale itself consists of six primary learning styles, a variety of which are present in each learner, though to varying degrees (Grasha & Yangarber-Hicks, 2000). The six learning

styles are avoidant, collaborative, competitive, dependent, independent, and participant (Grasha, 1996, p.128; see Appendix E for descriptions of each of the measured learning styles). The survey itself consists of 60 items, with ten questions each that are averaged together to measure dominance in one or more of the six measured learning styles (Grasha, 1996, 201-203; see Appendix C survey, section VI. Learning Styles Survey for items).

Literature Review

MOOCs are still a relatively new educational technology; as of now, broad searches of the literature through databases and search engines retrieve mostly narrative experiences with significantly fewer empirical studies. Though the 2013 and 2014 literature has now added significantly to the field of study, Liyanagunawardena, Adams, and Williams (2013) surveyed the literature available from 2008 to 2012, disaggregating the results into articles published, medium of publication (magazine, journal, conference paper, workshop, and reports), and subject of the article. Their findings were rather unsurprising in terms of number of articles published annually: over the past four years, published articles have increased from one in 2008 to 26 in 2012, with 45 distinct articles in total. Participant-based studies found through this systematic review were often narratives or case studies of smaller MOOC classes with discussion or written reflection requirements or relied heavily on the more easily collected demographic characteristics of a class. Also noted was the difficulty in keeping up with the literature of this emergent field, especially now that many institutions have completed their entry year into MOOC participation and are producing research results. Much of the literature is in the public

sphere, taking place in blogs and in comments sections of popular articles, with participants and non-participants both weighing in with their opinions and experiences.

Large-scale reports of more easily measurable participant characteristics have recently emerged into the literature scene, including overviews of Coursera participant data (Coursera, n.d.; Pierson & Do, 2014), participants in University of Pennsylvania's 32 Coursera MOOCs (Christensen, et. al, 2013), and participants in Harvard and Massachusetts Institute of Technology (MIT)'s edX MOOCs (Ho, A.D, et. al, 2014). In each of these studies, the participants number in the hundreds of thousands and, though an overview of age, gender, education, and nationality averages emerges across all the studies, little data can be extrapolated that can meaningfully be applied to pedagogical or support needs for individual MOOCs without additional studies, especially due to the difference in participation course-to-course (Ho, et. al, 2014). Zutshi, O'Hare, and Rodafinos (2013) attempted more detailed analysis of participant characteristics and attitudes through content analysis of twenty-one blog posts found through a web search, but with so few samples, this also cannot be generalized to all populations.

Non-narrative participant-focused and educational theory articles make up a much smaller portion of the literature, leaving a distinct opportunity for additional study, which this paper seeks to help fill. Some studies to break down the MOOC participants in subgroups beyond demographics, most commonly according to levels of engagement with provided course materials. The Harvard and MIT MOOC assessment utilizes the terms "only registered," "only viewed," "only explored," and "certified" to classify their participants (Ho, et. al, 2014). Milligan, Littlejohn, and Margaryan (2013) classify their participants in terms of engagement—those with "active participation," "passive

participation," and "lurking" behaviors. Kizilcec, Piech, and Schneider (2013) classify their participants as "auditing," "completing," "disengaging," and "sampling." While these are all highly measurable with course data, they are not particularly predictable nor do they offer aid in designing support for populations other than reiterating a common fact about MOOCs: participants engage at different levels, and some not at all.

Since MOOC literature related to non-demographic or involvement participant characteristics is still emergent, existing studies of distance and online learners may be the best established benchmark for comparison. Additionally, using learning styles as a subgrouping for participant characteristics will hopefully provide some meaningful data about participants that can be used to impact pedagogy and support of MOOCs.

Online education itself is constantly changing. Though it does continue to serve many diverse populations, more post-secondary students who reside on or near-campus are opting in to classes held online—over 20% of undergraduates in 2008 reported enrollment in at least one class (Radford, 2011). By 2012, this number had increased to 32% (Allen & Seaman, 2013). The motivation of online students in participating and successful completion lies both in the course design and the learner's preexisting characteristics. Some motivation can be simply due to situational and biological characteristics—for example, women and people who are unemployed tend to be more successful in completing and participating in online courses regardless of other characteristics (Lim & Kim, 2011). Those characteristics aside, motivated learners view the course as relevant to their goals and learning objectives, have a high degree of self-efficacy, and receive and reflect on reinforcement to a higher extent than their less motivated peers (Lim & Kim, 2011). More mature students often have the self-discipline

necessary to motivate themselves, but only when the coursework is related to their life in a real way (Ke & Kwak, 2013; Blankenship & Atkinson, 2010). Comfort with technology contributes both to motivation and success at all ages, as do personal beliefs in the effectiveness of online education (O'Malley, 1999; McVay Lynch, 2001; Palloff & Pratt, 2003). Engaged students also tend to be more mastery or task-focused and spend more time online because they see it as a valuable investment of their time (del Valle & Duffy 2006); this seems to also be true for MOOCs, as students with goals for their learning experience tend to persist despite some setbacks in the course (Milligan, Littlejohn, & Margaryan, 2013).

MOOCs need to accommodate a variety of initial motivations—not all students take MOOCs for the certificate, so creating a flexible curriculum that meets the needs of mastery and task-oriented learners, but also those who plan on being minimalist-in-effort because their goal is to simply explore without the stress of reinforcement (del Valle & Duffy 2006). Therefore, courses need to be designed with these learners in mind, catering to the most dominant styles, but allowing flexibility and opportunities for success for the less prominent styles (Grasha & Yangarber-Hicks, 2000). Often the students themselves create the learning community, so monitoring the digital environment to eliminate minimalists who may become disruptive becomes important. No matter the specific population, adapting the expected curriculum and technology to their group needs is essential in order to get the best educational results.

One way of understanding the learners enrolled in MOOCs is to contextualize them through their learning preferences by using a learning styles survey, but this type of study has not been done to the researcher's knowledge; Grünewald, Meinel, Totschnig,

and Willems (2013) analyzed survey responses according to a mixture Kolb and Fisher's learning style theories, but student did not formally complete an established learning style survey. Online learners, however, have been measured through their learning preferences and styles, both using formal scales and other assessments. Overall and unsurprisingly, successful online learners tend to prefer more independent behaviors; however, this should be paired with clear expectations and instructor support within the online class (Grasha & Yangarber-Hicks, 2000; Thiele, 2003; Diaz & Cartnal, 1999). Diaz & Cartnal (1999) found correlations between GRSLSS score and success in either the online or traditional classroom version of a course: online students tended to be more Independent and Collaborative within structured activities, but less Competitive than traditional students (Appendix E for descriptions of styles). Though learning styles have been disputed as a concrete way of understanding human learning potential (Santo, 2006), it is useful to have a tool in order to conceptualize the variety of learner and create awareness for an instructor (James & Gardner, 1995). Many misinterpret learning styles research, viewing it as intended to describe fixed intellectual processes, and misunderstanding that most are intended as a lens to view student preferences and strengths in learning. In reality, effective use of learning style literature and as a frame of reference emphasizes "students possess a variety of learning styles, but not every style is present to the same degree" (Grasha & Yangarber-Hicks, 2000, p. 4). Additionally, context can impact learning styles scoring, as learners can find some learning scenarios more easy or difficult to adapt within; therefore, using a learning styles scale score is more of an "awareness tool" to enhance the success of all learners as opposed to a set-in-stone metric of unchanging student characteristics (James & Gardner, 1995, p. 23).

Methodology

Survey Design

Drawing on previous research in success, motivation, and library support for online learning, research questions were developed using the literature of online learning and taken from additional surveys given to UNC Metadata MOOC participants in order to potentially allow for future comparison of survey sample population (see Appendix C for survey text).

All demographic questions are from the pre-course survey administered through Coursera and developed by the UNC-Chapel Hill MOOC team. However, not all questions from the pre-course survey were used; aside from country of origin, only questions that had been measured in other studies related to online learners and learning style studies using the GRSLSS were selected for comparison potential.

Two additional questions from the course-administered survey were chosen related to enrollment and motivation, though other options were added by the researcher. Other questions were developed using the researcher's knowledge of the course materials and potential resources that could reasonably be provided to supplement participants' knowledge development suggested in other literature about librarian support in online courses (Mahraj, 2012; Markgraf, 2004). Another portion of the motivation section was derived from the McVay Lynch Suitability for Distance Education Survey (McVay Lynch, 2001; see Appendix C, section V. Online Learning Attitudes). This survey has been used to measure preparedness for online coursework and results related to success in online classes were positively statistically correlated with positive attitudes about online courses (Blankenship & Atkinson, 2010); therefore, the MOOC attitude questions were

modeled after the McVay Lynch questions to measure if positive attitudes about MOOCs correlate with any specific learning styles.

The survey was pre-tested by a small group of individuals who either never or were no longer enrolled in the UNC Metadata MOOC who were informally recruited by the researcher through Facebook. In response to feedback from this group, several terms were defined and survey completion time was estimated to be approximately 20 minutes.

Survey Distribution

The survey was created in the Qualtrics platform and distributed through the Metadata MOOC course email list, a tool in the class site that allows for sending blind bulk messages to currently enrolled students (see Appendix B for recruitment emails). An Institutional Review Board (IRB) application was filed with the UNC Office of Human Research Ethics under study #13-3378; this study was exempted from further review.

Participants were recruited through the email option in the administrative menu of the UNC Metadata MOOC course page. As a Teaching Assistant (TA) in the Metadata MOOC, the researcher had access to this feature after obtaining permission from the professor and UNC Coursera team. In the final week in the course[1], 33,866 students were enrolled. In order to make certain there is a clear distinction between the course-given end-of-course survey and this survey, the course participants were contacted after the course survey messages was sent (see Appendix A for MOOC and survey distribution timeline).

---

[1] The final week of the course ranged from Sunday, October 27 to Saturday, November 2, 2013. Course statistics are listed in the administrative menu of the Coursera UNC Metadata course page, which the researcher had access to as a member of the course staff.

Data Analysis

After all survey results were downloaded, Microsoft Excel was used to sort and analyze data. Several elimination criteria were determined: any participants that were under 17 (Age and AgeVal variables) in order to meet IRB exemption qualifications and any participants who answered "No" to enrolling in the UNC Metadata MOOC (Q40 variable) were removed from the data. After these two criteria were met, there were exactly 1000 responses. Subtotals for each of the six GRSLSS learning styles were averaged; those respondents who did not complete all 60 questions in the learning style questionnaire were eliminated from those totals, but were not eliminated from the group for analysis for overall demographics. Valid learning style surveys were sorted according to the highest score for each respondent. These six learning style subgroups were compared to the different question groups in the survey, including demographics, attitudes about MOOCs, enrollment in online learning, enrollment in MOOCs, participation in MOOCs, motivation, challenges, and resource uses/needs. Though there is an option to connect course data to individual survey participants through Coursera, all survey data was kept anonymous.

<center>**Results**</center>

In total, 1182 surveys were submitted. Since only consent and age validation questions were required, individual data sets were not all complete; some participants did not answer all questions either by choice or due to skip logic. After elimination of data sets that did not meet the age requirement of 17 to both meet IRB exemption criteria and to validate the learning style survey, there were 1000 responses remaining. This was the data set that was then used for further analysis.

Demographics

Demographic information collected in this survey dealt with age, gender, geography, education, and employment.

Table 1. Numbers of Respondents per Country

No. Respondents	Country
329	United States
48	Canada
38	Spain
29	United Kingdom
23	Australia
22	Germany
20	Brazil
19	Netherlands
18	India
17	Greece
14	Italy
9	Ukraine
8	South Africa
7	France, Sweden
6	Bulgaria, Russia, Singapore
5	Portugal, Switzerland
4	Austria, Belgium, Colombia, Denmark, Finland, Hungary, Iran, Israel, Poland
3	Ireland, Mexico, New Zealand, Philippines, Romania, Venezuela, Vietnam
2	Argentina, Bangladesh, Chile, Czech Republic, Estonia, Lithuania, Luxembourg, Pakistan, Taiwan, Turkey, Zimbabwe
1	Algeria, Azerbaijan, The Bahamas, Bosnia and Herzegovina, China, Costa Rica, Croatia, Dominican Republic, Egypt, Hong Kong, Japan, Kenya, Latvia, Lebanon, Malaysia, Morocco, Nepal, Nigeria, Norway, Peru, Puerto Rico, Serbia and Montenegro, Slovenia, Sudan, Tanzania, Uganda, United Arab Emirates

Respondents to this survey represent 75 different countries (see Map in Appendix D), with the highest number of participants coming from the United States (see Table 1 for numbers of respondents from each country). All other countries have well under a hundred participants.

Respondents were almost equally divided between genders (*n*=749): males accounted for 51% of the responses and females for 49% (Table 2).

Table 2. Age & Gender Demographics of Respondents

Select the grouping that contains your age:	Male	Female	Category Total	Percent of Total Responses
17-21	1	5	6	1%
22-28	47	28	75	10%
29-33	61	55	117	16%
34-40	60	76	136	18%
41-45	64	54	118	16%
46-54	89	87	177	24%
55-64	51	54	105	14%
65 +	5	10	15	2%
TOTALS	379	370	749	100%
Participants 17-33	--	--	198	26%
Participants 34-65+	--	--	551	74%

Almost a quarter of respondents who provided their age (*n*=749, Table 2) were between the ages of 46-54. Thirty-four to forty year olds represent 18% of the surveyed population. Ages 29-33 and 41-45 each represented 16% of the total respondents. Fourteen percent of respondents were in the 55-64 age bracket, and the final statistically significant age grouping was 22-28, making up 10% of the population. People who are typical retirement age—65+-- only make up 2% of the population.

This data supports previous assertions that most MOOCs are taken by already highly educated populations (Christensen et. al, 2013; Coursera, n.d.) and, though open to all types of participants, those with less education seemingly less likely to participate in this model (Table 3). Ninety-nine percent of all respondents had participated in some level of post-secondary education, with 92% having completed their post-secondary education. Additionally, 62% of respondents have graduate degrees, dominated by 51% of respondents holding Master's degrees.

Table 3. Education Levels of Respondents

What is the highest level of school you have completed or the highest degree you have received?	Category Total	Percent of Total Responses
bachelor's degree (e.g., BA, AB, BS)	200	27%
master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)	378	51%
associate degree - occupational/technical/vocational program	19	3%
professional school degree (e.g., MD, DDS, DVM, LLB, JD)	24	3%
some college but no degree	48	6%
doctorate degree (e.g., PhD, EdD)	58	8%
high school diploma (or equivalent)	7	1%
associate degree - academic program	9	1%
some high school (but no degree)	3	0%
TOTALS	746	100%
Some Post-Secondary Education	736	99%
Completed Post-Secondary Education	688	92%
Completed Graduate-Level Education	460	62%

Table 4. Employment Status of Respondents

Are you currently working full-time, working part-time, looking for work, in school, retired, stay-at-home parent, or doing something else?	Category Total	Percent of Total Responses
Working full-time (30 hours or more per week)	535	56%
Working part-time (less than 30 hours per week)	97	10%
Looking for work	118	12%
Laid off from work	22	2%
Student (pre-college)	4	0%
Student (undergraduate)	22	2%
Student (graduate)	52	5%
Retired	21	2%
Stay-at-home parent or caregiver	37	4%
Doing something else	44	5%
TOTALS	952	100%
Looking, Laid Off, Retired, Stay-at-Home (total)	198	21%
Looking & Laid Off (Unemployed total)	140	15%
In school (total)	78	8%

Demographic questions related to employment included current school enrollment, so for 952 total responses, some choices represent multiple states for individual respondents (Table 4). Eight percent of respondents were currently enrolled in various levels of schooling, including pre-college, undergraduate, and graduate programs. Fifty-six percent of respondents were employed full time, with another 10% employed part-time. Twenty-one percent of respondents reported not being full-or part-time employed according to survey definitions, but were either looking for work, laid off from work, retired, or a stay-at-home parent or caregiver.

Grasha-Riechmann Student Learning Styles

Out of the 1000 responses, 750 respondents had complete responses for the GRSLSS questionnaire (see Appendix E for descriptions of each learning style).

According to their highest score in the learning styles inventory (Table 5), the dominant learning style of 44% of respondents is Independent, with an average score of 4.1 on a 5 point scale. Participant-style learners were the next highest subgroup of respondents, making up 29% of the responses with an average score of 4.2. Other significant subgroups were Collaborative and Dependent learners, making up 15% and 10% of the population, respectively. Those respondents who scored highest as Avoidant (1% of the population surveyed) and Competitive (also 1%) learners were in the significant minority.

Figure 1. GRSLSS score distribution.
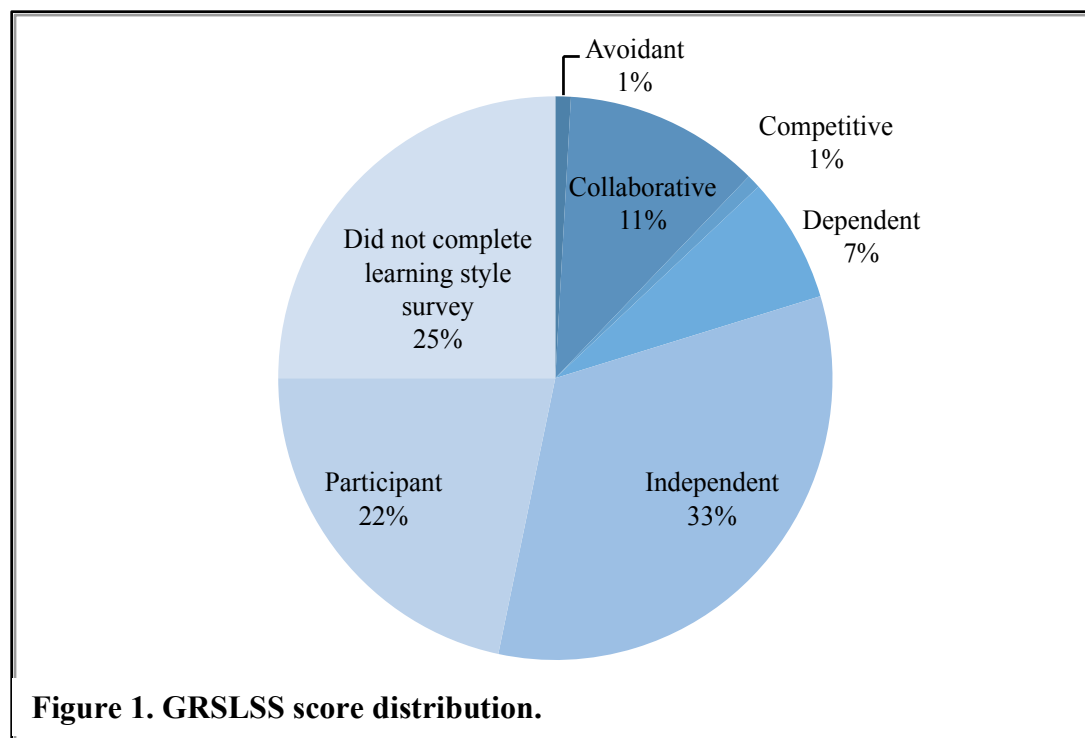
Table 5. Respondent highest-scored GRSLSS category.

GRSLSS Highest Score	Number of Respondents	Average Highest Score*
Avoidant	20	3.9
Collaborative	133	4.1
Competitive	10	4.3
Dependent	85	4
Independent	365	4.1
Participant	234	4.2
Did not complete learning style survey	153	--
TOTAL	1000	--

Attitudes about Online Learning and MOOCs

Analysis of data grouped according to each dominant learning style found few

significant variations between overall attitudes about the quality of online learning and

MOOC learning (Table 6). Overall attitudes regarding the quality, assessment, and

collaboration of online learning and MOOCs had a positive bias, with 48% of overall

responses falling into the moderately or strongly agree categories. Undecided responses were 23% of the population and 30% of the population responded negatively towards the attitude assessment questions, selecting either moderately or strongly disagree.

Table 6. Total attitudes towards online learning of survey respondents with GRSLSS score.

	Strongly Disagree	Moderately Disagree	Undecided	Moderately Agree	Strongly Agree	Total Responses
Avoidant	5	5	19	16	9	54
Collaborative	39	195	124	237	87	682
Competitive	4	12	10	14	8	48
Dependent	20	106	86	166	54	432
Independent	111	401	456	707	298	1973
Participant	115	300	345	375	166	1301
TOTALS	294	1019	1040	1515	622	4490

Numbers represent individual responses on six questions in attitude subset of survey, including:
1. In general, online learning is of equal quality to traditional classroom learning.
2. In general, online learning through a MOOC is of equal quality to traditional classroom learning.
3. In general, instruction through a MOOC is of equal quality to traditional classroom instruction.
4. In general, assessment through a MOOC is of equal quality to assessment in a traditional classroom.
5. In general, student support through a MOOC is of equal quality to student support in a traditional classroom.
6. In general, student collaboration through a MOOC is of equal quality to collaboration in a traditional classroom.

Few responses deviated more than four percentage points from the average group attitude with several exceptions: Avoidant learners moderately disagreed with the statements at a lower rate (9% to the 23% average) and were undecided at a higher rate (35% to the 23% average). Collaborative learners moderately disagreed at a slightly higher than average rate (29% to the 23% average). Further study could be done using this data, but when grouped into dominant learning styles groupings, little learning styles-distinct data can be gleaned from this set of questions.

Enrollment in Online Learning

Approximately one-third of respondents with completed learning style questionnaires had previously enrolled in other online courses (Table 7).

Table 7. Enrollment in other online classes by participants with GRSLSS score.

Have you enrolled in online course(s) other than Massive Open Online Course(s) (MOOCs) before?	Yes	No	Total
Avoidant	8	1	9
Collaborative	77	37	114
Competitive	5	3	8
Dependent	46	26	72
Independent	224	106	330
Participant	132	84	216
TOTALS	492	257	749

While all other learning style subgroups enrolled around the same percentage as the group average, 89% of Avoidant learners had previously participated in online courses, and also had a higher percentage enrollment in undergraduate and other higher education online courses than the other subgroups (Table 9). Respondents reported enrolling in professional development (29% of total respondents) and continuing education (22% of total respondents) online courses at a higher rate than the other courses; perhaps due to the general age of the response population and the advent of online courses in the 1990s and 2000s as a part of the general undergraduate curriculum, the opportunity to take online courses as part of a traditional undergraduate program was not an option. Nineteen percent of the respondents reported enrolling in at least one online graduate course (Table 9).

Table 8. Completion of online classes by respondents with GRSLSS score.

For the online course(s) that you have enrolled in, how many have you completed?	All	Some	None	Total
Avoidant	2	5	1	8
Collaborative	13	57	7	77
Competitive	2	2	1	5
Dependent	16	28	2	46
Independent	71	140	12	223
Participant	53	77	3	133
TOTALS	157	309	26	492

Table 9. Type of non-MOOC online classes taken by respondents with GRSLSS score.

Select the type of online course(s) that you have enrolled in. Select all that apply.	Community College	University, Undergraduate	University, Graduate	Online degree program	Continuing Education	Professional Development	Other (please specify)	Total
Avoidant	0	4	3	2	2	4	1	16
Collaborative	10	18	21	3	26	40	8	126
Competitive	1	2	2	1	4	2	0	12
Dependent	7	14	14	6	21	23	4	89
Independent	21	56	86	24	99	133	20	439
Participant	14	26	51	12	51	64	19	237
TOTALS	53	120	177	48	203	266	52	919

The majority of respondents reported completing some of their online courses (63% of total respondents). Competitive and Participant learners tended to complete online courses at a slightly higher rate than average, 40% for both groups. Avoidant and Collaborative learners completed all enrolled online courses at lower average rates than the other learning subgroups, at 25% and 17% respectively. Competitive and Avoidant

learners reported higher rates of completing none of the online classes in which they enrolled, at 20% and 13% respectively. (See Table 8 for online course completion data)

Enrollment and Participation in MOOCs

Compared to the enrollment in other online courses, respondents overwhelmingly had enrolled in additional MOOCs other than the UNC Metadata MOOC—80% of all respondents reported additional MOOC enrollment (Table 10).

Table 10. Enrollment in MOOCs other than the UNC Metadata MOOC by respondents with GRSLSS score.

Have you enrolled in other MOOCs other than the UNC Metadata MOOC?	Yes	No	Total
Avoidant	8	1	9
Collaborative	86	28	114
Competitive	5	3	8
Dependent	48	24	72
Independent	282	48	330
Participant	171	46	217
TOTALS	600	150	750

Only 10 responses reported not logging onto the course site at all for the UNC Metadata MOOC (Table 11); since one of the critiques of MOOCs is related to a high perceived dropout rate, this population poses an interesting area of future study if the goal of MOOCs is, in fact, to be measured by completion percentage of enrolled population. Additionally, for other MOOCs, 50% of the total response population reported not logging into the course site at all for some of the MOOCs they had enrolled in and 5% of respondents did not log in for any of the other MOOCs in which they enrolled (Appendix F, Table 13b). Avoidant respondents were most likely to not log onto the course site for this population sample.

Table 11. Participation level in UNC Metadata MOOC by respondents with GRSLSS score.

Choose the answer that best describes your level of participation in the UNC Metadata MOOC.	I earned a Statement of Accomplishment or Verified Certificate issued by the MOOC provider.	I completed the MOOC to my own standards.	I completed some of the coursework.	I did not complete any coursework.	I did not log onto the course site.	Total
Avoidant	4	1	2	1	1	9
Collaborative	45	15	31	21	2	114
Competitive	6	0	1	1	0	8
Dependent	42	7	11	12	0	72
Independent	191	27	60	47	5	330
Participant	138	17	45	15	2	217
TOTALS	426	67	150	97	10	750

For those respondents that participated in MOOCs they enrolled in, all respondents reported not completing all MOOCs equally; the majority of respondents logged onto the course site and completed some course work (Appendix F, Tables 13a and 13b) for the MOOCs they enrolled in and over half of respondents completed the course to one of these standards some of the time (Table 13a). However, a similar percentage of respondents completed the MOOC either to their own or to the provider's standards all and none of the time, seeming to indicate that participation in MOOCs is not something that perhaps can be consistently measured for individual participants across MOOCs.

Respondents in all learning style subgroups participated in watching course videos, completing at least one homework, reading optional articles, and participating in the discussion board (Table 12). Discussion board participation was the least common action participated in by respondents, with only 11% of respondents reporting

involvement in this area of the course. Perhaps predictably, Participant learners were slightly more involved in the discussion boards at 13%, with Independent (11%) and Collaborative (10%) learners making up the other two groups with the highest participation (Table 12).

Table 12. Active participation in UNC Metadata MOOC by respondents with GRSLSS score.

What coursework did you complete in the UNC Metadata MOOC? Select all that apply.	Watching more than one of the video lectures.	Completing at least one homework.	Reading at least one of the optional articles.	Participating in at least one of the discussion board threads.	Totals
Avoidant	9	5	6	1	21
Collaborative	98	79	71	27	275
Competitive	7	5	4	1	17
Dependent	69	57	44	16	186
Independent	306	248	230	101	885
Participant	204	182	171	80	637
TOTALS	693	576	526	226	2021

Motivation for Enrolling in MOOCs

Students across learning styles predominantly enrolled in MOOCs out of general interest or curiosity about the topic (22% of total respondents), followed by either supporting current job skills (15% of respondents) or developing new job skills (14% of respondents)(Table 14). Additionally, the chance to earn a statement of accomplishment from the MOOC provider (10% of respondents) or drop out if needed (13% of respondents) were also some of the appeals of the MOOC format. Course and institution reputation were considerations for some students, but overall were not the primary motivations of this set of respondents.

Table 14. Reasons for enrolling in MOOCs by respondents with GRSLSS score.

What motivated you to enroll in MOOC(s)? Check all that apply.	Avoidant	Collaborative	Competitive	Dependent	Independent	Participant	Total
The course supported my current academic program.	1	21	2	11	52	26	113
The course supported my current job responsibilities or company's line-of-business.	5	61	4	40	179	129	418
The skills from this course may be useful for obtaining a new job.	3	65	6	44	170	116	404
I enrolled in the course out of general interest, curiosity, or enjoyment.	5	101	6	48	287	181	628
I took the course because of the reputation of offering institution.	2	38	3	18	107	63	231
I took the course because of the reputation of the instructor.	1	16	2	6	35	24	84
I was interested in the opportunity to earn a Statement of Accomplishment or Verified Certificate.	3	43	3	28	138	85	300
I had friends taking the course	0	9	0	3	25	15	52
The course was low-stakes in terms of commitment-- if I needed to drop out, I would be able to with no repercussions.	2	52	2	33	179	112	380
I cannot afford to pursue a formal education.	2	17	2	10	61	25	117
I am geographically isolated from educational institutions	2	15	1	6	42	14	80
I was required to enroll as a component of a for-credit course through my home institution.	0	0	0	0	2	1	3
I was required to enroll for my job.	0	3	0	0	5	1	9
Other: Please specify.	1	11	0	2	29	18	61
TOTALS	27	452	31	249	1311	810	2880

Interestingly enough, despite one of the stated goals of MOOCs being to reach

people in educational deserts, only 3% of respondents stated that they were

geographically isolated from educational institutions. Few distinctions across learning

style subgroups exist in this subset of the data, suggesting that learning style did not

necessarily contribute to motivation for enrolling in this MOOC.

Table 15. Challenges faced by respondents with GRSLSS scores while enrolled in MOOCs.

What challenges have you faced once enrolled in MOOC(s)? Check all that apply.	Avoidant	Collaborative	Competitive	Dependent	Independent	Participant	Total
The concepts were too complex for my skill level.	2	13	1	8	35	18	77
The concepts were too complex for the amount of time I had to devote to the course.	1	25	3	13	76	46	164
The concepts were too easy.		8	0	4	33	15	60
I was too busy to complete assignments.	5	82	4	44	210	133	478
I was not interested in the topic once enrolled.	0	10	1	7	36	21	75
I did not want to do the work, though the topic was interesting.	1	16	2	12	49	17	97
I was unmotivated because there was nothing to lose or gain by taking the course.	1	17	0	10	29	19	76
I found the staff unresponsive to my specific questions.	0	1	0	0	9	1	11
I found the other students on the discussion boards unhelpful.	0	4	0	2	17	11	34
I found the other students on the discussion boards hostile.	0	3	0	1	5	3	12
I was afraid to participate on the discussion boards.	0	9	0	14	27	13	63
The online platform of the course was confusing.	0	6	0	1	13	8	28
None.	2	18	2	16	54	51	143
Other: Please specify.	2	20	1	10	61	37	131
TOTALS	14	232	14	142	654	393	1449

Challenges of Participants Enrolled in MOOCs

The most common challenges that participants across learning styles faced once enrolled in MOOCs were both related to time: being too busy to complete assignments (33% of total respondents) and not having enough time to learn complex concepts (11%) (Table 15). Ten percent of respondents reported no challenges.

There were some slight variances according to learning style subgroups. Dependent learners were slightly more likely to be afraid to participate on discussion boards (10% to 4% group average), which would be a challenge for their learning preferences. Avoidant learners found more courses too difficult for their skill level (14% to 5% group average). Competitive learners were almost twice as likely to not want to do work, though interested by the topic (14% to 7% group average). Without specific contextual information about the courses to which these challenges apply, making specific accommodations to meet students' needs is difficult, but since the highest scoring challenges all relate to time, expectations of student participation can be moderated or dropout rates may be able to be more easily explained.

Resource Use and Needs of Participants Enrolled in MOOCs

Video lectures (16% of total respondents with learning style score), in-video quizzes (14%) and supplementary optional (12%) and required (11%) readings were the most commonly used resources in a MOOC environment across all learning styles (Table 16). These are the most commonly provided resources in MOOCs, so in terms of drawing significant conclusions, this data may not be particularly meaningful. Nine percent of all learning styles categories reported using the discussion board, with 4% utilizing study groups and 3% having used social media discussion groups (Table 16).

Table 16. Resources used in MOOCs by respondents with GRSLSS scores.

Which resources have you used in any MOOC you have taken before? Check all that apply.	Avoidant	Collaborative	Competitive	Dependent	Independent	Participant	Total
Video Lectures	6	90	5	57	298	183	639
In-Video Quizzes	7	81	3	49	251	161	552
Video lectures transcribed in print or non-video image files	2	48	1	21	131	82	285
Supplementary Optional Readings or Media	3	69	3	33	204	140	452
Supplementary Required Readings or Media	3	65	2	36	195	135	436
Discussion Boards (General)	3	55	2	21	167	119	367
Discussion Boards (Study Groups)		34		11	72	41	158
Discussion Boards through Social Media (Facebook, Linked-In, MeetUp)	1	18	1	5	46	34	105
Other study group: Please specify.	0	5	0	0	6	6	17
Outside resources not assigned through the course and self-discovered	3	47	1	19	154	84	308
Outside resources not assigned through the course and recommended by the professor or staff of the course	1	47	2	17	149	104	320
Outside resources not assigned through the course and recommended by other students within the course	0	27	1	5	97	55	185
None	1	11	2	7	7	15	43
Other resources: Please specify.	0	4		3	14	7	28
TOTALS	30	601	23	284	1791	1166	3895

Across all learning styles, respondents in almost all categories reported seeking outside resources, either instructor-recommended (8%), student-recommended (5%) or self-discovered (8%) (Table 16). Additionally, when asked what additional resources would have been helpful, 22% of respondents would have liked a recommended resource page for further exploration (Table 17).

Table 17. Additional useful resources for respondents with GRSLSS score.

Which additional resources would have been useful to you as a student? Check all that apply.	Avoidant	Collaborative	Competitive	Dependent	Independent	Participant	Total
Live Chats (Video or text) with the Professor	1	31	3	8	46	37	126
Live Chats (Video or text) with other students	1	19	1	6	28	24	79
Librarian or information expert available to help with additional resources	2	35	1	11	59	45	153
Provided LibGuide or additional recommended resource list provided as part of course page	2	45	2	25	129	91	294
Non-credit extra practice on more complex concepts	0	43	2	23	126	99	293
For-credit practice on more complex concepts	1	25	1	16	80	57	180
None	2	18	3	15	71	40	149
Other: Please specify, listing if necessary.	1	8	0	3	32	8	52
TOTALS	10	224	13	107	571	401	1326

Since an overwhelming majority of the surveyed population tested highest in the Independent learning style and online learners, no matter their preference, tend to need to be more independent in order to participate in online learning, MOOCs included, this seems to indicate that non-required readings and resources are appreciated because, since many participants are motivated by general interest or a desire to enhance their own skills, providing curated resources may be a missed opportunity in many MOOCs. Additionally, students would also like more both for- (14%) and non-(22%) credit practice on course concepts (Table 17).

Discussion

Demographics

Two large-scale surveys have collected demographics for Coursera participants: Coursera collected its own data, surveying over 250,000 students (Pierson & Do, 2014) and the University of Pennsylvania surveyed 34,779 respondents who had watched at least one lecture in at least one of the university's MOOCs (Christensen et. al, 2013). Additionally, Harvard and MIT have recently released enrollment statistics for their first year of edX MOOCs (Ho, et. al, 2014). Since these numbers are much more likely to represent the broad MOOC population as opposed to the nuances of enrollment that are specific to individual courses, they will be used for demographic and some motivational comparisons, but do not have comparable data for other variables in this survey.

Compared to the broad studies, this set of respondents is more predominantly from North America (51%), compared to Coursera's (n.d.) data that averages 35.2% of enrollees from North America and Christensen et. al's (2013) approximate 37%. Harvard and MIT note a varied percentage of participants from the United States--from 16 to 36%, depending upon the course (Ho, et. al, 2014)—but this still shows a higher than average U.S. response rate for this survey. This survey population also differs from the averages in another significant basic factor: Based on a study conducted by Coursera of its participants, typically 40% of course participants are female (Pierson & Do, 2014). Harvard and MIT's MOOC participants average much fewer female enrollees at 29% of the reporting population (Ho, et. al, 2014). This response set has a higher percentage of female enrollees at 49%, but since American participants in MOOCs tend to enroll in almost equal numbers according to gender (Pierson & Do, 2014) and since this data set is

comprised of over 44% American respondents, that may contribute to equalizing the gender ratios.

The respondents to this survey also differ from other reported data regarding participant age: Christensen, et. al (2013) and Coursera (n.d.) both report their students are predominantly under 30, with 41% and 39% of the total surveyed population. Harvard and MIT's enrolled populations averaged between the ages of 23 to 30 (Ho, et. al, 2014). Even by grouping up to age 33 in this data set, only 26% of this surveyed population is in that age grouping, suggesting that perhaps for a course appearing more specific to a professional field, even unintentionally, may attract professionals already established within that field. More study would need to be done to make clear conclusions.

Taking these demographic differences from the large-scale studies into account, further deliberate studies would need to be undertaken, but in this case, the course topic itself may have been a major influencing factor. Though the course was not designed only for library and information science professionals, metadata is a topic that appears in many professional contexts, especially with the increasing digitization of library resources and organization of web resources for search and discovery. Additionally, since the course itself was tied to the School of Information and Library Science at UNC-Chapel Hill, that association may have biased enrollment and recruited more professionals already within the field of information science, data management, and library science. Twenty-nine percent of respondents to this survey reported wanting to either gain new job skills or enhance current job skills (Table 14), so this conclusion seems to be supported by the collected data--students make up a much smaller portion of

the survey population than Christensen, et. al (2013) found--8% in this sample to 17%--and full-time employed individuals make up the largest portion of the survey sample in both of the Coursera studies; they were not reported in the Harvard and MIT statistics.

Also, since many information and library science professionals are required to have a Master's degree as part of their certification, if the theory of enrollment is correct, this supports the higher-than-average percent of respondents with a graduate degree (Table 3). This may also explain why respondents to this survey are older than average participants—34-40 year olds represent 18% of the surveyed population, 41-45 represent 16% of the total respondents, and 14% of respondents were in the 55-64 age bracket (Table 2); these numbers may represent in-field professionals who did not learn about this topic in their graduate education experience but now need new skills to continue with trends within their professional field. More study would be needed and aggregated by course type in order to confirm these interpretations.

Attitudes about Online Learning and MOOCs

Overall, no matter the learning style, survey respondents reported generally favorable opinions towards online learning and the quality of education achieved through MOOCs (Table 6). Since MOOCs are optional educational experiences for most enrollees, this correlates to other studies regarding attitudes about online learning and learner participation and success. O'Malley (1999), Lee (2010), Blankenship and Atkinson (2010), and Lee (2013) all studied various qualities of successful online students, perception of quality and overall positive attitudes about online learning being one factor of success. Though a positive attitude about online and MOOC learning does not necessarily align with success in a MOOC as measured through these respondents, it

is more likely to indicate a tendency to enroll in MOOCs. The majority of survey

respondents reported earning a certificate of completion from the MOOC provider, this

obviously does not represent the general population of MOOCs, nor the enrolled

population of the UNC Metadata MOOC, where 1,418 students received a certificate of

completion out of 33,938 graded participants[2]. However, it does seem to indicate that

positive attitudes do correlate to this measure of success in MOOCs.

GRSLSS Scores & Survey Responses

In a gender-balanced, slightly older set of online student respondents, it makes

sense that Independent learners make up the dominant learning preference. Hruska and

Grasha (1982), in their norming of the learning styles, discovered that students over 25

were much more Independent and Participant in their learning preferences. Many studies

report that online students tend to exhibit dominantly independent characteristics, but few

specifically use the GRSLSS survey. Diaz and Cartnal (1999), however, found that,

using the GRSLSS, when given the choice between an online and in-person class of the

same topic, students who chose to participate in the online class were largely

Independent, scoring on average 3.56 on the GRSLSS (p. 133). Independent learners in

this survey's average score was 4.1, seeming to indicate that their preference for

independent learning is significantly stronger. Other learning styles that seem to align

well with interactive environments such as that found in a MOOC are the Collaborative

and Participant styles, 11% and 22% respectively of the surveyed population.

Interestingly enough, despite the negative correlations between Avoidant, Competitive,

---

[2] Participant data is from Coursera Data page in Administrative features available to course staff. Graded participation indicates beginning or submitting at least one graded assignment, including surveys or quizzes. Certificates were awarded to students who were graded at 80% correct answers, excluding survey results, which were ungraded.

and Dependent learners choosing to participate in online environments (Diaz & Cartnal, 1999; Grasha & Yangarber-Hicks, 2000), all of these learning styles are present to some degree in these survey results, perhaps indicating that though these may be these participants dominant preferences, they have adapted in order to participate in the MOOC environment.

MOOCs do actually provide opportunities for all students who self-select into the MOOC environment to indulge their dominant learning preferences:

- Competitive learners may benefit from enrolling in certificate portions of the course, since their primary motivation is to compete (and do better than) other students in the course. They may also benefit from choosing to participate in the discussion boards, but might need to be monitored in order to not intimidate less confident learners (Zutshi, O'Hare, & Rodafinos, 2013).

- Collaborative learners may be the future community TAs[3] or may be those involved in study groups, discussion boards, or other ways where they can learn as part of a group. They may also be more likely to participate in peer-review exercises and assignments.

- Avoidant learners, if they choose to participate at all, are probably the lurkers or passive participants. Since most MOOCs are optional learning opportunities, by allowing this type of low-stakes interaction, this learning style can be supported.

---

[3] A community TA for a MOOC is a student who has participated and done well in a MOOC during a previous offering of the course and is asked back to help monitor discussion boards and field questions for future offerings.

- Participant learners, like collaborative learners, will benefit from discussion and study group participation. Since they are often characterized by participating in as much course material as possible (and not much outside the course), providing related materials within the context of the course may benefit this learning style.

- Dependent learners will benefit from clear learning objectives, end-of-unit assessments and clear expectations for course participation. They often only learn what is required, so in order to meet their needs, the course should be designed so that required materials align with learning objectives.

- Independent learners benefit from all parts of the MOOC experience, but may be better supported with additional resources to allow for their own exploration to be enhanced, as they often will seek other materials to explore due to their own intellectual curiosity. (Hruska & Grasha, 1982)

Overall, 57% of respondents reported earning a Certificate of Completion or Verified Certificate (Table11), a larger-than-average number compared to participants in the course—4% of all graded participants. Overall, 86% of respondents engaged in the course material some way by completing the course according to provider standards, their own standards, or completing some coursework. Not completing any coursework (13% of respondents) is an ambiguous metric here; other studies (Ho, et. al, 2014; Milligan, Littlejohn, & Margaryan, 2013) identify two similar subgroups "only view[ers]" and lurkers. Because no additional details are available, this subgroup's involvement is not known—did they see watching the videos as coursework or just completing assignments?

More precise questions and further analysis of current data to break down individual data sets would further clarify what this subgroup intended, but overall, participation rates by this group, regardless of learning style, is high compared to general course participation. The highest percentage of participants who earned a certificate were the Competitive learners (75%, Table 11), which, though they make up a small number of overall participants, may show how Competitive learners best engage with the MOOC format— through competing with others and themselves to be one of the few to earn this certificate. Participant style learners were the next group that was more successful in earning certificates, with 64% of their population. Studies suggest that Participant-style engagement in multiple aspects of an online course tends to correspond with success (Lee, 2013; Grasha & Yangarber-Hicks, 2000; Hruska & Grasha, 1982; Thiele, 2003). Over half of Independent learners earned certificates of completion (58%, Table 11), as did Dependent learners (58%).

Motivation for enrolling overall was based on general curiosity or interest, with 22% of the total response population and also ranking highest out of all motivations for each learning style group. This is comparably low to the University of Pennsylvania participant pool: approximately 50% of total respondents reported enrolling in their selected MOOC for "curiosity" or "just for fun" (Christensen, et. al, 2013). Kizilcec, Piech, and Schneider (2013) also found that MOOCs might be a way that professionals are embracing lifelong learning opportunities, as they allow any learner to enroll, but whether this could be classified as general curiosity or professional interest could be debated.

As previously discussed, professional interest also scored highly as a reason for enrolling, supported by a slightly different perspective by Zutshi, O'Hare, and Rodafinos's (2013) findings that those participants whose blog posts they analyzed often were trying out the MOOC format because they were instructional designers or somehow involved in education. This was the primary reason that Avoidant survey respondents enrolled in MOOCs (Table 14); perhaps this gives learners who are less inclined to engage in coursework a rationale for taking an optional course. Avoidant respondents were equally likely to enroll for their own personal curiosity, so the small sample number may not yield any real conclusions. However, since the top two reasons for enrolling across all learning styles were curiosity and job-related skill development, a larger sample size may not change the results. This corresponds to Christensen et. al's (2013) findings: their survey results concluded that 43.9% of respondents enrolled to gain job skills for their current job and 17% for a new job, the second and third top responses of why participants enrolled in MOOCs.

Fourteen percent of respondents reported a motivation for enrollment was the low-stakes nature of the course (Table 14). This corresponds to one of the major challenges that respondents also faced because enrolling wouldn't cost them anything: having too little time to complete assignments or fully engage in the course (Table 15). No learning preference varied notably from these responses; in fact, all learning preferences ranked time as their top challenge faced in MOOCs (Table 15). Ho et. al (2014) found that in the Harvard and MIT MOOCs, registrant participation dropped off sharply between the first and the second week—this could be indicative of many factors, but could also support that, after sampling the course, participants did not have time to

continue to engage. Zutshi, O'Hare, and Rodafinos (2013) also found that time was a

major factor in some of the experiences of their MOOC bloggers: as one stated, "Some of

us do have jobs and the daily requirement is proving difficult" (p. 226). Though not all

MOOCs have daily requirements, often there are weekly or deadlines at other

frequencies. Time management is a consideration in success in other online courses

(Thiele, 2003; del Valle & Duffy, 2009; Blankenship & Atkinson, 2010), and if the

course is optional and no formal grade is being received, learners must be even more self-

motivated and self-directed than in graded courses.

Implications for Library Practice

These topics draw upon previous studies of online learners, a population that

libraries are increasingly able to serve through empirical understanding of the preferences

and needs of those participants. Issues of library resource support also become

problematic for all the aforementioned special populations and traditional distance and

online education students; though many materials are available online through proxy

servers, are digital materials all the necessary support online classes need from a library?

Would face-to-face for local participants or live chat sessions reinforcing skills addressed

and needed to be a successful online student—such as critical thinking and source

evaluation/reflection—be attended or appreciated? Does the library need to provide

tutorials on how to use learning platforms in order to enhance success? What about the

instructors? Do they need specific resources, digital or otherwise? Do they need

training? The questions continue as the scope of online education increases. Embedded

librarian services have been used in other online courses (Markgraf, 2004); using this

same service in MOOCs is promising, if a bit problematic in terms of what their role

would actually be (Wu, 2013). Information specialists could contribute both for course design and participant assistance, but navigating the large population causes issues as does the non-homogenized expectations within MOOCs (Mahraj, 2012).

Based on survey results obtained through this study and through Grünewald, Meinel, Totschnig, and Willems' (2013), it seems as though an untapped opportunity for librarians may be to curate open-access resources for further study or assist instructors and course staff in selecting these resources. Twelve percent of respondents completed optional readings suggested by the MOOC instructor and another 21% of survey respondents looked to outside resources either suggested by other students, the instructor, or self-discovered. Additionally, 12% of respondents would have found a librarian or other information expert useful to their MOOC experience and 22% would have found a LibGuide or other curated resource list helpful (Table 17). Since those learners who opt to engage in online learning are overall more independent, providing librarian curated materials may both support the curriculum itself and those learners who seek more information from trustworthy sources (Wu, 2013). The librarian's expertise in resource evaluation could provide these learners, who are still new to the topic, with openly available but still valuable resources, since they area already seeking out these materials independent of the course. Perhaps this could be an additional opportunity for participant engagement—an additional materials thread on the discussion board or part of the course page itself where discussions could take place regarding the additional materials and participants could suggest materials they have found. Having a reference librarian (or team of librarians) assigned to check in with MOOC participants would mimic the

distance education services already provided through some schools (Kearley & Phillips, 2004).

Additionally, librarians can utilize the ideas behind learning styles to increase their information literacy instruction and selection of resources. Many librarians do not have a background in education, but are asked to teach and instruct, especially in selection of materials for incredibly diverse populations. By understanding the theory of learning styles, librarians can employ all types of resources, especially those that will engage active learning in the individualized context of the course (Sanderson, 2011). By learning about participants in MOOCs, some libraries have even begun designing their own MOOCs in order to meet continued instructional needs (Chant, 2013)—by learning about the participants, these courses can be better designed to meet their needs, whether through learning styles theory or general understandings of motivations and challenges faced by overall participants.

Limitations

One of the challenges of measuring student involvement in MOOCs is that there is simultaneously an incredible amount of data and a simultaneous inability to understand what the individual clicks, certificates earned, or demographic characteristics mean in terms of student motivation. Therefore, it is difficult to know if any conclusions made through the analysis of this data are generalizable to other individual MOOCs. Even though studies have been done of different subjects in online courses and the learner characteristics that tend to dominate those settings, since MOOCs attract diverse individuals who may not be a subject-area native, different subject MOOCs may respond differently. Future studies should also be done in various subject areas and should be

compared to see if learner demographics change according to subjects. Additionally, since this study frames the data in terms of GRSLSS scores, it is difficult to know if the results from this study would compare to other MOOC populations since, to the researcher's knowledge, no other studies using a learning style survey, GRSLSS or other, have been completed. To test the validity of these results, additional tests using the GRSLSS should be done and compared across course types.

  Learning styles research is not without critics. Numerous articles over the years have argued against the learning styles idea in general as styles may vary across contexts and a person's learning style is not fixed. Learning style studies in the context of online classes also are problematic because computer skills and motivations may be more significant factors in success or failure, something that a learning style survey will not measure (Santo, 2006; McVay Lynch, 2001; Grasha & Yangarber-Hicks, 2000; James & Gardner, 1995). In this learning styles survey, though a small portion of the population tested into both the Avoidant and Competitive categories, those participants were so few in number that percentage comparisons using those subcategories were heavily weighted towards individual answers, whereas for those categories such as Independent and Participant, a larger number of participants contributed to each set of results, perhaps making the proportion more statistically valid. Increasing the sample size would draw more meaningful distinctions about this subset of this population, but perhaps those participants who are Avoidant or Competitive have chosen, despite that dominant preference, to participate in MOOCs. Learning styles do not strictly dictate success or failure; they merely indicate a disposition or preference towards certain learning characteristics.

As with all survey research, another limitation is that there is likely to be a bias towards more active participants, keeping the large population of non-participants enrolled in each MOOC a continued mystery. The few data sets gleaned here from non-participants are valuable, but for what purpose? Is the purpose of identifying common characteristics of MOOC participants to better meet the needs of those who are active participants or to reach all those who sign up? Since sign up is not equivalent to traditional enrollment—lacking such barriers as money and accountability--, is this metric really realistic to use for MOOCs? In a class structure where, according to Harvard and MIT's findings 50% of participants cease activity within the first week (Ho, et. al, 2014), perhaps these are not participants who the courses need to be adapted for in order to enhance their success or interaction. Maybe a better metric would be increasing persistence after the mid-point for the course. Since time was a major contributor to challenges students enrolled in the UNC Metadata MOOC faced (Table 15), those who persist for a majority of the course may be a better population to consider true participants, as opposed to just those who enroll.

Also, what makes a participant "successful" in a MOOC is a topic still up for debate—are successful MOOC participants those who earn a provider-issued certificate or are they successful if they learn according to their own goals? Harvard and MIT's MOOC study indicated that a significant number of participants explored course content to some degree (Ho, et. al, 2014); perhaps traditional notions of success need not be applied to this non-traditional course structure and forms of exploration, a metric relatively easy to count with most MOOC provider courseware, be considered a form of success of the course as well. Additionally, a certificate does not necessarily indicate

learning as many participants, as mentioned, do engage with the courseware but choose

not to complete assessments (Ho, et. al, 2014). Cheating and plagiarism of written

assignments is not uncommon for MOOCs, so, despite verification attempts by MOOC

providers, if a student earns a certificate but does so by cheating, how is their experience

more valuable than that of a person who chose to explore and develop their own

knowledge without committing to a certificate (Webley, 2012)?

Conclusion

Though enrollment in MOOCs has somewhat waned since "the year of the

MOOC" (Pappano, 2012), MOOCs are still attracting the attention of learners

worldwide and institutions continue to develop and offer courses on a variety of topics.

Learning styles surveys, though somewhat lengthy, can be a useful tool in exploring the

contextual preferences of students enrolled in MOOCs. This study found, supporting

previously conducted surveys of online learners in other contexts, that MOOC

respondents to this survey were predominantly Independent, showing a preference for

self-directed learning and exploration due to intrinsic motivations. Despite

representation of all other GRSLSS categories, there were many similarities between

the preferences of these respondents, including a desire for more support resources,

some of which could be used as an opportunity for librarians to participate in MOOCs

as part of the instructional team and also continue to enhance their support for distance

learners. Even if the results of this study do not apply to all MOOCs or all MOOC

participants, understanding these massively diverse student bodies may help develop a

framework for reaching as many participants as possible. Replication of this survey

across diverse MOOC courses would be an ideal way to compare populations and see

how similar different discipline. Despite major recent contributions to the literature

regarding participant characteristics, more study still needs to be done to delve into the

differences between different types of courses and how participants want and need to be

supported to see if there are generalizable results or if subject contributes significantly

to participant characteristics.

References

Allen, I.E. and Seaman, J. (2013). *Changing Course: Ten years of tracking online education in the United States.* Babson Survey Research Group.

American Council on Education. (2013, January 15). ACE to forge new ground in MOOC evaluation and research effort. Retrieved from http://www.acenet.edu/news-room/Pages/ACE-to-Forge-New-Ground-in-MOOC-Evaluation-and-Research-Effort.aspx

Blankenship, R. and Atkinson, J.K. (2010). Undergraduate student online learning readiness. *International Journal of Educational Research*, 5(2), 44-54. Retrieved from http://go.galegroup.com/ps/i.do?id=GALE%7CA299759812&v=2.1&u=unc_main&it=r&p=AONE&sw=w&asid=4ed39b616239d29ee0126fcee313fec4

Chant, I. (2013, Dec.) Opening up: Next steps for MOOCs and libraries. *Library Journal*. Retrieved from http://lj.libraryjournal.com/2013/12/digital-content/opening-up/#_

Christensen, G., Steinmetz, A., Alcorn, B., Bennett, A., Woods, D., and Emanuel, E.J. (2013, Nov. 6). The MOOC phenomenon: Who takes massive open online classes and why? Working paper. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2350964

Coursera. (n.d.) General resources: Coursera students. *Instructor Support: MOOC Pedagogy*. Retrieved from https://instructor-support.desk.com/customer/portal/

articles/1148463-coursera-students

Diaz, D.P. and Cartnal, R.B. (1999). Students' learning styles in two classes: Online

distance education and equivalent on-campus. *College Teaching*, 47(4), 130-135.

doi: 10.1080/87567559909595802

del Valle, R. and Duffy, T.M. (2009). Online learning: Learner characteristics and their

approaches to managing learning. *Instructional Science*, 37(2), 129-149. doi:

10.1007/s11251-007-9039-0

EDUCAUSE Learning Initiative. (2011). Seven things you should know about MOOCs.

Retrieved from https://net.educause.edu/ir/library/pdf/ELI7078.pdf

Grasha, A.F. (1996). *Teaching with style: A practical guide to enhancing learning by*

understanding teaching and learning styles. Pittsburg: Alliance Publishers.

Grasha, A.F. and Yangarber-Hicks, N. (2000). Integrating teaching styles and learning

styles with instructional technology. *College Teaching*, 48(1), 2-10. Retrieved

from http://www.jstor.org/stable/27558972

Grünewald, F., Meinel, C., Totschnig, M., and Willems, C. (2013). Designing MOOCs

for the support of multiple learning styles. *Scaling Up Learning for Sustained*

Impact: 8th European Conference on Technology Enhanced Learning. (371-382).

Berlin, Germany: Springer. doi: 10.1007/978-3-642-40814-4_29

Ho, A. D., Reich, J., Nesterko, S., Seaton, D. T., Mullaney, T., Waldo, J., & Chuang, I.

(2014). HarvardX and MITx: The first year of open online courses. HarvardX and

MITx Working Paper No. 1. Retrieved from http://papers.ssrn.com/sol3/

papers.cfm?abstract_id=2381263

Hruska, S. and Grasha, A.F. (1982). The Grasha-Riechmann student learning styles
   scales. In The National Association of Secondary School Principals (Eds.),
   Student Learning Styles and Brain Behaviors. (81-86). New York: St. John's
   University.

James, W. B. and Gardner, D.L. (1995). Learning styles: Implications for distance
   learning. *New Directions for Adult and Continuing Education*, 1995(67), 19-31.
   doi: 0.1002/ace.36719956705

Kay, J, Reimann, P., Diebold, E., and Kummerfeld, B. (2013). MOOCs: So many
   learners, so much potential. *IEEE Intelligent Systems*, 28(3), 70-77. doi:
   10.1109/MIS.2013.66

Kearley, J.P. and Phillips, L. (2004). Embedding library reference services in online
   courses. *Improving Internet Reference Services to Distance Learners*. (65-76).
   Binghamton, NY: The Hawthorne Information Press.

Kizilcec, R.F., Piech, C., and Schneider, E. (2013). Deconstructing disengagement:
   Analyzing learner subpopulations in massive open online courses. *Proceedings of
   the Third International Conference on Learning Analytics and Knowledge*. (170-
   179). New York, NY: ACM. Retrieved from http://dl.acm.org/
   citation.cfm?id=2460330

Kolowich, S. (2013, Feb. 7). American council on education recommends 5 MOOCs for
   credit. *The Chronicle of Higher Education*. Retrieved from
   http://chronicle.com/article/American-Council-on-Education/137155/

Lee, J. (2010). Online support service quality, online learning acceptance, and student

satisfaction. *Internet and Higher Education*, 13(4), 277-283. doi:

http://dx.doi.org/10.1016/j.iheduc.2010.08.002

Lee, S.W. (2013). Investigating students' learning approaches, perceptions of online

learning, discussions, and students' online and academic performance.

Computers & Education, 68, 345-352. doi: http://dx.doi.org/10.1016/

j.compendu.2013.05.019

Liyanagunawardena, T. R., Adams, A. A., & Williams, S. A. (2013). MOOCS: A

systematic study of the published literature 2008-2012. *The International Review

of Research in Open and Distance Learning*, 14(3), 202-27. Retrieved from

http://www.irrodl.org/index.php/irrodl/article/view/1455

Lewin, T. (2013, August 17). Master's degree is new frontier of study online. *The New

York Times*. Retrieved from http://www.nytimes.com/2013/08/18/education/

masters-degree-is-new-frontier-of-study-online.html

Mahraj, K. (2012). Using information expertise to enhance massive open online courses.

Public Services Quarterly, 8(4), 359-68. doi: 10.1080/15228959.2012.730415

Markgraf, J.S. (2004). Librarian participation in the online classroom. *Improving

Internet Reference Services to Distance Learners*. (5-19). Binghamton, NY: The

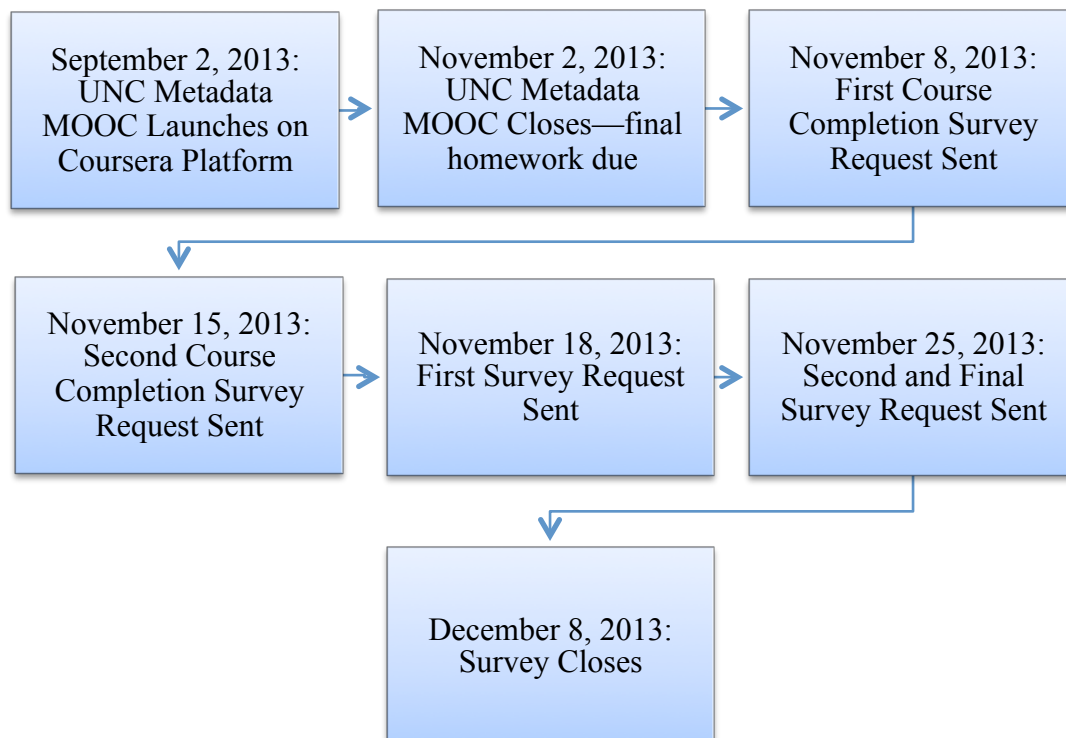Hawthorne Information Press.

McVay Lynch, M. (2001). Effective student preparation for online learning. *The

Technology Source*, November/December 2001. Retrieved from

http://technologysource.org/article/effective_student_preparation_for_online_lear

ning/

Milligan, C, Littlejohn, A., and Margaryan, A. (2013). Patterns of engagement in

connectivist MOOCs. *Journal of Online Learning and Teaching*, 9(2), 149-159.

Retrieved from http://jolt.merlot.org/vol9no2/milligan_0613.htm

O'Malley, J. (1999). Students perceptions of distance learning, online learning and the

traditional classroom. *Online Journal of Distance Learning Administration*, 2(4).

Retrieved from http://www.westga.edu/~distance/ojdla/winter24/omalley24.html

Palloff, R.M. and Pratt, K. (2003). The virtual student: A profile and guide to working

with online learners. San Francisco, CA: Josey Bass.

Pappano, L. (2012, Nov. 2). The year of the MOOC. *The New York Times*. Retrieved

from http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-

courses-are-multiplying-at-a-rapid-pace.html?_r=1&

Pierson, E. and Do, C. (2014, Mar. 8). What about the women? *Coursera Blog*.

Retrieved from http://blog.coursera.org/post/79073490420/what-about-the-

women

Queen, B. and Lewis, L. (2011). Distance education courses for public elementary and

secondary school students: 2009-10. National Center for Educational Statistics:

First Look. Retrieved from http://nces.ed.gov/pubs2012/2012008.pdf

Radford, A.W. (2011). Learning at a distance: Undergraduate enrollment in distance

education courses and degree programs. National Center for Educational

Statistics: Stats in Brief. Retrieved from ttp://nces.ed.gov/pubs2012/2012154.pdf

Sanderson, H. (2011). Using learning styles as information literacy: Critical

considerations for librarians. *The Journal of Academic Librarianship,* 37(5), 376-

385. doi: http://dx.doi.org/10.1016/j.acalib.2011.06.002

Santo, S.A. (2006). Relationships between learning styles and online learning: Myth or

    reality? *Performance Improvement Quarterly*, 19(3), 73-88. doi: 10.1111/j.1937-

    8327.2006.tb00378.x

Thiele, J.E. (2003). Learning patterns of online students. *Journal of Nursing Education*,

    42(8), 364-366. PMID: 1293889

Webley, K. (2012, Nov. 19). MOOC Brigade: Can Online Courses Keep Students from

    Cheating? *Time*. Retrieved from http://nation.time.com/2012/11/19/mooc-

    brigade-can-online-courses-keep-students-from-cheating/

Wu, K. (2013). Academic libraries in the age of MOOCs. *Reference Services Review*,

    41(3), 576-587. doi: 10.1108/RSR-03-2013-0015

Zutshi, S., O'Hare, S., and Rodafinos, A. (2013). Experiences in MOOCs: The

    perspective of students. *American Journal of Distance Education*, 27(4), 218-

    227. doi: 10.1080/08923647.2013.838067

Appendices

Appendix A: MOOC and Research Timeline

September 2, 2013: UNC Metadata MOOC Launches on Coursera Platform	November 2, 2013: UNC Metadata MOOC Closes—final homework due	November 8, 2013: First Course Completion Survey Request Sent
November 15, 2013: Second Course Completion Survey Request Sent	November 18, 2013: First Survey Request Sent	November 25, 2013: Second and Final Survey Request Sent
	December 8, 2013: Survey Closes	

Appendix B: Recruitment Emails to Participants

First Contact[1]:

Subject: Help Us Learn More about MOOC Students- A Survey Request

Dear [Name of Student Generated by Coursera Email Feature],
My name is Meredith Lewis, and I was the Teaching Assistant in UNC & Coursera's Metadata MOOC. I'm also a graduate student in UNC-Chapel Hill's School of Information and Library Science and am, for my Master's project, conducting a study to measure student attitudes about online learning and resource use within MOOCs. In order to gather this data, I'm hoping that you will have a few minutes to spare to take my survey.

The survey itself is divided into three primary parts: 1) a questionnaire regarding your participation in online learning, both in MOOCs and in other contexts; 2) a learning preference survey; and 3) a brief demographic questionnaire. **Whether you choose to participate in the survey will have no impact on your performance in the Metadata MOOC. Additionally, in no way will any information you provide in the survey be connected to your grade or participation in the course.**

Please consider participating in this survey no matter the level of your participation (or non-participation) in the course itself-—all respondents are desirable so we can better understand the diverse population of students who make enrollment in the tens to hundreds of thousands for many of these massive courses.

The survey should take no longer than 20 minutes to complete. Again, your participation is completely voluntary, and the information you provide will be kept confidential. Results will be reported only in aggregate form; your name will never be associated with your data.

Please click the link below to begin the survey: https://unc.az1.qualtrics.com/SE/?SID=SV_b94JF73TsqcnxXf

Thank you for your participation and assistance with my project,

Meredith Lewis
TA, UNC Metadata MOOC
Graduate Student, MSLS '14
UNC-Chapel Hill School of Information and Library Science

---

[1] sent to 28,179 on November 18, 2013

Second (Final) Contact[2]:

Subject: Second Request: Help Us Learn More about MOOC Students- A Survey Request

Dear [Name of Student Generated by Coursera Email Feature],

You were previously contacted about participating in a survey to measure student attitudes about online learning and resource use within MOOCs. If you have already taken the survey, thank you! I greatly appreciate your contribution to my research. Once the survey closes in a few weeks, I'll begin posting reflections and results on meredila.wordpress.com if you'd like to follow along.

If you haven't taken the survey, please consider taking about 20 minutes out of your schedule to answer a few questions about your participation in online learning, your learning preferences, and your demographics. Please click the link below to begin the survey: https://unc.az1.qualtrics.com/SE/?SID=SV_b94JF73TsqcnxXf

Just a reminder: Whether you choose to participate in the survey or not will have no impact on your performance in the Metadata MOOC. Additionally, the information you provide will be kept confidential. Results will be reported only in aggregate form; your name will never be associated directly with your course data.

 Thank you,

Meredith Lewis
TA, UNC Metadata MOOC
Graduate Student, MSLS '14
UNC-Chapel Hill School of Information and Library Science

---

[2] emailed to 25,138 students on November 25, 2013

Appendix C: Survey

The survey was administered through the Qualtrics platform available through UNC-Chapel Hill. Variable names are identified as the text bolded in parenthesis next to the question or answer choices.

Metadata MOOC Student Survey

I. Consent
(AgeVal) Are you over 17 years old? (All no answers will be automatically taken to the end of the survey.)
_____ Yes
_____ No

Please read the consent form and then indicate your agreement by checking the box below it.

This survey is being conducted by Meredith Lewis, a Masters in Library Science student the School of Information and Library Science at the University of North Carolina at Chapel Hill. The purpose of the study is to measure student attitudes about online learning and resource use within Massive Open Online Courses (MOOCs). The survey is divided into three primary parts: 1) a questionnaire regarding your participation in online learning, both in MOOCs and in other contexts; 2) a learning preference survey; and 3) a brief demographic questionnaire.

The survey will take approximately 20 minutes to complete. Your participation is completely voluntary, and the information you provide will be kept confidential. Results will be reported only in aggregate form; your name or data about your grades in the UNC Metadata MOOC will never be associated with your answers in this survey.

If you have any questions about the research project or the survey itself, please contact Meredith Lewis (meredila@live.unc.edu). If you have any questions about your rights as a research participant, you may contact the University of North Carolina Institutional Review Board at irb_questions@unc.edu and mention study number 13-3378.

(Consent) Please click the "I agree to participate" button below to begin the survey.
_____ I agree to participate

II. Experiences in Online Learning
Online courses are defined as for- or non-credit classes academic or professional in nature in which instruction and content are delivered primarily over the Internet.
For the purposes of this survey, **enrolled** means going through the steps necessary to sign up for the class and does not indicate further participation or completion of the course.

(Q6) Have you enrolled in online course(s) other than a MOOC before?
_____ Yes
_____ No (Apply skip logic for "No" answers to go to end of this section)

(Q8) Please check the type of online course(s) that you have enrolled in. Check all that apply.
_____ Community College
_____ University undergraduate
_____ University graduate
_____ Online degree program
_____ Continuing Education
_____ Professional Development
_____ Other: (Please specify) _____

(Q10) For the online course(s) that you have enrolled in, how many have you completed?
_____ All
_____ Some
_____ None

III. Massive Open Online Courses (MOOCs)
MOOCs are online courses aimed at large-scale or unlimited participation and open access via the web. Courses are often conducted via recorded video lecture and additional resources and activities may be included in the online curriculum.

For the purposes of this survey, enrolled means going through the steps necessary to sign up for the class and does not indicate further participation or completion of the course.

(Q40) Were you enrolled in the UNC Metadata MOOC?
_____ Yes
_____ No

(Q19) Have you enrolled in other MOOCs other than the UNC Metadata MOOC?
_____ Yes
_____ No

(Q17) Choose the answer that best describes your level of participation in the UNC Metadata MOOC.
_____ I earned a Statement of Accomplishment or Verified Certificate issued by the MOOC provider.
_____ I completed the MOOC(s) to my own standards.
_____ I completed some of the coursework.
_____ I did not complete any coursework.

_____ I did not log into the course site.

(Q18) What coursework did you complete in the UNC Metadata MOOC? Select all that apply.
_____ Watching more than one of the video lectures.
_____ Completing at least one homework.
_____ Reading at least one of the optional articles.
_____ Participating in at least one of the discussion board threads.

(Q20) For MOOCs other than the UNC Metadata MOOC that you have enrolled in, choose the answer that best expresses your general participation in MOOCs. Likert Scale: All, Some, None
_____ I earned a Statement of Accomplishment or Verified Certificate issued by the MOOC provider.
_____ I completed the MOOC(s) to my own standards.
_____ I completed some of the coursework.
_____ I did not complete any coursework.
_____ I did not log into the course site.

(Q21) List the name(s) of the MOOCs you have <u>enrolled in, but not completed</u>, including the UNC Metadata MOOC if applicable: _____

(Q33) List the name(s) of the MOOCs you have <u>completed</u> either according to your own standards or the standards of the MOOC provider, including the UNC Metadata MOOC if applicable: _____

IV. Motivation & Resources
Answer the following questions relating to your general experiences in all of the MOOCs you have enrolled in, including but not limited to the UNC Metadata MOOC.

(Q35) What motivated you to enroll in MOOC(s)? Check all that apply
_____ The course supported my current academic program
_____ The course supported my current job responsibilities or company's line-of-business.
_____ The skills from this course may be useful for obtaining a new job.
_____ I enrolled in the course out of general interest, curiosity, or enjoyment.
_____ I took the course because of the reputation of offering institution.
_____ I took the course because of the reputation of the instructor.
_____ I was interested in the opportunity to earn a Statement of Accomplishment or Verified Certificate.
_____ I had friends taking the course

_____ The course was low-stakes in terms of commitment-- if I needed to drop out, I would be able to with no repercussions.

_____ I cannot afford to pursue a formal education.

_____ I am geographically isolated from educational institutions

_____ I was required to enroll as a component of a for-credit course through my home institution.

_____ I was required to enroll for my job.

_____ Other: Please specify _____

(Q36) What challenges have you faced once enrolled in MOOC(s)? Check all that apply.

_____ The concepts were too complex for my skill level.

_____ The concepts were too complex for the amount of time I had to devote to the course.

_____ The concepts were too easy.

_____ I was too busy to complete assignments.

_____ I was not interested in the topic once enrolled.

_____ I did not want to do the work, though the topic was interesting.

_____ I was unmotivated because there was nothing to lose or gain by taking the course.

_____ I found the staff unresponsive to my specific questions.

_____ I found the other students on the discussion boards unhelpful.

_____ I found the other students on the discussion boards hostile.

_____ I was afraid to participate on the discussion boards.

_____ The online platform of the course was confusing.

_____ None.

_____ Other: Please specify _____

(Q37) Which resources have you used in any MOOC you have taken before? Check all that apply.

_____ None

_____ Video Lectures

_____ In-Video Quizzes

_____ Video lectures transcribed in print or non-video image files

_____ Supplementary Optional Readings or Media

_____ Supplementary Required Readings or Media

_____ Discussion Boards (General)

_____ Discussion Boards (Study Groups)

_____ Discussion Boards through Social Media (Facebook, Linked-In, MeetUp)

_____ Other study group: Please specify

_____

_____ Outside resources not assigned through the course and self-discovered

_____ Outside resources not assigned through the course and recommended by the professor or staff of the course

_____ Outside resources not assigned through the course and recommended by other students within the course
_____ Other resources: Please specify _____

(Q39) Which additional resources would have been useful to you as a student? Check all that apply.
_____ None
_____ Live Chats (Video or text) with the Professor
_____ Live Chats (Video or text) with other students
_____ Librarian or information expert available to help with additional resources
_____ Provided LibGuide or additional recommended resource list provided as part of course page
_____ Non-credit extra practice on more complex concepts
_____ For-credit practice on more complex concepts
_____ Other: Please specify, listing if necessary

_____

V. Online Learning Attitudes (Based on McVay-Lynch Suitability for Distance Education Survey)

The following questions are intended to measure your general attitudes about online learning and MOOCs. Please answer honestly by rating your agreement with each statement.

Likert Scale: Strongly Agree (5), Moderately Agree (4), Undecided (3), Moderately Disagree (2), Strongly Disagree (1)
(attitu_1) In general, online learning is of equal quality to traditional classroom learning.
(attitu_2) In general, online learning through a MOOC is of equal quality to traditional classroom learning.
(attitu_3) In general, instruction through a MOOC is of equal quality to traditional classroom instruction.
(attitu_4) In general, assessment through a MOOC is of equal quality to assessment in a traditional classroom.
(attitu_5) In general, student support through a MOOC is of equal quality to student support in a traditional classroom.
(attitu_6) In general, student collaboration through a MOOC is of equal quality to collaboration in a traditional classroom.

VI. Learning Styles Survey

The following questionnaire has been designed to help you clarify your attitudes and feelings about yourself as a learner. There are no right or wrong answers to each question. However, as you answer each question, form your answers with regard to your general attitudes and feelings about yourself as a learner.

Respond to the items listed below by using the following ratings scale. There are 60 questions.

Likert Scale: Strongly Agree, Moderately Agree, Undecided, Moderately Disagree, Strongly Disagree

1. I prefer to work by myself on assignments in my courses.
2. I often daydream during class.
3. Working with other students on class activities is something I enjoy doing.
4. I like it whenever teachers clearly state what is required and expected.
5. To do well, it is necessary to compete with other students for the teacher's attention.
6. I do whatever is asked of me to learn the content in my classes.
7. My ideas about the content are often as good as those in the textbook.
8. Classroom activities are usually boring.
9. I enjoy discussing my ideas about the course content with other students.
10. I rely on my teachers to tell me what is important for me to learn.

11. It is necessary to compete with other students to get a good grade.
12. Class sessions typically are worth attending.
13. I study what is important to me and not always what the instructor says is important.
14. I very seldom am excited about material covered in a course.
15. I enjoy hearing what other students think about issues raised in class.
16. I only do what I am absolutely required to do in my courses.
17. In class, I must compete with other students to get my ideas across.
18. I get more out of going to class that staying at home.
19. I learn a lot of the content of my classes on my own.
20. I don't want to attend most of my classes.

21. Students should be encouraged to share more of their ideas with each other.
22. I complete assignments exactly the way my teachers tell me to do them.
23. Students have to be aggressive to do well in courses.
24. It is my responsibility to get as much as I can out of a course.
25. I feel very confident about my ability to learn on my own.
26. Paying attention during class sessions is difficult for me.
27. I like to study for tests with other students.
28. I do not like making choices about what to study or how to do assignments.
29. I like to solve problems or answer questions before anybody else can.
30. Classroom activities are interesting.

31. I like to develop my own ideas about course content.
32. I have given up trying to learn anything from going to class.
33. Class sessions make me feel like part of a team where people help each other learn.
34. Students should be more closely supervised by teachers on course projects.
35. To get ahead in class, it is necessary to step on the toes of other students.
36. I try to participate as much as I can in all aspects of a course.

37. I have my own ideas about how a course should be run.
38. I study just hard enough to get by.
39. An important part of taking courses is learning to get along with other people.
40. My notes contain almost everything the teacher said in class.

41. Being one of the best students in my classes is very important to me.
42. I do all course assignments well whether or not I think they are interesting.
43. If I like a topic, I try to find out more about it on my own.
44. I typically cram for exams.
45. Learning the material is a cooperative effort between students and teachers.
46. I prefer class sessions that are highly organized.
47. To stand out in my classes, I complete assignments better than other students.
48. I typically complete course assignments before their deadlines.
49. I like classes where I can work at my own pace.
50. I would prefer that teachers ignore me in class.

51. I am willing to help other students out when they do not understand something.
52. Students should be told exactly what material is covered on exams.
53. I like to know how well other students are doing on exams and course assignments.
54. I complete required assignments as well as those that are optional.
55. When I don't understand something, I first try to figure it out for myself.
56. During class sessions, I tend to socialize with people sitting next to me.
57. I enjoy participating in small group activities during class.
58. I like it when teachers are well organized for a session.
59. I want my teachers to give me more recognition for the good work I do.
60. In my classes, I often sit toward the front of the room.

VII. About You
To finish up the survey, answer a few questions about yourself.

(Age) Select the grouping that contains your age:
_____ under 17
_____ 17- 21
_____ 22- 28
_____ 29- 33
_____ 34- 40
_____ 41- 45
_____ 46 - 54
_____ 55-64
_____ 65 +

(Gender) Select your gender:
_____ Female
_____ Male

(country) In which country do you reside? (drop down list of countries from
http://www.listofcountriesoftheworld.com/)

(educ) What is the highest level of school you have completed or the highest degree you
have received? For a list of United States school level descriptions, refer to this graphic:
http://en.wikipedia.org/wiki/Education_in_the_United_States#School_grades
_____   no schooling completed
_____   some primary or elementary school
_____   some high school (but no degree)
_____   high school diploma (or equivalent)
_____   some college but no degree
_____   associate degree - occupational/technical/vocational program
_____   associate degree - academic program
_____   bachelor's degree (e.g., BA, AB, BS)
_____   master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)
_____   professional school degree (e.g., MD, DDS, DVM, LLB, JD)
_____   doctorate degree (e.g., PhD, EdD)

(emplym) Are you currently working full-time, working part-time, looking for work, in
school, retired, stay-at-home parent, or doing something else? (Select all that apply.)
_____   Working full-time (30 hours or more per week)
_____   Working part-time (less than 30 hours per week)
_____   Looking for work
_____   Laid off from work
_____   Student (pre-college)
_____   Student (undergraduate)
_____   Student (graduate)
_____   Retired
_____   Stay-at-home parent or caregiver
_____   Doing something else : Please specify_____

Thank you for completing this survey. If you would like to follow along with my
research on MOOCs and, when completed, the summary of the survey results, you may
do so on the following website set up to document my research process and results
at meredila.wordpress.com

Please click the arrow button in the bottom corner of this window to submit your survey.

Appendix D: Geographic Distribution of Survey Respondents

Figure 2. Map of Respondents
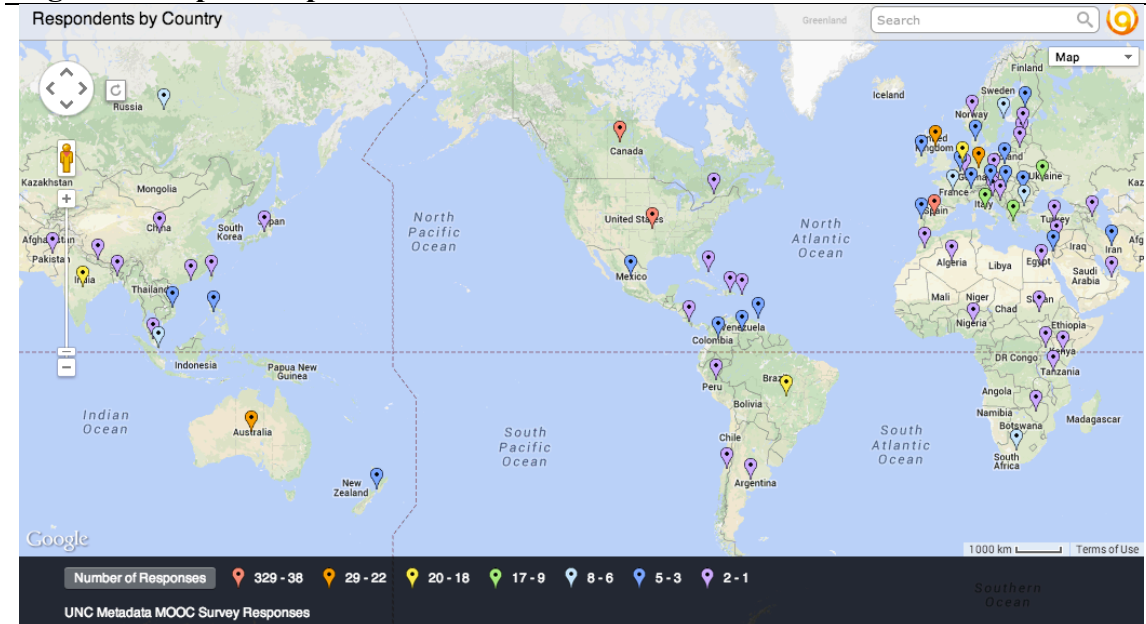
Map created by BatchGeo.com.
URL: http://batchgeo.com/map/1c4e745c55f584a59b56f0799c774523

Appendix E: GRSLSS Student Learning Styles

Table 3-5
The Grasha-Riechmann Student Learning Styles

Competitive
Students who learn material in order to perform better than others in the class. Believe they must compete with other students in a course for the rewards that are offered. Like to be the center of attention and to receive recognition for their accomplishments in class.
General Classroom Preferences
> Become a group leader in discussions ...Teacher-centered instructional procedures...Singled out in class for doing a good job...Class activities where they can do better than others.

Collaborative
Typical of students who feel they can learn by sharing ideas and talents. They cooperate with the teacher and like to work with others.
General Classroom Preferences
> Lectures with small group discussions...Small seminars...Student-designed aspects of courses...Group projects.

Avoidant
Not enthusiastic about learning content and attending class. Do not participate with students and teachers in the classroom. They are uninterested and overwhelmed by what goes on in class.
General Classroom Preferences
> Generally turned off by most classroom activities... Would prefer no tests...Pass-fail grading systems...Does not like enthusiastic teachers...Does not want to be called on in class.

Participant
Good citizens in class. Enjoy going to class and take part in as much of the course activities as possible. Typically eager to do as much of the required and optional course requirements as they can.
General Classroom Preferences
> Lectures with discussion...Opportunities to discuss material...Class reading assignments...Teachers who can analyze and synthesize information well.

Dependent
Show little intellectual curiosity and who learn only what is required. View teacher and peers as sources of structure and support and look to authority figures for specific guidelines on what to do.
General Classroom Preferences
> Outlines or notes on the board...Clear deadlines and instructions for assignments...Teacher-centered classroom methods...As little ambiguity as possible in all aspects of course.

Independent
Students who like to think for themselves and are confident in their learning abilities. Prefer to learn the content that they feel is important and would prefer to work alone on course projects than with other students.
General Classroom Preferences
> Independent study...Self-paced instruction...Assignments that give students a chance to think independently...Projects that students can design...Student-centered rather than teacher-centered course designs.

Grasha, A.F. (1996). *Teaching with style: A practical guide to enhancing learning by understanding teaching & learning styles* (128)*.* Pittsburgh: Alliance Publishers.

Appendix F: Other MOOC Enrollment and Resource Use

Table 13a. Participation level in MOOCs other than UNC Metadata MOOC by respondents with GRSLSS score.

For MOOCs other than the UNC Metadata MOOC, choose the answer that best expresses your general participation in MOOCs.			
I earned a Statement of Accomplishment or Verified Certificate issued by the MOOC provider.	All	Some	None	Total
Avoidant	1	2	2	5
Collaborative	6	44	24	74
Competitive	2	1	2	5
Dependent	10	21	14	45
Independent	42	154	67	263
Participant	27	86	51	164
TOTALS	88	308	160	556

I completed the MOOC to my own standards.	All	Some	None	Totals
Avoidant	0	3	2	5
Collaborative	12	45	15	72
Competitive	1	2	1	4
Dependent	8	25	13	46
Independent	68	147	40	255
Participant	26	77	46	149
TOTALS	115	299	117	531

I completed some of the coursework.	All	Some	None	Totals
Avoidant	1	3	1	5
Collaborative	17	55	5	77
Competitive	1	2	1	4
Dependent	12	23	12	47
Independent	65	177	17	259
Participant	40	92	18	149
TOTALS	136	352	54	542

Table 13b. Participation level in MOOCs other than UNC Metadata MOOC by respondents with GRSLSS score.

For MOOCs other than the UNC Metadata MOOC, choose the answer that best expresses your general participation in MOOCs.

I did not complete any coursework.	All	Some	None	Totals
Avoidant	2	2	0	4
Collaborative	6	37	24	67
Competitive	0	2	2	4
Dependent	2	16	27	45
Independent	7	128	109	244
Participant	5	47	85	137
TOTALS	22	232	247	501

I did not log onto the course site.	All	Some	None	Totals
Avoidant	1	0	2	3
Collaborative	5	45	19	69
Competitive	0	2	2	4
Dependent	4	21	21	46
Independent	9	134	109	252
Participant	8	53	79	140
TOTALS	27	255	232	514