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Social Learning in Massive Open Online Courses:
An Analysis of Pedagogical Implications and Students' Learning Experiences

A dissertation submitted in partial satisfaction of the
Requirements for the degree of Doctor of Education

by

Andrew Jefferson Hill

2015

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Andrew Jefferson Hill

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ABSTRACT OF THE DISSERTATION

Social Learning in Massive Open Online Courses:
An Analysis of Pedagogical Implications and Students' Learning Experiences

by

Andrew Jefferson Hill

Doctor of Education

University of California, Los Angeles, 2015

Professor Robert A. Rhoads, Chair

Massive Open Online Courses (MOOCs) are a relatively new form of online education which allow a single instructor to teach tens of thousands of enrolled students from around the world; ostensibly offering free university-level education to anyone connected to the internet. A growing number of MOOC hosts have formed to create digital platforms allowing instructors to design and teach their courses; each offering a different set of tools to convey content, assess student learning, and allow communication in massive virtual classrooms. A new environment suggests that some educators might need to alter pedagogy to address the problem of how to teach a massive virtual population of student learners. Critics often cite a few well-publicized failures and a trend of high rates of attrition as evidence of failure, but educators continue to experiment with the MOOC model of instruction.

Teaching a MOOC is not only different from traditional university teaching, but also different from earlier attempts to teach at a distance. Perhaps most notably, the massiveness of the MOOC model appears to prevent instructors from addressing individual needs of some learners. MOOCs have provided ways for students to communicate with each other, typically through discussion forums, allowing some to rely on peers to reinforce larger scale instruction. Some students find the sheer volume of information on forums problematic, even with search and sorting tools provided by MOOC platforms.

Some MOOC educators have made use of other pedagogical methods which appear to be designed to encourage students to interact with and learn from peers, apparently finding value in social learning. If educators had a better understanding of different pedagogies used to promote social learning, and how students might react to these teaching methods, perhaps MOOC instructors could rely on students to address individualized instruction needs of their peers. Social learning methods seem a perfect fit for MOOCs, offering a way of teaching online students which would not require educators to add resources as enrollment numbers scale into the tens or hundreds of thousands. I engaged in this research project to provide more information to educators about the nature of social learning methods available to MOOC educators, as well as to provide a look into student experiences. To answer the following research questions, I engaged in a two-phase research project:

1. What are the different methods employed in massive open online courses to promote student social learning and peer interaction?
2. What do students report about their experiences with social learning and peer interaction methods used in MOOCs?

- a. To what extent does student motivation to take a course influence students' reported experiences?
3. What learning outcomes or course-related benefits do students attribute to social learning experiences in MOOC environments?

The first phase of the research project addressed the first question. I enrolled in 267 MOOCs from eleven hosts; representing every course I could find and enroll in over a six-month research window. Enrolling in these courses granted me access to course data about how instructors attempted to use social learning methods in their courses. I examined pedagogy and attempted to explain the intentions of educators based on information from course websites. Through this phase of data collection, it became clear that platforms offered a variety of tools, which instructor sometimes used for social learning. I combined tools with how educators appeared to use the tools to define seven categories of social learning methods (Forums, Peer Assessments, Groups, Face-to-Face Meetings, Synchronous Communication, Social Media, and Social Presence).

I then placed methods from each category along a spectrum of social learning. Methods on the lowest end of the spectrum seemed to be less likely or less intent on promoting social learning; these methods represented the bulk of social learning findings from phase one. Social learning methods on the highest end of the spectrum were those which educators explicitly used to encourage or even necessitate student interaction to complete course activities. The data from phase one not only illustrated a broad view of social learning methods offered in MOOCs, the findings also guided my selection of sites and interview candidates in the second phase.

In the second phase of the research project, I selected courses which appeared to be most intent on promoting social learning. I selected four courses, each on a different platform

(Coursera, edX, FutureLearn, and NovoEd); each offered different social learning methods, though many used methods in overlapping categories. After briefly studying the first few weeks of content, I selected three or four students from each course who I felt likely to have the most experience with social learning methods: students appeared actively engaged in social learning methods and were nearly finished with their courses. Over the next month, I conducted virtual interviews (via Skype, Google Hangouts, or the phone) with thirteen students about their experiences. I asked questions specifically about how they experienced social learning methods and how different activities influenced their learning or other course-related outcomes. I based questions on specific conjectures of social constructivist learning.

Some findings from the second phase of the research project were surprising, most notably the interplay between motivation and social learning methods. I had expected students to report having strong reasons for taking the course, perhaps partially explaining why they would be active and nearly finished with their courses. I did not expect six of the thirteen students to report finding motivation from social connections they felt with other students in the course. Most frequently, students reported experiencing closeness from relationships made with other students working in small groups, which sometimes used synchronous communication and face-to-face meetings. Students tended to cite smaller scale and more synchronous communication as the source of social connections, but at least one student felt a kind of connection with the class through large discussion forums, perhaps because of the course content.

Forums, which most tended to describe as large and less personal than other social learning methods, did not appear to result in personal social connections. Students did report forums to be a useful means of communication and experienced improved learning outcomes, even without an available search tool. While forums appeared to be a viable means of

exchanging information, students tended to report richer experiences when using smaller scale social learning methods; with the exception of anonymous peer assessments.

The other methods discussed by students at a smaller scale (groups, synchronous communication, and face-to-face meetings) appeared to be much more likely to affect students' ability to connect with peers socially and often led to notable increases in student learning. Learning itself appeared to be difficult for some students explain. Students tended to describe positive outcomes from social learning experiences in terms of understanding other students' experiences or opinions. Yet, most did not define these experiences as learning; a word that most reserved for formal course materials, even from students who described finding value in social learning and peer interaction. The apparent absence of some students' ability to recognize social learning outcomes, together with a lack of explanation of many social learning methods by educators, suggested a few ways educators might improve social learning in MOOCs.

The findings suggest that even students stating an awareness of the value of social learning may lack an understanding of what outcomes they can expect. There may be many students who would benefit from an increased understanding of social learning: how to use different methods, and what benefits they might find. Additionally, while all MOOC platforms appeared to offer tools which instructors could offer to promote social learning, and many educators used them, few offered explanations or models of how students might learn from peers in their courses.

A good first step, and something relatively easy to accomplish, might be to increase student awareness of social learning, and instruct students on how and why to use social learning methods in MOOCs. If such knowledge became widespread, we could increase the learning, and perhaps motivation, of millions of students worldwide over the next decade. If students and

educators increase the understanding and use of social learning, we may witness a shift in the culture of MOOCs. A shifting culture among students and educators might also motivate instructors to design their courses around small groups, synchronous communication, and even face-to-face meetings. Though these methods might be difficult for some educators to incorporate into courses, the findings suggest that the benefits to learning might make these efforts worthwhile.

The dissertation of Andrew Jefferson Hill is approved.

M. Kevin Eagan

Noel Enyedy

Jonathan Furner

Robert A. Rhoads, Committee Chair

University of California, Los Angeles

2015

DEDICATION

I dedicate this dissertation to my wife Karla, who has lasted through many long and lonely weekends without her husband. This work is largely a part of the support you have given me over the past few years, and I would not be here without you. Thank you for supporting me, pushing me, and never letting me give up on myself.

TABLE OF CONTENTS

ABSTRACT OF THE DISSERTATION.....	ii
COMMITTEE PAGE.....	viii
DEDICATION.....	ix
TABLE OF CONTENTS.....	x
ACKNOWLEDGEMENTS.....	xiii
VITA.....	xiv
CHAPTER 1: INTRODUCTION.....	1
Background.....	6
The Problem and the Research Questions	11
Research Population.....	12
Research Method.....	13
Significance of the Study.....	14
CHAPTER 2: LITERATURE REVIEW.....	16
Definitions.....	17
History of Distance Education and Theories of Learning.....	17
The Debate about Efficacy of Online Learning.....	26
Communicating Online, Interaction, and Social Presence.....	28
Collaborative Learning Online.....	33
MOOC Course Design.....	36
CHAPTER 3: RESEARCH DESIGN.....	38
Research Questions.....	39
Research Design Overview.....	39
Phase One: Design.....	40
Phase One: Site Selection.....	42
Phase One: Data Collection.....	43
Phase One: Data Analysis.....	43
Phase Two: Design.....	44
Phase Two: Site Selection.....	45
Phase Two: Data Collection.....	45
Phase Two: Data Analysis.....	46
Trustworthiness and Authenticity.....	47

Ethical Issues.....	48
Summary.....	49
CHAPTER 4: FINDINGS.....	50
Phase One Findings: Overview.....	50
Phase One Findings: Seven Categories of Social Learning Methods.....	53
Finding #1: Forums.....	56
Finding #2: Peer Assessments.....	60
Finding #3: Groups.....	61
Finding #4: Face-to-Face Meetings.....	63
Finding #5: Synchronous Communication.....	64
Finding #6: Social Media.....	66
Finding #7: Social Presence.....	66
Phase Two Findings: Overview.....	69
Phase Two Findings: Four Selected Courses.....	70
Coursera Course.....	70
EdX Course.....	72
NovoEd Course.....	75
FutureLearn Course.....	76
Phase Two Findings: Experiences with Social Learning Methods.....	78
Finding #8: Motivation.....	83
Finding #9: Forums.....	86
Finding #10: Peer Assessment.....	89
Finding #11: Groups.....	91
Finding #12: Face-to-face Meetings.....	93
Finding #13: Synchronous Communication.....	95
Finding #14: Social Media.....	96
Finding #15: Social Presence.....	96
Summary of Findings.....	97
CHAPTER 5: DISCUSSION.....	103
Summary of the Research Project.....	104
Summary of the Findings.....	109
Recommendations for Instructors.....	119
Recommendation #1: Promote social learning values to students....	120
Recommendation #2: Explain use of social learning methods.....	120
Recommendation #3: Encourage use of social learning methods....	121
Recommendation #4: Model use of social learning methods.....	122
Recommendation #5: Allow students to explain peer assessment....	123
Recommendation #6: Promote synchronous and face-to-face.....	124
Recommendation #7: Incorporate small group work into courses...	125
Recommendation #8: Information exchange for social learning....	126

Recommendations for MOOC Providers.....	127
Recommendation #9: Share MOOC data.....	128
Recommendation #10: Provide training for MOOC instructors.....	129
Recommendation #11: Offer a variety of social learning tools.....	130
Recommendations for Educational Leaders.....	130
Recommendation #12: Increase the awareness of social learning....	131
Recommendation #13: Incorporate social learning early.....	131
Recommendation #14: Experiment with online learning.....	132
Recommendations for Social Learning Scholars and Theory.....	132
Recommendation #15: Investigate relationship of motivation.....	133
Limitations.....	134
Future Research.....	139
APPENDIX A: Electronic Request for Interview.....	144
APPENDIX B: Interview Protocol.....	145
APPENDIX C: Phase One Data Collection Worksheets.....	148
APPENDIX D: Phase One MOOC Host Social Learning Statements.....	148
REFERENCES.....	151

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VITA

1997-2000
Lab Manager, Interactive Learning Center
Science Library
University of California Irvine
Irvine, CA

2000
B.A., Japanese Language and Literature
University of California Irvine
Irvine, CA

2001-2005
Technology Curriculum Development Specialist
Paul Merage School of Business
University of California Irvine
Irvine, CA

2005
M.B.A.
University of California Irvine
Irvine, CA

2005-2012
Director of Instructional Computing
Paul Merage School of Business
University of California Irvine
Irvine, CA

2012- Current
Chief Information Officer,
Director of Computing and Network Services
School of Social Sciences
University of California Irvine
Irvine, CA

Chapter 1: Introduction

The massive open online course (MOOC) model is a relatively new phenomenon that offers free¹ courses taught over the internet by university professors to very large student enrollments. Even though most do not reward college credit for successful completion, MOOCs attract millions of students each year to enroll in a variety of courses. The fledgling MOOC environment leaves educators teaching classes with enrollments numbering in the thousands; some without an understanding of how they should teach in the new online environment. Many see teaching a MOOC as experimental, and as such, educators use a variety of techniques to increase student participation and learning (Toven-Lindsey, Rhoads, & Lozano, 2015). While educators have some quantitative data available about enrollment, participation, and learning outcomes, instructors may benefit from a deeper understanding of student learning in a massive online context.

MOOC providers, such as Coursera and edX each offer a unique (but overlapping) set of tools for teaching massive student audiences. However, individual courses sometimes use these tools in different ways, and sometimes use software or technologies that are not part of their provider's toolkit. Although instructors experiment with various ways to use teaching tools, information about individual courses is not regularly aggregated and disseminated, which could lead to duplication of efforts, and increase the likelihood that someone teaching a course may not be aware of techniques that could improve their students' learning. Educators might benefit from

¹ While most of the teaching and research community define MOOCs as being free, there are a small number of courses calling themselves "MOOCs" that charge a fee, still considering themselves "open" to any student (Rhoads, 2015).

a better idea of what instructors are doing to teach their courses and how specific techniques might translate into student learning experiences.

The MOOC model offers the potential to teach millions worldwide at a very small cost per student, but the same model is fraught with nascent issues that educators may not fully understand, let alone resolve. Because MOOC courses are freely available to anyone with a computer and an internet connection, courses sometimes consist of 100,000 or more enrolled students from any number of cultural backgrounds. MOOC enrollees range widely in background, interest, and motivation (Guo & Reinecke, 2014). A middle school student in a third world country might study right alongside a business professional with years of experience, or even an educator with a PhD in the course subject matter. The broad spectrum of students, coupled with massive course enrollments, presents a situation in which professors may have difficulty understanding how students experience some pedagogical methods.

Something that MOOC providers struggled with is encouraging and enabling student interaction in order to improve learning. McGuire (2013) noted that while serving as the editor of MOOC News and Reviews,² an online community devoted to reviewing and discussing MOOC-related news, students identified trouble using online forums as the primary problem with massive online courses. Students described difficulty adapting to forums, which often became flooded with a number of independent *threads* (online discussion topics), which made finding relevant discussions difficult. This sometimes led to multiple students posting similar questions in different threads, with answers lost among the sheer volume of conversations. Instructors also reported difficulty responding to the large volume of student communication; such relatively unregulated content may have even detracted from the quality of some courses (Wen, Yang, &

² <http://moocnewsandreviews.com>

Rosé, 2014). While MOOC discussion forums typically offer powerful tools for searching and sorting information, students may find their value limited (Bruff, Fisher, McEwen, & Smith, 2013); perhaps educators could help students learn by offering additional ways to communicate.

Many MOOC providers state the importance of learning that takes place through social interaction between students, frequently described as social constructivist learning (Palincsar, 1998) or social learning (Seely Brown & Adler, 2008) by the educational research community. Even more progressive, and what seems to have started the MOOC movement, was the notion of “connectivist” learning. Connectivists assert that modern, technologically enabled learning consists of connections made with other people and (often electronic) repositories of information (Siemens, 2005). This early MOOC model offered a means for students to interact with and learn from each other online, which set it apart from earlier attempts at massive online learning termed the open courseware (OCW) movement.

OCW participant universities, perhaps most famously MIT, placed their course materials online (primarily syllabi, but some audio, video, or other resources) to be freely available to anyone via the internet. A MOOC is different because it more closely mimics a university course. Instructors teach MOOCs over a set duration (typically several weeks), allowing educators to push students to study the same topics within a set window of time. MOOCs also add discussion forums: a means by which students can communicate with each other. While the MOOC model includes several steps forward from the previous OCW model, the ability for students to interact and learn socially from peers might be the most important (Bransford, Brown, & Cocking, 2000).

In most MOOC platforms, the online message forum is the primary tool offered for students to use to communicate with each other (Coetzee, Fox, Hearst, & Hartmann, 2014); this

could be problematic for instructors and students alike. Anyone enrolled in the course, regardless of background or motivation, can take part in any online conversation. This allows students to write opinions not based on course material, or just look for faults in other comments and attack them, something common in unregulated online communication (Suler, 2004). Because MOOCs typically have little resources to dedicate towards regulating or policing student comments, the malevolence of a few individuals could impede the effectiveness of discussion forums as communication and collaboration tools (Herring, Job-Sluder, Scheckler, & Barab, 2002; Press & Tripodi, 2014), and perhaps lower instructor morale (Wang & Baker, 2014).

Even in courses lacking malicious participants, instructors may have difficulty using forum tools to overcome the sheer volume of student comments. Instructors may have difficulty relying on forums alone to interact with or understand student reactions to teaching efforts. In some courses, MOOC platform staff or course teaching assistants are able to monitor message boards, but such solutions become increasingly costly as the size of enrollments increase. If MOOCs are to be successful in offering students the opportunity to learn socially, which some scholars find an important part of learning (Bransford et al., 2000; Palincsar, 1998), educators could benefit from an improved understanding of MOOC student experiences.

Some MOOC platforms are experimenting with different methods of encouraging interaction, such as: peer assessment, posting requirements, or small group work. Some instructors use tools outside of MOOC platforms, such as social media, to encourage interaction. However, there is little data published about how students view these efforts. There is a clear lack of understanding about student perceptions of peer interaction and social learning in MOOC environments. Educators, researchers, and MOOC course designers might benefit from a better understanding of the student experience and could perhaps use that knowledge to improve

learning outcomes for potentially millions of students worldwide. Educators would likely experience difficulty altering teaching methods to improve learning in MOOCs, without first understanding how students might experience different classroom social learning environments.

If educators are not able to teach well, and the MOOC model were to fail, institutions of higher learning may not suffer, but an opportunity to educate people worldwide could be lost. The number of universities affected is large and growing. A 2012 survey revealed that 2.6% of universities taught at least one MOOC (Allen & Seaman, 2013); by 2014 that number had increased to 8% (Allen & Seaman, 2015). A founding tenant of early MOOC platforms was that their courses were taught by highly qualified faculty with excellent reputations for teaching. There is little evidence to suggest that these faculty had the requisite skill and understanding to teach online to the unique student body that MOOCs typically attracted. This lack of understanding might have dire consequences, such as those seen in the course “Fundamentals of Online Education: Planning and Application” taught at Georgia Tech University, in which the entire course was postponed indefinitely.³

Whereas problems in a traditional college classroom may not represent important concerns to a university, even minor problems within a single MOOC led to large scale and widely publicized consequences. In addition to problems with the Georgia Tech course, a macroeconomics course at the University California Irvine drew media attention when the professor withdrew from teaching his course over reported disagreements about course instruction.⁴ This kind of problem in a traditional university course might affect the education of hundreds of students, but because this happened in a MOOC course, the disruption affected over

³ <http://chronicle.com/blogs/wiredcampus/georgia-tech-and-coursera-try-to-recover-from-mooc-stumble>

⁴ <http://latimesblogs.latimes.com/lanow/2013/02/uc-irvine-business-professor-stops-teaching-midway-in-online-coursera-class.html>

37,000 enrolled students. Because relatively small problems can cause such large consequences, it is imperative that educators and MOOC platforms resolve difficulties with their courses. If educators could more fully understand the nature of student experiences, they might have a higher likelihood of success. The lack of data about the student MOOC experience presents a barrier to improving MOOC education.

Background

While the MOOC model has only existed since 2008, the idea of free online education stemmed from the Open Educational Resources (OER) movement, which in the early 1990s sought to utilize the nascent worldwide web to host educational materials which educators, learners, and researchers could use and share freely (Rhoads, Berdan, & Toven-Lindsey, 2013). Later in 2001, MIT appeared in the news by being the first large university to join the Open Courseware (OCW) Movement (Rhoads et al., 2013). Open Courseware was an evolution of OER that packaged educational resources into classes that mirrored courses taught in the classroom. OER offered online course materials such as syllabi, homework, and links to additional materials, but rarely included audio or video recordings of lectures. The OCW model also offered no means for interaction between students or faculty, and did not track student progress.

While open courseware had been discussed in the academic community, widespread public awareness about massive free online education did not rise sharply until the fall of 2011, when Sebastian Thrun and Peter Norvig of Stanford University taught their artificial intelligence course online to 160,000 enrolled students from 190 countries (Markoff, 2011). Their course was different from the early open courseware initiatives, because faculty participated in teaching the

course in a way that mimicked classroom instruction as much as possible. The course instructors interacted with, and tracked the progress of participating students, even certifying those that completed the course (though without granting university credit).

Soon after the success of Thrun and Norvig's course, a handful of organizations began to explore mechanisms by which universities could teach online, without charging a fee, in a way that could scale to massive numbers of students from around the world. Thrun collaborated with venture capitalists and corporate partners to start Udacity; one of three teaching and hosting platforms that dominated the early MOOC landscape. While Udacity started as a platform for hosting MOOCs, they quickly abandoned the "open" model to become a for-profit company. Udacity did not advertise a specific pedagogy, but focused on two broad methods: use of short video clips to reduce passive listening durations, and the use of highly interactive course materials. Udacity espoused a mission of inexpensive higher education led by industry leaders and excellent instructors to encourage lifelong learning.⁵

MIT and Harvard used their experience from open courseware initiatives to join the MOOC movement by forming a University-level partnership called edX. After the University of California Berkeley and the University of Texas system joined the consortium, they began planning an "X University Consortium" of universities teaching on their edX platform, all of who shared challenges and successes to improve MOOC pedagogy.⁶ The edX consortium released its platform as open source software (available for others to freely use and build upon) and claimed to teach using pedagogies such as: self-paced learning, online message boards, and

⁵ Mission statements at <https://www.udacity.com/how-it-works> and <https://www.udacity.com/us>, accessed February 9, 2013.

⁶ EdX strategy outlined at <https://www.edx.org/faq>, accessed February 1, 2013.

collaborative learning. EdX stressed that their platform and pedagogy would constantly change to meet the needs of students.

Coursera, which quickly became the largest MOOC platform, was the product of two Stanford professors, Daphne Koller and Andrew Ng, who spearheaded a partnership between Stanford and the Universities of Michigan, Princeton, and Pennsylvania. By the start of 2014, Coursera had partnered with close to 100 universities from around the world, offering almost 600 courses with over 22 million enrollments.⁷ Coursera stated its courses utilized pedagogical methods that included retrieval learning through interactive exercises, per Karpicke and Roediger (2008), and mastery learning, as described by Bloom (1984).

What set the MOOC model apart from earlier OCW initiatives to teach on a massive scale was synchronousness, or what Norvig described as “the innovation of due dates.”⁸ The MOOC model time course instruction and learning activities to ensure that students would stay on roughly the same pace, typically setting a hard deadline for course completion and removing course content after a set time. By participating in course activities at a similar pace, students were likely to experience similar problems in understanding and or have similar questions about course materials. MOOC educators could then expect students to help their peers overcome shared difficulty through online forums. In this way, social learning may have been a goal of MOOC educators from the very beginning.

Unfortunately, the mere presence of large online forums, in which educators may have expected interaction to take place, did not always result in the majority of students communicating or learning together. Norvig and other MOOC educators described promoting student participation in course discussions, but few described methods of encouragement or

⁷ According to <https://www.coursera.org/about/community> accessed April 5, 2015.

⁸ http://www.ted.com/talks/peter_norvig_the_100_000_student_classroom.html

claimed to understand how students experienced these efforts. Without understanding how students experienced methods used to promote peer interaction in MOOCs, the education community was likely to encounter difficulty improving participation rates or social learning in their classrooms.

The idea of peers learning together was rooted in decades of research in learning theory and online education (Bransford et al., 2000; Palincsar, 1998; Swan, 2002). For example, one way that Coursera encouraged its students to learn from each other was through peer assessment activities, most frequently used in classes where a “right” answer to an open-ended question could not be determined without extremely costly software, tailored to each course (Glance, Forsey, & Riley, 2013). Coursera’s peer assessment model typically assigned a student to grade five other students’ work, while five other students, in turn, graded their work; the average score (less adjustments to account for outliers or other anomalies) became that student’s grade on an assignment (Piech et al., 2013).

Utilization of peer assessment could only have been successful if the assessments were reliable. Coursera worked closely with the Stanford Human Computer Interface group to research validity of peer assessments. Their findings suggested that reliability was a function of the quality of grading rubric offered to students and regarded rubric creation as the biggest challenge to online peer assessments (Kulkarni & Klemmer, 2012). In addition to the contribution towards assessment, there may have been value in the process of peer-evaluation, because students who examined each other’s answers tended to show increased understanding about the subject matter, and gained insights into their own metacognition (Sadler & Good, 2006).

Metacognition, as described in Flavell's seminal work on the subject, was the degree to which a learner could understand their own learning process (1979). Metacognitive knowledge differed between individuals and reflected many factors that influenced one's own learning. Increases in metacognitive ability appeared to improve learning, even well into the future (Ford, Smith, Weissbein, Gully, & Salas, 1998). Metacognitive ability also appeared to correlate with improvements in group projects (Goos, Galbraith, & Renshaw, 2002), suggesting peer assessments may have been useful for online courses with group assignments. Peer assessment appeared to offer more than accurate summative assessments, because students involved may have also found an increased understanding of their own learning.

Like peer assessments, collaborative and small group work also appeared to be a promising fit for MOOCs. Collaborative and group work presented a potential means to overcome a fundamental teaching conundrum present in the MOOC model: a single instructor could not effectively reach students individually to personalize instruction, as they might in a traditional classroom (Xu & Jaggars, 2014). Methods of instruction and course design that allowed peers to learn from each other, seemed an ideal way to help instructors meet the needs of massive student enrollments. Social constructivist scholars argue that learning takes place precisely in that way, by constructing meaning through peer interaction (Palincsar, 1998). While some students appeared to be struggling to learn from peers through discussion forums, perhaps group work, peer assessments, or other methods may have improved their learning experiences in MOOCs.

Some used the term "social learning" to describe the many theories about how or why students learn from each other through social interaction (Seely Brown & Adler, 2008). In addition to learning theories, MOOC providers were also clearly paying attention to research in

online education conducted at a smaller scale. There was a great deal of quantitative research examining variables positively correlated with success in online courses. Although success in these studies was typically defined by student self-assessment or course satisfaction, the data resoundingly reported that increased rates of interaction were tied to better learning experiences for students in online courses (Arbaugh, 2005; Eom, Wen, & Ashill, 2006; Kim, Kwon, & Cho, 2011; Peltier, Drago, & Schibrowsky, 2003).

The Problem and the Research Questions

MOOC educators teaching in massive virtual classrooms were likely to have experienced difficulty understanding a massive, diverse student body in an online environment. While educators were aware that MOOC student communities differed in size, background and learning objectives from traditional university courses (DeBoer et al., 2013; DeBoer, Ho, Stump, & Breslow, 2014; Guo & Reinecke, 2014), they were unlikely to understand MOOC students well enough to employ a pedagogy that could replicate learning happening in face-to-face courses (Xu & Jaggars, 2014). A first step towards creating MOOCs meeting standards of traditional classroom learning, may have been through finding ways to personalize instruction. While student enrollment numbers were typically far too large to allow an instructor to interact with many students personally, students might have assisted with instruction if they were motivated to interact with peers online. While instructors have experimented with methods to encourage social learning in MOOCs, there was a scarcity of data available to educators about how students experienced these efforts. This research project addressed the following research questions, by first identifying a range of social learning methods employed in different MOOCs, and then gathering data from students about how they experienced some of these methods:

4. What are the different methods employed in massive open online courses to promote student social learning and peer interaction?
5. What do students report about their experiences with social learning and peer interaction methods used in MOOCs?
 - a. To what extent does student motivation to take a course influence students' reported experiences?
6. What learning outcomes or course-related benefits do students attribute to social learning experiences in MOOC environments?

Research Population

During the first phase of this research project, I examined the stated and implemented pedagogical techniques used to teach every MOOC I could find, actively teaching courses at the postsecondary level during a six-month window. I focused on one platform at a time, making my way through each course on that platform before moving to the next. During that time, I gathered data from 267 MOOCs on 11 different platforms. During the second phase of the research project, I purposefully selected four different courses, to study the experiences of students through the lens of social constructivist learning theory. I chose each course using criteria generated inductively during the first stage of research. I selected courses which were not only likely to yield a student population attempting to use social learning methods, but also courses offering a breadth of the methods discovered during the first phase.

Research Method

I approached this research project using a sequential two-stage exploratory strategy (Creswell, 2013) for two equally important reasons. The first stage of the research not only answered the first research question, but also guided the second stage of the research. The findings of the first phase illuminated a variety of contexts for social learning existing in MOOCs, which I used to select sites and interview candidates likely to yield rich data about student experiences.

During the first phase of this study, I used qualitative methods to gather and categorize data about the variety of methods used to promote student interaction across a broad number of courses and MOOC platforms. I then explained different social learning methods, and categorized them using open coding techniques (Merriam, 2009). I next ranked individual methods within each category along a spectrum of social learning. Methods fell on the spectrum based on how educators appeared to promote peer interaction; methods highest on the spectrum appeared most intent on social learning. The first phase findings were instrumental in the site selection for the second phase of this research, in which I selected courses using methods highest on the social learning spectrum.

I chose to use qualitative methods during the second phase of the research project, because quantitative methods may not have provided enough depth to understand the student experiences well enough to answer the second and third research questions. In phase two, I conducted interviews of students participating in selected courses, using Skype, Google Hangouts, or the telephone. I chose to gather data through interviews, because I sought a better understanding of how MOOC students interpreted and made sense of their experiences within the context of a variety of social learning spaces. By interviewing multiple students in each

selected course, I hoped to discover how different online learners offered varying or similar interpretations of social learning methods in a particular context. Given the relative newness of MOOC learning environments, qualitative research methods offered a particularly useful means for understanding how students experienced different social learning methods.

Significance of the Study

This study offered insight into how students experienced social learning techniques in the context of their MOOCs. I hoped that by bringing the results of this research to light, anyone involved in teaching or designing a MOOC may have had more information to work with, so that student populations around the world might have experienced improvements in the social aspects of learning. Because MOOCs operated on such a large scale, even minor improvements to courses offered potentially large increases in learning around the world. If students identified and educators adopted pedagogies found useful to learning in MOOCs, the findings from this study could have positively affected the learning of hundreds of thousands of students over the next decade.

While there was not as much research about the new MOOC model as other types of distance education, there was a growing interest in this kind of education, some of which may have been spawned by a \$400,000 investment in research made by the Bill and Melinda Gates Foundation.⁹ In addition, there was a very active online blogging community concerned with MOOC issues. By releasing the findings from this research project to that community, I hoped useful information about social learning methods might reach those who taught in MOOC environments. It was likely that others teaching MOOCs would find value in any research that

⁹ For more information, see <http://www.moocresearch.com/research-initiative/about>

could have improved their courses and might have been willing to alter their teaching. Repeated use of identified social learning methods may have helped educators determine effective pedagogies for teaching massive online audiences. Ideas generated from this research may also have offered MOOC hosts insight into potentially useful changes they could have made to their platforms, which could have improved the education of their millions of students. Finally, it was my hope that the findings from this dissertation spark further research about the best ways to teach online students on a massive scale.

Chapter 2: Literature Review

A number of educational researchers have long believed that a significant part of learning takes place in a social context (Bransford et al., 2000). When applied to a massive online setting, where instructors lacked the resources to interact with individual students, a well-designed course emphasizing social learning may have enabled students themselves to take the brunt of teaching at an individual level. One problem was to find a way to structure and teach a course so that students would find it useful or even necessary to interact with each other online. Most MOOCs used large online discussion forums to allow student communication. While discussion forums may have been useful and a powerful means of aggregating and searching for peer-generated information, this method might not have been an ideal way for students to learn socially.

This chapter discussed the research literature supporting a need for social learning in massive online courses. I started by explaining massive open online courses and how they emerged from broader trends of online and distance learning. As the delivery of distance education evolved over time, so did theories about how people learn. The intersection of communication technologies and learning theory were the heart of this research project. Understanding the evolution of these two factors, especially as they relate to each other, was necessary to understand the importance of this study, as well as the language I used to discuss the findings. I also reviewed the literature about interaction, which lies at the heart of social learning theory, and discussed the limits of online communication which impeded students' ability to learn from each other. Finally, I discussed the application of group learning literature to online courses.

Definitions

Distance Education – Distance education is formal education which takes place between an instructor and student separated by some physical distance. Instructors and students do not communicate in person, instead using alternative media, such as television, radio, or the Internet. Distance education is typically categorized by the medium of communication used (e.g. telecourse, correspondence course, online course).

Online Learning – Online learning is a subcategory of distance education, in which learning takes place over the internet. The research community may use terms like “computer-based learning” or “e-learning” interchangeably with online learning.

Asynchronous/synchronous communication – Synchronous communication is communication where all parties are able to communicate at the same time, such as in a face-to-face or telephone conversation, or electronically via online chat. Asynchronous communication does not take occur the same time; for example, communication through email or online message boards.

History of Distance Education and Theories of Learning

In order to understand the meaning and importance of social learning, it was important to understand how learning theories have evolved over the past hundred years. To understand MOOCs – what they were and why they existed, it was necessary to understand the history of online education. Examining these two phenomena, particularly how they related to each other, illustrated the importance of social learning in MOOC environments. Understanding the intersection of technology and distance learning also may have revealed a historical pattern of educational practice lagging behind theory.

While the MOOC moniker has only been widely recognized for a few years (Haber, 2014; Rhoads, 2015), the concept of distance education fits firmly in a long history of education that stretches back into the 1800s. Early implementations took the form of correspondence courses that offered a means by which students could enroll in and take classes, even if they were far from one of the (relatively few, at the time) colleges and universities in the country. The first correspondence courses were only possible in the United States because of improvements to infrastructure and technology: namely the postal service, that allowed for inexpensive and reliable written communication between student and teacher (Moore & Kearsley, 2011).

After correspondence courses set the stage, educators used improvements to communication technologies to improve their ability to communicate with students. With the advent of radio and later television, educators were able to transmit content to larger numbers of students. Students were unable to use these media to communicate with instructors; their communication took place via written essays or answers to test questions transmitted through the mail. These early advances in communication technology that allowed one-way communication on a large scale meshed well with early theories of learning and education.

Educators at the time largely held an objectivist view of learning: knowledge was a static and definable thing that instructors possessed and could transmit to students. If a teacher knew how to add, for example, she could pass that ability or knowledge to a student through instruction. This theory worked, because much of the early educational impetus was based around teaching reading, writing and mathematics, with little emphasis on students' ability to think for themselves or clearly communicate their ideas (Bransford et al., 2000). The objectivist theory of knowledge was rooted in empirical ontological beliefs, which dominated scientific thinking in the early twentieth century.

Empiricists believed that truth was concrete, definable, and measurable through observation. Empiricist ontological beliefs complemented the prevailing psychological theory of behaviorism, which described any human action as a response to stimulus; all actions being predicated upon past stimuli (Watson, 1913). Psychologists discovered that they could use stimuli to condition people to behave in different ways. A well-known example of this principle was a result of experiments carried out by Pavlov (1927) in which dogs were given food after hearing a bell, which conditioned them to respond to the bell by salivating; their bodies reacting to an expectation of food.

Empiricist ontology and behaviorist psychological theory played a large role in how educators perceived learning during the early twentieth century. Using these theories, teaching was viewed as a kind of stimulus, which could alter future behavior of students in ways that were measurable (Thorndike, 1906). For example, a student with no training in arithmetic might respond to a stimulus of “what is four plus four” with an answer of “I don’t know.” A teacher, through the stimulus of instruction, could change the future of a student’s response to the same question with the correct answer of “eight.”

This paradigm of learning was a natural fit for the media of communication used by correspondence courses, whether by mail, radio, or television, and persisted in much of the online education to follow. Teachers were able to assess this type of learning with relative ease, because the answers to questions were relatively concrete; the accurate recounting of facts or methods was clearly discernable. Teaching did not remain this simple, particularly as both the needs of learners and theories of learning changed over the last half of the 20th century.

Learning theory evolved with scientific thinking, leading scholars to seek an explanation of cognitive processes involved in learning. Cognitive theorists explained learning and as a series

of inputs, which were stored in human memory that would lead to future outputs. While similar in this regard to behaviorism, cognitive theory shifted from a strictly empirical belief of knowledge to include the influence of the learner, or at least some construct of a complex mental state beyond some culmination of prior stimuli. Tolman (1932) argued that behavior was influenced by internal volition, which could not be explained merely through past stimuli, but included goals unique to each individual learner. Educational theories followed suit, with educators paying closer attention to the construction of knowledge inside the mind of the learner (Piaget, 1952; Vygotskiĭ, 1978).

The late twentieth century gave rise to new ideas for many educational researchers, who began to shift from objectivist towards constructivist epistemologies (Jonassen, 1991); constructivist theory held that learners constructed knowledge and defined meaning individually in their minds by combining new stimuli with previous experiences (Biggs, 1993). Constructivist thinkers typically contrasted their theories with objectivist views about learning (Driscoll, 2005); rather than defining knowledge as some fixed thing that a teacher held and could transfer to students, constructivists described learners as active participants in the process of knowledge creation. Constructivist theory proposed that instead of consuming knowledge or obtaining skills, learners made sense of new knowledge by how it would affirm or conflict with past learning experiences. On the surface, this concept of learning may not have seemed to have a significant operational impact on distance education. A teacher continued to transmit new information to students; the difference appeared in how student learned: by constructing meaning from a conflicting or reaffirming combination of past and new knowledge.

The constructivist concept of learning may have become problematic when considering assessment of that learning. If learning is something unique to an individual mind, individuals

could have had a somewhat different understanding of various facts or their relevance. In addition, if education was a construction of knowledge rather than a retention of facts, traditional assessment methods may not have accurately reflected learning. The research community categorized the two types of learning broadly as “surface” and “deep” learning, based on the work of Marton and Säljö (1976), who defined surface learning as the rote memorization of facts, whereas deep learning was a greater understanding of content and how to apply it to the completion of other tasks.

Perhaps resistance to altering pedagogy to follow constructivist learning theory was due in part to the difficulty of accurately assessing deep learning. When educators adjusted their practices to fit constructivist learning theories, they often found traditional assessment methods inadequate, yet difficult to change. Speck (2002) observes that traditional methods of assessment persist, because they are easily quantifiable and fulfill a societal expectation for certainty and ranking. In addition to considerations about assessment, constructivism began to affect how educators saw their role in the learning process.

Whereas traditional teaching took the form of direct instruction, with teachers carefully controlling what happened in the classroom to ensure student retention of material (Baumann, 1988), constructivists saw the need to assist learners in using past experiences to construct new knowledge. Teachers started to view themselves more as facilitators of knowledge creation rather the sole means for knowledge transmission (Jonassen, 1991). Constructivist research, seeking an understanding of the complex internal constructs that learners engage in during meaning making, soon turned to social and cultural aspects of individual learners (Cobb & Yackel, 1996; Palincsar, 1998).

Social constructivist theory viewed learning as a form of meaning making much like constructivism, but stressed the importance interaction with others, including peers. The theory that learning contained a social aspect and learners made use of others when constructing knowledge was not new, but had been written about for many years (Dewey, 1909; Vygotskiĭ, 1978). According to social constructivist theory, learning was profoundly affected by social discourse, including the language and cultural symbolism used during communication (Palincsar, 1998). New learning theories, though they offered pedagogical implications, failed to make an impact on the evolving field of distance education until advances in information and communication technologies matured to make it easy for learners to communicate with each other electronically. As learners became increasingly accustomed to communicating electronically, the stage was set for the emergence of a new learning theory: connectivism.

Connectivism built upon social constructivism, but defined learning as taking place in a world in which people are connected to sources of knowledge through vast worldwide computer networks (Siemens, 2005). Connectivist theory described learning as the development of a network of connections to knowledge resources, including other people, as well as online repositories of data. The learning goals of connectivists were to construct knowledge and provide a means for lifelong learning through the development of networked sources of knowledge. The connectivist theory, however, did not address the quality of individual sources of knowledge networks, which could have led to inaccurate or suboptimal networks.

Without qualifying the accuracy of their sources, a connectivist learner relying upon a weak knowledge network might not have learned very well at all, and may have had difficulty evaluating the quality of what they had learned. While connectivist principles appeared to be a natural fit for the nascent interconnected world, I chose not to use connectivist learning theory as

the basis for evaluating data in this research project. Connectivist learning theory may not have placed sufficient emphasis on the quality of individual knowledge to stand up to scrutiny (Rhoads, 2015).

There are aspects of constructivism which dovetail with other learning theories. For example, a successful connectivist learner takes control of her own learning to address her precise needs. Taking control of one's own learning in this fashion had been a focal point of the study of andragogy, or adult learning (Merriam, 2001) for much of the twentieth century, and provides another lens for studying learning in massive online environments (Beaven, Hauck, Comas-Quinn, Lewis, & de los Arcos, 2014). The study of adult learning is not only important because of the intersection with connectivist theory, but also because it serves as a foundation for later learning theories (Blaschke, 2012).

The first modern theoretical underpinnings about the difference between children and adult learners were based on motivations for learning (Lindeman, 1926). Lindeman (1926) and later Knowles (1980) theorized that adults learners were different from children because adults were more independent and thus tended to guide their own learning. In addition, the theory of andragogy states that adult learners are practical learners who seek knowledge that will be of immediate benefit to them in their lives. Early andragogy theory stated that children's learning was different in two main respects: children required guidance to learn, and were content to learn things not useful to them until later in life. Another important piece of adult learning theory is the importance of life experience which adults utilize for learning (Knowles, 1980; Merriam, 2001). Making use of prior experience in learning is precisely what constructivists believe about learning.

While Lindeman strictly delineated child and adult learning as different in purpose, use, and motivation, it was Knowles (1975, 1980) who most famously described the differences between child and adult learning as a process, rather than a dichotomous variable (Mezirow, 1991). Children do not become adults overnight and a learner of any age can fall somewhere along the spectrum between different aspects of child and adult learning. Knowles wrote that andragogy, a term referring to the teaching of adults, was something for educators to consider, no matter what the age of the learner (1980). The job of teaching is, at least in part, to aid the learner in moving along the scale from child to adult learning; to push learners to use their experiences, motivate themselves, and obtain knowledge with practical benefits to eventually become “self-directed learners” (Knowles, 1980; Merriam, 2001).

Educators practicing early forms of distance learning based on behaviorist beliefs primarily utilized the pedagogical model of direct instruction, and many are likely to continue those practices. However new opportunities emerged for learners who Knowles would have described as being farther along the scale of independence towards self-directed learning. Some educators began to offer resources for self-directed learners, suggesting a goal of education might be to focus on developing the skills of a learner, rather than on finding ways to teaching better (Hase & Kenyon, 2000). Self-directed learners have been able to access libraries and other materials to learn a wide variety of subjects for many years, but it was not until the open courseware movement that learners from anywhere around the world could see how to focus their studies to mimic courses taught at highly selective institutions (Goldberg, 2001). The open courseware model is an extension of classroom learning, where faculty offer the syllabi and other instructional materials from traditional courses freely to anyone over the internet. The open courseware model marks a striking improvement for self-directed learners, because someone

interested in a subject can find some direction as to what to study by following a course of study taught by an expert in the field.

For a learner not as far along the scale towards being a self-directed learner, however, open courseware might not be enough to help students everywhere to educate themselves. The advent of massive open online courses (MOOCs) opens the door for more direction, and even the ability to interact with other learners seeking the same knowledge. In a MOOC, self-directed learners are able to receive direct instruction from faculty in a manner similar to that given to students in a classroom, usually through short video recordings of lectures. In addition, students can learn from each other through text-based conversations on message boards, satisfying learning as described by social constructivists.

A question remains about whether students are actually learning socially in MOOC environments, or are instead acting as connectivist or self-directed learners. Instructors of MOOCs endeavor to teach classes of tens and even hundreds of thousands of students, which makes any semblance of personal attention towards individual students highly implausible. Assuming that many learners are at different points on the spectrum between dependent and independent, as adult learning theorists suggest (Merriam, 2001), learners may benefit from assistance in the process of becoming self-directed learners. Because receiving this assistance from an instructor in a MOOC is unlikely, learners can only look to the experiences of peers to assist each other in the growth towards self-directed learning.

The question about whether MOOC courses adhere to connectivist principles has spawned a bifurcation in the classification of MOOCs, such that one is classified either an “xMOOC” or a “cMOOC.” Scholars refer to xMOOCs as those that adhere to principles more in line with direct instruction, while the term “cMOOC” describes MOOCs designed and taught

with connectivist principles (Smith & Eng, 2013). Though cMOOCs seem to adhere to a more modern understanding of how students (particularly adult students) learn, and place emphasis on emerging forms of internet communication, they make up a very small percentage of MOOCs; in fact, most equate the unmodified term “MOOC” with “xMOOC.”

In a cMOOC, educators stress the need for students to create their own personal learning networks, with each person taking part in aggregation, relation, creation, and sharing activities (Kop, 2011). Both styles of MOOC continue to be experimental, with a small percentage of students finishing entire courses and earning certificates of completion. Critics raise questions about the value and effectiveness of MOOCs, typically citing low completion rates (Perna, 2014) or poor learning outcomes (DeBoer et al., 2014). Criticism is certainly not new to the MOOC model; educators have debated online learning from the early 1990s.

The Debate about Efficacy of Online Learning

A majority of the research about online learning attempts to validate or disparage the practice of education in online formats. The most common method of evaluating online education is to compare learning online to classroom instruction. The debate most often finds authors on one side or the other of a theory that Clark (1983) termed the “no significant difference phenomenon” of distance education. Clark and the findings of hundreds of others indicate that the communication media used to teach has no statistically significant correlation with instruction, regardless of whether teaching occurs via mail, television, internet, or in person (Russell, 1999; Zhao, Lei, Yan, Lai, & Tan, 2005). While a majority of the research comparing distance and classroom education is consistent with the findings of Clark (Russell, 1999), there are many who disagree and some who even question the methods and sampling techniques of

studies supporting the no significant difference phenomenon (Bernard et al., 2004; Phipps & Merisotis, 1999).

Selective institutions and organizations hoping to see online learning succeed, may further cloud the discussion. A meta-analysis by the U.S. Department of Education (DOE) found “students in online conditions performed modestly better, on average, than those learning the same material through traditional face-to-face instruction” (Means, Toyama, Murphy, Bakia, & Jones, 2010, p. xiv). However when scholars from the Columbia University Community College Research Center reviewed the data used in the DOE analysis, they found that the recommendations did not hold true for courses that took place entirely online or for courses lasting an entire quarter or semester, questioning the generalizability of their results (Jaggars & Bailey, 2010).

Another group praising online learning is the Distance Education and Training Council (DETC), a distance learning accreditation organization recognized by the U.S. Department of Education and the Council for Higher Education Accreditation. The DETC made a bold claim that they did not support with evidence: “All of the research published since 1920 has indicated that correspondence/distance study students perform just as well as, and in most cases better than, their classroom counterparts (<http://www.detc.org/frequentlyQust.html>).” Even a cursory examination of the literature about online learning outcomes challenges the veracity of their claim. An extensive review of the literature by scholars at Michigan State University discovered that of 51 articles reviewed, “about two thirds of the studies show that distance education produced better student outcomes than face-to-face education while the other third showed the opposite (Zhao et al., 2005, p. 28)”; clearly claims by the DETC are difficult to accept.

While the debate over efficacy of online learning continues, much of the discussion about differences between online and classroom education focus on the use of technology for instruction. The use of computers and technology for teaching, what researchers refer to as Information and Communication Technology (ICT), describe many of these issues. While most educators agree that computer use is an important tool for education, they often view ICT systems as unsuccessful because instructors lack training in the use of particular systems (Bingimlas, 2009). In online learning systems, use of computer technology becomes even more complex, being used as the sole means of communication.

Communicating Online, Interaction, and Social Presence

When faculty and students communicate in the classroom, they do so naturally, as they have done their entire lives. However, in an online learning environment there is a medium between them: a computer connected to the Internet. As soon as computers were used for communication, researchers began to consider the inherent differences between computer-based and face-to-face communication (Bordia, 1997; Williams, 1977). Media richness theory (MRT), described in the seminal article by Daft and Lengel (1984) provides a useful lens for evaluating differences in communication media and is often applied to online environments (Otondo, Van Scotter, Allen, & Palvia, 2008). MRT states that communication media exists on a scale from lean media, such as numbers written down on a page, to rich media, such as face-to-face communication. Communication can consist of more than words, and often depends upon a person's ability to express and comprehend more subtle, often non-verbal, forms of expression.

Face-to-face communication, which is at the richest end of the scale, allows people to convey additional meaning through tone of voice, facial expressions, and body language. During

communication, media that falls closer to the lean side of the spectrum creates gaps where involved parties lose communicative subtleties. This frequently results in more challenges to comprehension. A conversation over the telephone, for example, would retain inflection and tone of voice found in a face-to-face conversation and may fall towards the rich side of the spectrum, but the lack of facial expressions and body language found in a face-to-face conversation may result in communication failures (Daft & Lengel, 1984).

Media richness, aside from being indicative of communication quality, is also positively associated with student satisfaction and learning outcomes (Liu, Liao, & Pratt, 2009).

Asynchronous text-based communication, such as that found in the majority of online discussions, is among the leanest form of communication media, which suggests that a majority of online learning environments contain an inherent barrier to communication. Researchers also frame studies of communication in online learning environments in terms of interaction.

Interaction is important, because it represents a foundation for learning. From the time of early childhood well into adulthood, increased interaction with others and with the world leads to increased cognitive function in the brain and contributes to learning in school (Bransford et al., 2000). In the formal classroom setting, Moore (1989) writes that interaction occurs in one of three ways: student-teacher interaction, student-student interaction, and the interaction between student and course materials.

It is no wonder then that Meyer (2002), in her book examining aspects contributing to quality in distance education, posits “quality learning is largely the result of ample interaction with the faculty, other students, and content (p. vii).” Research has long supported the theory that increased interaction rates in online courses are strongly associated with improved learning

outcomes and student satisfaction (Arbaugh, 2005; Eom et al., 2006; Kim et al., 2011; Peltier et al., 2003).

While much of the research about online learning recognizes interaction and collaboration as components that contribute to student learning, research commonly stops at simply recommending faculty create an environment conducive to student interaction (Curtis & Lawson, 2001; Maor, 2003; Sun, Tsai, Finger, Chen, & Yeh, 2008; Swan, 2002). If interaction is critical to learning, and especially problematic in online courses, interaction should be an important consideration of online educators.

Following the turn of the 21st century, online learning interaction researchers have further split Moore's (1989) student-student interaction into two categories: cognitive and social; finding both to be essential elements worth consideration (Kreijns, Kirschner, & Jochems, 2003). The difference between social and cognitive interaction is straightforward. Cognitive interaction occurs during the course of student discussion about course materials, content, or contributions to group assignments. Students tend to interact cognitively while performing tasks related to learning. Social interaction, on the other hand, is less formal communication that occurs outside the scope of required coursework. By interacting socially and becoming better acquainted, students are more likely to overcome the psychological (perceived) distance inherent in text-based communication and increase the feeling of community (Tu & McIsaac, 2002).

While reviewing literature about the lack of social interaction found in online postsecondary courses, Kreijns et al. (2003) suggests that educators often mistakenly equate potential social interaction with actual social interaction online; assuming that social interaction is taking place, merely because it can take place. In addition, they found that educators

commonly failed to distinguish between social and cognitive interaction and did not recognize the importance of both types of communication.

Kreijns et al. (2003) identified three categorical approaches to improving interaction online: cognitive, direct, and conceptual. Cognitive approaches are aimed at encouraging “epistemic fluency” by assigning tasks which required students to understand and express the epistemic perspectives of themselves and those in their groups (Kreijns et al., 2003, p. 338). The direct approach to encouraging interaction in online courses focuses on tasks requiring group work like jigsaw activities: a pedagogical strategy involving groups of students learning different concepts, and then changing group members so each student could teach and learn from new group members.¹⁰

The conceptual approach is the most complex of the three and depends largely on the unique learning conditions predicated by different course content. Educators using a conceptual approach, tailor activities and task requirements in a way that promote and even enforce collaboration. In these assignments, students are unable to succeed without input from other group members, yet remain individually accountable for their work (Kreijns et al., 2003).

Before considering how to encourage students to interact online in a MOOC course, whether it be socially or cognitively, it would be useful first to understand precisely what it was about group interaction that contributes to learning. Fortunately, there is a great deal of research literature about functioning and learning in groups. Many scholars refer to the pursuit of inquiry as a kind of learning that requires dialogue (Dewey, 1938; Garrison, Anderson, & Archer, 2000; Lipman, 2003).

¹⁰ For more details see *Cooperation in the classroom: The jigsaw method* (2011) by Aronson & Patnoe

Lipman (2003) calls the kind of group interaction responsible for learning, a *Community of Inquiry* and suggests that learning happens through dialogue that creates a disequilibrium, resulting from a clash between knowledge learned a priori with knowledge learned from others in the classroom. He wrote, “one cannot help thinking of the analogy with walking, where you move forward by constantly throwing yourself off balance...in a dialogue, each argument evokes a counterargument that pushes itself beyond the other and pushes the other beyond itself” (Lipman, 2003, p. 87). This description of inquiry mirrors social constructivist principles, because dialogue is a necessary means of pushing students from currently held beliefs towards the construction of new meaning.

Some researchers examined the text-based communication of their online classes to find evidence of Lipman’s (2003) definition of inquiry (Garrison, 1993; Garrison et al., 2000; Rourke, Anderson, Garrison, & Archer, 1999). In doing so, researchers formulated a construct they also call Community of Inquiry (COI), and applied it to online courses (Garrison et al., 2000). Their later research efforts attempted to find textual elements, such as key words or phrases, that were indicative of the various elements of their COI construct and attempted to validate their findings through additional research (Garrison, Anderson, & Archer, 2010).

The COI framework is a construct comprised of three distinct types of presence: social, cognitive, and teaching. Presence, as defined in the seminal work by Lombard and Ditton (1997) is “the perceptual illusion of nonmediation” such that the communication taking place is perceived as being equivalent to communication without that medium. In this sense, presence occurs naturally in a face-to-face dialogue, because speakers communicate without considering the nature of their communication medium (speaking), but instead merely focus on the content of communication. Presence occurring online, is defined as the degree to which members of a

community interact without perceiving their medium (e.g. an email) as intruding on their ability to communicate effectively. In this way, being present in an online environment signifies an ideal state of interaction. It is therefore possible to describe the Community of Inquiry framework as a sense of interaction within a community of learners on cognitive and social levels, in which they do not perceive the computer as impeding communication.

Collaborative Learning Online

While Community of Inquiry theory offers a way of explaining what learning looks like in online courses, the research is descriptive rather than prescriptive (Garrison et al., 2010). Other scholars may agree with Brown, Collins, and Duguid (1989) that learning in groups might best be achieved through collaborative learning. Collaborative learning is different from cooperative learning. Dillenbourg, Baker, Blaye, and O'Malley (1995) define cooperative learning as an activity in which multiple students each conduct individual tasks as part of a larger learning project, whereas collaborative learning involves the exchange of ideas, challenges, and conversation that can lead to mutual understanding and problem solving.

Collaborative learning research has shifted over the years to study groups as the unit of analysis, rather than individual students, defining students instead as cognitive pieces of a learning network (Dillenbourg et al., 1995). This is precisely how Siemens (2005) describes learners, as each individual is thought to contribute past knowledge and understanding as well as gather knowledge from others through discourse. Indeed, there seems to be agreement between collaborative learning research, social constructivism, and connectivism about the role of learners in learning groups. A branch of collaborative learning research that deals specifically

with the use of technology to aid collaboration emerged, called Computer Supported Collaborative Learning (CSCL).

CSCL is the study of how computer use supported collaborative learning. While this area of research studies education broadly, including education of children and adults, online and in person (Stahl, Koschmann, & Suthers, 2006), it has important implications for online learning and the design of massive open online courses. An area of CSCL research concerning the design of situations, environments, and artifacts which enhance learning through collaboration (Resta & Laferrière, 2007; Stahl et al., 2006) may offer useful design elements for collaborative MOOC learning environments.

CSCL research offers evidence that students involved in collaborative, task-oriented learning activities are more likely to develop deeper understanding of materials, be more satisfied, and perform better as a group than individually in online courses (Resta & Laferrière, 2007). This research may influence educators designing online courses towards task-oriented group work, because it appears to be an effective way of ensuring peer interaction and improving learning outcomes of students.

The needs and performance of students in online environments vary with different student characteristics, suggesting online learning educators and course designers could benefit from an improved understanding of their students (Resta & Laferrière, 2007). It is difficult to imagine how a single instructor could understand much about every student in a massive online course, which typically attracts thousands of students from varying backgrounds, cultures, languages, and abilities (Guo & Reinecke, 2014). The effort to understand and organize students is likely to grow less feasible as student enrollment numbers increase.

The research examined so far in this chapter clearly indicates not only the importance and potential efficacy of social learning online, but also informs educators that they should carefully construct online environments and develop learning tasks that fully utilize social aspects of learning (Kop, 2011). Direct instruction appears to translate rather easily to a massive online format, but interaction and group inquiry activities seem more critical to promoting deeper forms of student learning. Educators might also design problem-solving activities to encourage peer interaction and collaboration, to help alleviate the difficulty providing personalized instruction to MOOC students. From the research, it appears MOOCs could be an ideal setting for collaborative learning. Educators may be able to use large numbers of students to shoulder some the burden of individual-level instruction that would otherwise be implausible with massive student audiences.

Though MOOC educators face unique challenges, attempting to design an effective course with the proper alignment of technology and pedagogy is not a new problem, but is rooted in a decades-old problem of Instructional Design and Technology (IDT), where researchers tend to view learning systematically (Reiser, 2001a, 2001b). The IDT research relevant to online education addresses the principle issues of how to design, implement, and evaluate processes and situations to improve learning. If a course based on task-oriented group collaboration offers a way to improve learning in massive online courses, as the literature discussed to this point suggests, the primary problem may exist in how to evaluate students on both an individual and group basis (Strijbos, Martens, & Jochems, 2004).

MOOC Course Design

Rust, O'Donovan, and Price (2005) generated an iterative model, based on a review of social constructivist literature, of group-based activities that include a feedback mechanism addressing social constructivist concerns. The model was built upon “seamlessly, demonstrably interrelated” criteria for assessment, teaching, and desired learning outcomes (Rust et al., 2005, p. 232). Students engage with these criteria, such that groups construct a shared meaning on which to base their work. Students next submit work for assessment in the form of an online dialogue. This step offers another opportunity for shared knowledge creation and generates a refined understanding of the initial assessment criteria. From here, the students iteratively repeat the cycle until learners and educators are satisfied with their results.

Rust et al. (2005) offer an additional cycle for educators, suggesting an interactive process by which teaching staff influence the changing understanding of assessment, learning, and teaching criteria. While this additional cycle may be effective, it would be difficult to apply to online classes on a massive scale; MOOC course designers would need to approach the initial design of a course with great care to ensure alignment of teaching, learning, and assessment criteria. This and other research suggests that if educators are able to translate successful online pedagogies to work on a massive scale, they may be able to increase the quality of social learning in MOOCs and potentially realize the goal of making a course as good or better than one found in a traditional classroom.

The research literature taken as a whole is strongly indicative of the importance of social learning and increased interaction among students in online courses, which strengthens the argument for the need of this research project. While educators created cMOOCs with these ideals in mind, xMOOCs operating primarily on principles of direct instruction, make up the

majority of the MOOC landscape. Many MOOC hosts seem to espouse the benefits of group learning and many instructors use methods to encourage student interaction, but many may be operating without a complete understanding of how students experience social learning in a massive virtual environment. The next chapter describes how I addressed this lack of data through a two-stage sequential research project.

Chapter 3: Research Design

In preceding chapters, I have argued that massive open online courses (MOOCs) could have benefitted from pedagogical and course design elements to promote student interaction online, potentially increasing the likelihood of social learning. I have argued the merits of social learning and reviewed the literature about how educators have used these methods in online formats. I have also stressed that, while MOOC educators tended to agree with the importance of social learning, and most incorporated course elements enabling student interaction into their courses, many may have in some ways operated in the dark. MOOC educators may have benefitted from knowing more about how students experienced particular social learning contexts, and understanding the ways in which online learners interacted and constructed meaning with methods used in their courses. I have argued that qualitative research methods, specifically interviews, would be an appropriate means of understanding how students experience learning in an online setting. The results of this research offer educators an increased understanding of how students received social constructivist pedagogies in the context of a MOOC.

In this chapter, I begin with a review of the research questions I sought to answer through this study. Next, I discuss the overview of a two-stage research project, and describe how I gathered the data required to answer each research question. I provide an overview of the populations of interest and site selection criteria, including considerations of trustworthiness, validity, and ethics during data collection. Finally, I describe how I analyzed the data to generate meaningful and valid answers to the research questions.

Research Questions

This research has addressed the following questions:

1. What are the different methods employed in massive open online courses to promote student social learning and peer interaction?
2. What do students report about their experiences with social learning and peer interaction methods used in MOOCs?
 - a. To what extent does student motivation to take a course influence students' reported experiences?
3. What learning outcomes or course-related benefits do students attribute to social learning experiences in MOOC environments?

Research Design Overview

The first research question was concerned with describing, categorizing, and quantifying methods used to promote peer interaction and social learning. The second and third research questions were dependent upon findings from research addressing question one. This required I conduct the research in two sequential phases (Creswell, 2013). The first phase data provided a means to assess the variety and potential for social learning of a variety of methods used in MOOCs, allowing me to purposefully select courses and students most likely to yield the data necessary to conduct the second phase of the research project.

During the first phase, I answered the first research question by examining the methods used to facilitate social learning among a large number of MOOCs. Because different MOOC providers and instructors used different terminology for similar pedagogical tools, it was necessary to use qualitative methods in order to code, organize, and catalogue the findings to

discern underlying meaning (Merriam, 2009). I then used the categories generated from the results of the first phase to inform the selection of sites in which to conduct the second phase of research.

In the second phase of the research project, I purposefully selected four sites which spanned the range of pedagogical tools found during phase one, and used methods in a way that appeared intent on promoting social learning and peer interaction. From each selected course, I chose three or four students who appeared to be active and engaged with the social learning methods offered. I conducted interviews of each selected student to discover their experiences learning with peers. I gathered interview data about student learning experiences through the lens of social constructivist learning theory (Kreijns et al., 2003; Palincsar, 1998). I chose to use qualitative methods in the second phase, because I needed to gather data about an unknown phenomenon and inductively code the results to answer the research questions.

Although interpreting interview data through social constructivist principles could not provide quantitative data about learning outcomes, I believed this analysis would not only answer the research questions, but might have provided the research community with alternative ideas about evaluating learning in MOOCs. I have previously argued that social learning methods might be a good way to teach massive audiences; evaluating learning through a social constructivist lens might also have been useful to MOOC educators, specifically those using social learning methods in their courses.

Phase One: Design

During the first phase of this research, I conducted an extensive online search for MOOC providers, which often included universities only hosting a few, or even one, course. After

compiling a list of hosts, I examined each platform to find stated pedagogical beliefs, as well as methods used to accomplish social learning. After gathering data about a MOOC platform, I gathered similar data, but at the course level, by enrolling in every available active course. After gathering data about the platform, and each open course on the platform, I moved to the next platform until I exhausted all open courses from every platform I found.

Because access to course data was almost always restricted to enrolled students, I needed to sign up for each of the 267 courses to answer the first research question. Fortunately, signing up as a MOOC student on an individual platform took only a few minutes. After registering as a student on a platform, adding courses was a matter of a few mouse clicks. For example, Coursera required I register on their site as a student by entering my email address and creating a password. After registering, I was able to enroll in any open course with a few clicks of the mouse. I created separate email addresses to sign up for each MOOC host, so that monitoring course emails would be more manageable, and to prevent my personal email account from being inundated with thousands of additional messages.

Because I enrolled in courses acting in the capacity of a fellow student, I worked with the UCLA Institutional Review Board to make sure my course involvement was ethical and unlikely to harm anyone. Fortunately, most MOOC platforms required students agree to a privacy statement, often with an understanding that information shared in the quasi-public arena of their courses could be used for research purposes.

Phase One: Site Selection

In the first phase of research, I began searching for MOOC hosts through various online directories¹¹ in order to obtain a list of the entire population of English language MOOCs offered. It is likely that my list was not complete, but by examining MOOC aggregators and searchable directories of courses, the list was most likely at least representative of English language MOOCs being offered worldwide at the time. From the dataset of self-described MOOC hosts and courses, I removed those that did not meet the criteria of my definition of a MOOC. This included self-paced courses, which were unlikely to have massive concurrent active participation and seldom contained any social learning components; such courses would have been difficult to distinguish from some Open Course Ware offerings. I removed some self-named MOOCs that were fee-based, because they did not meet the definition of “open” used by most of the educational community (Rhoads, 2015). I also removed from consideration any site or course that placed a barrier to enrollment, such as proof of identification, age, citizenship, or any expectation that I would have been likely to violate as a researcher.

Using the criterion of non-exclusion was important, because the vast majority of MOOCs were free and open to anyone with a computer connected to the internet; a fact which contributed both to the massive size of MOOC enrollments as well as the diversity of student enrollments . Answering the first research question accurately required studying techniques used to encourage peer interaction and socialization in a traditionally open MOOC audience, in which a student could have been someone from almost any country or background in the world (DeBoer et al., 2013; Guo & Reinecke, 2014). If I would have chosen a course not truly open in this way, I might have further impeded the generalizability of findings of the second phase of research.

¹¹ Sites like: http://www.moocs.co/Higher_Education_MOOCs.html, <http://degreed.com/about/moocs>, <http://www.mooc.ca/providers.htm>, etc.

Phase One: Data Collection

In the first phase, I answered the first research question by gathering data made available by eleven MOOC platforms (Coursera, edX, FutureLearn, Canvas/Instructure, CourseSites/Blackboard, Iversity, NovoEd, Open Course World, OpenLearning, Desire2Learn, and Open2Study) and each active course on that platform. I gathered data about stated information regarding pedagogies, philosophies, and course methods that pertained to student interaction or social learning, including forums, group work, peer assessments, as well as methods not discussed in the literature review. The pedagogical data was most often text-based and typically available on platform websites and course syllabi. I manually retrieved this data because each MOOC platform placed information of interest in different areas of their website, and individual courses posted data in a variety of formats (e.g. plain text, HTML, pdf, or Word). These differences made finding and downloading course information through custom programming infeasible.

Instead I copied and pasted the data manually into an excel database along with source locations. Using the database allowed me to electronically search and categorize the data, while providing a means for easily quantifying the data for analysis and interpretation. Because the number of courses was large, and the pedagogical data of interest was in a variety of difficult to find locations, this phase of the research lasted about six months.

Phase One: Data Analysis

I organized the data categorically by MOOC hosting platform, to first view the data for each course in the context of the MOOC provider hosting the course. In addition, I tracked data by university, because hosts like edX sometimes appeared differently across universities.

Context was important, because some MOOC platforms promoted social learning in a central location on their sites, and some individual courses did not repeat platform information. Context was also useful when attempting to discern the intended use of social learning methods, which may have resulted from instructor wishes or policies set by a MOOC host.

Next, I sorted through the course data to highlight the pedagogical beliefs, philosophies, and methods that educators used to encourage social learning. I used a combination of open coding (Merriam, 2009) and information in the literature review to define categories and sort the data. I included the use of open coding because the MOOCs tended to be experimental, and I encountered techniques not yet seen in the literature. It was necessary to create some categories of social learning methods inductively. After sorting the data into different categories, I was able to answer the first research question and had the criteria I needed to select sites and interview candidates for the second phase of the research.

Phase Two: Design

The purpose of the second phase of the research project was to increase the understanding of how students experienced social learning in MOOCs, by conducting interviews of several students. To answer the second and third research questions, I selected four courses which appeared to be using a variety of social learning methods intent on promoting social learning. From those courses, I selected and interviewed thirteen students who were actively involved in using the social learning methods of their courses and were close to completion. I interviewed MOOC students about their experiences with social learning methods, and about how those methods might have affected their learning outcomes. I framed the interview questions and data analysis through the lens of social constructivist learning theory, paying close attention to student

interaction along both social and cognitive dimensions, as well as how motivation might have influenced their experiences.

Phase Two: Site Selection

I used the data gathered during the first phase of the research to inform the selection of a sample of four courses, each from a different MOOC hosts. I selected courses which used different methods to promote social learning, focusing on courses which were not very close to completion. Each course had at least four weeks of instruction remaining. This was an important criterion, because I needed time to identify students of interest, invite them to be interviewed, and complete interviews of students still enrolled in courses. I used this method of student selection criteria to find students most likely to have extensive experience with social learning methods in their courses.

Phase Two: Data Collection

I gathered the data for phase two by conducting semi-structured interviews of three or four students from each course; thirteen students total. I conducted interviews via Skype,¹² Google Hangouts, or by phone. I used semi-structured interviews, because they were a proven method for collecting data about a phenomenon not fully understood by the research community (Merriam, 2009). While a survey would likely have reached a broader audience, I felt the rich data gathered through interviews likely to provide the best answers to the research questions.

The open structure of interviews also allowed me to build upon data I received during early interviews to generate new questions and understanding for later interviews. During each

¹² Skype (www.skype.com) is a synchronous audio and video communication program that is both free and ubiquitous.

interview, I sought answers to the second and third research questions. My goal in the interviews was to uncover students' perceptions and experiences with learning in their MOOCs, as well as how students experienced social learning methods. I recorded the audio, and transcribed verbatim each interview for analysis.

Timing of student selection was important, because the majority of students who initially signed up for a MOOC were likely to stop participating during the first half of the course (though few would formally drop out); conducting interviews late in the course left a body of participating students who were much more likely to complete and thus be invested in successful study (Clow, 2013; Ferguson & Clow, 2015; Heutte, Kaplan, Fenouillet, Caron, & Rosselle, 2014). In order to answer the second and third research questions, I needed to interview students who were actively posting comments to discussion forums and appeared to be involved in other methods of social learning. For these reasons, I invited student interview candidates after the second half of the class. To encourage students to participate in interviews, I offered each a \$20 online gift certificate to Amazon.com, a popular consumer goods website. Because I did not select students based on their geographic location, I expected to interview students from almost anywhere in the world and needed an online gift that anyone could use. Although Amazon.com only shipped goods to less than half of the countries with MOOC participants, students could have used the coupon for electronic downloads (e.g. e-books, music, and movies); Amazon also offered gift cards in the local currencies of many of the students interviewed.

Phase Two: Data Analysis

I started analyzing interview data from the earlier students while still interviewing the remaining students, taking advantage of the time between interviews to refine probing and

follow-up questions. I organized the transcribed interview data into categories deductively generated from the literature review, as well as by specific conjectures of learning described by social constructivists. As I examined the interview data, I used open coding, a method by which researchers organize and label data during the data collection phase (Merriam, 2009). This allowed me to supplement coding used for analysis, and inductively create categories based on unexpected interview data.

Trustworthiness and Authenticity

I interviewed students identifying themselves online by email addresses or online pseudonyms; students' demographic characteristics were not readily apparent or verifiable. While future research could replicate this study and follow the same protocols I used, it would be difficult to ensure that there be sufficient overlap between relevant student characteristics. I remained as impartial as possible and worded my interview questions in a way as to not lead students to respond in any particular way. As I was participating (albeit in a limited fashion) in the virtual courses I studied, I strived to exercise caution with interviewees, so as not to allow my own personal experiences with the course to influence the content or manner of asking interview questions. I also made every effort to ensure accurate recording of the collected data and reviewed all transcribed interview data to ensure accuracy of transcriptions.

I carried out the collection and analysis of data, intent on meeting the five criteria of validity developed by Guba and Lincoln (1989). These criteria served as important considerations to ensure that I accurately represented student perspectives, while also providing insight into how their views might differ from their peers, so that students felt "empowered to act" (Guba & Lincoln, 1989, p. 246) to change their own learning outcomes. My goal was to

answer the research questions by gathering data in a trustworthy manner (Shenton, 2004) and accurately represent the learning experiences of students in each course.

Ethical Issues

During any communication pursuant to this research project, I explicitly identified myself as a graduate student conducting research. I was careful to ensure that any student I communicated with fully understood my identity and purpose. I provided interview candidates with information about their rights as interview subjects, as well as my contact information, in accordance with the Institutional Review Board policies at UCLA. It was very unlikely that harm would come to anyone studied, because I did not expose student ideas or opinions in the findings of this research in a way that could be traced back to any individual.

Students in MOOC discussions typically identified themselves by a name or email address, which may or may not have been a student's real name or primary email address, and some platforms used online pseudonyms. Kozinets (2010) warned that some students, even those participating in public forums and operating under pseudonyms, may still not want their thoughts identified in research or published outside of the community of origin. The increasing power of internet search engines (e.g. google.com) with the addition of internet archiving services, (e.g. archive.org) created the potential for someone to trace quotations in this research project back to a pseudonym, email address, or name. Because internet users often reused email addresses and pseudonyms as virtual identities, I obtained the permission of each student before quoting them directly.

The students I interviewed controlled their level of anonymity in a way, by deciding which email address or pseudonym to use for taking that course. However, when enrolling in

courses, they were probably not aware that they might later participate in research. In my record keeping, I further protected the identity of students by not naming interview participants. After the data analysis was finished, I destroyed the document linking interview data to students, making it impossible to trace results back to any participant. The nature of our discussions did not, to my knowledge, contain information of a sensitive or emotionally disturbing nature, and none of the students reacted in a manner to indicate discomfort. I focused on learning experiences and responses to social learning methods, which did not seem to upset any interview candidate. I was confident that our discussions would not result in emotional harm.

Summary

I chose to answer research questions which could benefit MOOC educators by increasing their understanding of the students they teach. Specifically, I designed the research questions to illustrate the techniques educators were using to promote peer interaction and social learning, as well as offer insight into how students experienced these efforts in the context of a MOOC. Answering these research questions required a two-stage research project.

The first stage answered the first research question, offering a breadth of techniques used in MOOC virtual classrooms, and also guided the selection of research sites and interview candidates to answer the remaining research questions. I carefully selected sites in order to ensure variation, while paring down the overall size of data collection and analysis to a manageable level. I chose to employ qualitative research methods to study selected online student populations, so that the research might provide a deep and rich understanding of student experiences with social learning in MOOCs.

Chapter 4: Findings

This chapter details the results of a two-phase study about student social learning in Massive Open Online Courses. I have argued that social learning methods, if successful, could provide a way to increase student learning in MOOC environments that scales with large enrollments. I engaged in this study to gain a better understanding of social learning methods used by MOOC educators, and how students experienced those methods. During the first phase, I collected data about social learning tools offered in MOOCs and how those tools were implemented; the combination of which I referred to as a method. I used the information from the first phase of the study to select four courses using methods categorized higher on the social learning spectrum. From those courses, I interviewed a small number of students, selected because they appeared to be actively participating in social learning methods throughout the course.

Phase One Findings: Overview

During the first phase of the study, from July through December of 2014, I examined 267 courses from 11 different MOOC learning platforms: Coursera, edX, FutureLearn, Canvas/Instructure, CourseSites/Blackboard, Iversity, NovoEd, Open Course World, OpenLearning, Desire2Learn, and Open2Study. The first stage of the study addressed the first research question:

1. What are the different methods employed in massive open online courses to promote student social learning and peer interaction?

In order to identify the various methods educators used to promote social learning, I first had to identify MOOC platforms and enroll in their courses. I began searching for MOOC hosts through a few websites which aggregated lists of courses from different providers.¹³ From the 47 different potential platforms listed via these directories, I found 11 that were offering MOOCs, as defined by my research criteria. I removed the majority of the platforms listed on the aggregator sites, typically because they did not meet the criteria of being open, due to payment requirements, and a few others because they were not intended for a massive audience. In addition, some of the sites listed claimed to be MOOC hosts, but were instead gateway websites to MOOCs another platforms (e.g. a university website with links to each MOOC taught at that university, though they were hosted on one or more other platforms).

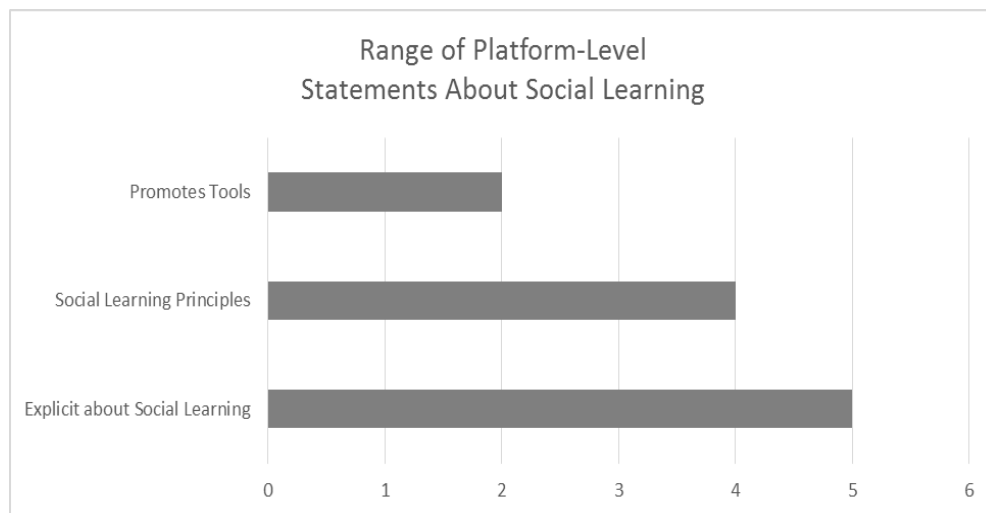
From the list of MOOC hosts, I examined each platform, later returning to platforms, one by one, to examine each course open on that platform. While the first research question was concerned with methods for social learning, I initially focused on the tools offered that instructors could use as methods for promoting social learning. Because the platform level data typically revealed tools more than it did methods (methods being dependent on implementation by instructors in individual courses), I searched for each platform's stated beliefs about social learning principles.

By gathering data about the stated philosophies, pedagogies, and best practices related to social learning methods from each host website, I hoped to gain insight into how their tools were designed to be used as social learning methods. I searched each site for evidence that they promoted, or at least found value in, social learning in the context of a MOOC. From the eleven

¹³ Specifically I searched Class Central (www.class-central.com), MOOC List (www.mooc-list.com), MOOCs Directory (www.moocs.co), and MOOC Factory (<http://moocs.epfl.ch/mooc-factory>).

hosts, I was able to find at least one statement related to social learning, though not all were explicit about social learning pedagogy. Using open coding techniques (Merriam, 2009), I inductively separated the platforms into three distinct categories, which ranged from little or no stated orientation towards social learning pedagogies, to those that were explicit about the importance of social learning on their platforms. Statements fell into one of three broad categories, the frequency appears below in Table 1.

Table 1: MOOC Host Social Learning Beliefs



At the low end of the spectrum of stated social learning beliefs were two hosts that only mentioned offering tools which instructors could use for social learning methods. At the high end of the spectrum were the five hosts who mentioned social learning, or peer-to-peer learning as itself being an important part of MOOC pedagogy. For example, Coursera stated that peer assessments were "shown in many studies to result in...a valuable learning experience for the grader." Coursera implied that use of a social learning tool, could improve student learning, but not explicitly how or why.

Four hosts mentioned social learning principles, without necessarily identifying them as pedagogical beliefs. These include statements like “the students who get the most out of our courses are the students who are the most involved” or “students will achieve at higher levels if they...are socially engaged with their peers.” Five of the eleven platforms were explicit about their social learning beliefs, such as CourseSites which stated, “The interconnected, interactive nature of social learning exponentially amplifies the rate at which critical content can be shared and questions can be answered.” Included in this group were statements like “peer to peer learning is a core component of an open online course” stated on the Iversity host website. A list of sites and their statements about social learning are in Appendix D of this study.

After examining the websites of MOOC hosts, I started with one host and enrolled in every course open for enrollment. After enrolling in each course, I was able to gather course level data. I gathered data about social learning methods from each course in detail, reading syllabi, FAQs, and other information about the course given to students from the teaching staff. While doing so, I paid close attention to the stated beliefs about social learning made by course instructors, and noted when such statements were made.

Phase One Findings: Seven Categories of Social Learning Methods

After collecting data from several MOOC platforms, I was able to inductively identify seven distinct categories of tools offered to enable or encourage social learning. Some categories, such as “Forums” or “Peer Assessment,” used similar tools, while categories like “Social Presence” were constructs based on research about social learning found in the literature review.

Each platform offered a different mix of methods which allowed students to learn from each other. More than half of the platforms (6 of 11) contained courses with homogeneous sets

of tools, suggesting that individual courses on those platforms may not have been able to alter the mix of tools offered to students in a particular course. The other platforms all contained courses with very different toolset offerings. Courses, even in homogeneous sites, differed widely in the implementation of tools, showing a great variation in social learning methods. The data showing the number of courses and frequency of social learning methods in each platform appears below in Table 2.

Table 2: Frequency of Social Learning Methods by Host

Platform	Total Courses	Forums	Peer Assessments	Groups
Coursera	75	98.7% (74)	44% (33)	1.3% (1)
EdX	41	100% (41)	12.2% (5)	4.9% (2)
FutureLearn	13	100% (13)	0% (0)	0% (0)
Canvas (Instructure)	21	100% (21)	19% (4)	19% (4)
CourseSites (Blackboard)	7	100% (7)	0% (0)	42.9% (3)
Iversity	13	100% (13)	23.1% (3)	7.7% (1)
NovoEd	7	100% (7)	42.9% (3)	71.4% (5)
Open Course World	2	100% (2)	0% (0)	0% (0)
OpenLearning	30	100% (30)	10% (3)	73.3% (22)
Desire2Learn	12	100% (12)	0% (0)	0% (0)
Open2Study	46	100% (46)	0% (0)	0% (0)
Totals	267	266	51	38

Platform	Face to Face Meeting	Synchronous Communication	Social Media	Social Presence
Coursera	96% (72)	10.7% (8)	25.3% (19)	21.3% (16)
EdX	2.4% (1)	12.2% (5)	26.8% (11)	4.9% (2)
FutureLearn	7.7% (1)	0% (0)	100% (13)	100% (13)
Canvas (Instructure)	0% (0)	33.3% (7)	23.8% (5)	19% (4)
CourseSites (Blackboard)	0% (0)	0% (0)	14.3% (1)	100% (7)
Iversity	0% (0)	0% (0)	30.8% (4)	7.7% (1)
NovoEd	0% (0)	28.6% (2)	100% (7)	28.6% (2)
Open Course World	0% (0)	0% (0)	0% (0)	0% (0)
OpenLearning	0% (0)	96.7% (29)	0% (0)	100% (30)
Desire2Learn Open Courses	0% (0)	0% (0)	0% (0)	0% (0)
Open2Study	0% (0)	0% (0)	100%	0% (0)
Totals	74	51	106	75

After organizing the data about social learning methods into seven categories, I set about trying to distinguish which methods were used in a way that appeared most intent on increasing the likelihood or quality of student interaction and social learning. I initially created three categories to place social learning methods along a continuum: *lowest*, *additive*, and *highest*. The lowest examples represented tools that instructors did not appear intent on using as social learning methods; these were cases when a tool was available in a course, but without instructor input about their use. The next category of methods I considered additive, because they were not mutually exclusive, and could be combined; each offering guidance, an incentive, or reason for students to engage in social learning. Different courses and platforms tended to contain unique mixes of additive methods in a single category. I reserved the third category for methods used in a way that seemed most likely to benefit student social learning. Table 3 below offers a summary of the analysis.

Table 3: Social Learning Methods Categories

Method	Social Learning Methods		
	Lowest	Additive	Highest
Forums	Make available	Encourage/Explain	Instructors model use
		Grading forum participation.	Assignments requiring forums:
		Useability features:	peer modeling
		search	peer assessment
		voting	
		following	
	organize		
	sort		
Peer Assessments	Make available	Encourage/Explain	Non-grade reward:
		Grading or requirement	Individual feedback from Instructor
		Qualitative feedback	Paid visit to campus
Groups	Make Available	Encourage/Explain	Collaborative Assignments
		Grading or requirement	
		Variety of Communication tools	
Face to Face	Provide tool or forum	Encourage/Explain	
Synchronous Communication	Provide Tool	Encourage/Explain	Unhangout
		Integrate with groups	
		Audio and/or video	
Social Media	Provide Links	Encourage/Explain	Instructor use/modeling
		Create account for course	Conduct class activities
Social Presence		Self-introductions	Paired (virtual) lecture viewing
		Profile pages/biographies	Advice from former students
		Class Map	Peer modeling

I then assigned course methods to three categories along a spectrum of social learning, from lowest to highest (*minimal, promotional, and integrated*). Minimal courses used a tool without offering instructions about how or why students should use it in the course. This category caught a large number of courses. Next, I defined courses as promotional if they used at least one additive method. Typically, these courses at least mentioned how students should use a tool, but did not offer students a reason or motivation to use the social learning method. Some in the promotional category used more than one additive method, but clearly fell short of courses using methods in the integrated category. The integrated category contained the few rare methods that appeared most likely to result in student adoption and social learning, because students in those courses needed to use the method in order to complete the course. Table 4 below shows the distribution of social learning methods across a social learning spectrum.

Table 4: Summary of Social Learning Data from 267 Courses

Method	Course Frequency	Social Learning Spectrum		
		Minimal	Promotional	Integrated
Forums	99.6% (266)	60.5% (161)	38.3% (102)	1.1% (3)
Peer Assessments	19.1% (51)	0% (0)	96.1% (49)	3.9% (2)
Groups	14.2% (38)	26.3% (10)	57.9% (22)	15.8% (6)
Face to Face	27.7% (74)	93.2% (69)	6.8% (5)	0% (0)
Synchronous Communication	19.1% (51)	51% (26)	47.1% (24)	1.9% (1)
Social Media	39.7% (106)	61.3% (65)	37.7% (40)	0.9% (1)
Social Presence	28.1% (75)	38.7% (29)	54.7% (41)	6.7% (5)

Finding #1: Forums

Discussion forums were a nearly ubiquitous means of communication between students and instructors, offered in 99.63% (all but one) of the courses studied. Across all courses and

platforms, they shared just a few common features: they were a text-based, asynchronous means by which students could communicate with each other. Communication posted to forums was visible to anyone in the course, and remained for the duration of the course.

The most common forum structure, available on all but one platform, was the threaded discussion, like those found on many websites. A threaded discussion allows an author to start a new topic (or thread). Underneath or within that thread, others can create a new post, or respond directly to another's post. Posts appear in reverse chronological order, with the most recent post showing up first, unless it is a response to another post, in which the previous post(s) would show up, with responses noted most typically by indentation. A vast majority of courses with threaded discussions allowed students to create their own threads, while a few (nine of 254) courses followed threads defined by the instructors.

Forums also varied greatly in how instructors used them to enable and encourage student interaction and social learning. At the low end of the social learning spectrum were courses that merely offered discussion forums. A majority of forum use fit this category, while 105 (39.33%) courses made an effort to suggest that students use forums to communicate, ask questions, or learn from each other. Additional methods to encourage users to use forums included grading incentives, where the number of posts made to the forums affected student grades. This was present on one platform, Coursera, in 16% (12 of 75) courses examined. Similarly, on the Desire2Learn platform, two of the eleven courses reviewed did not allow students to read the forums until they had made one post (a self-introduction).

While methods to coerce students to post are likely to increase student activity on forums, these measures do not incentivize reading, responding, or engaging in meaningful dialogue. Additionally, because these methods appeared to be only about making a certain number of

posts, and nothing to do with the quality of those posts, I would expect that the resultant posts may not increase the quality or overall value of the forums as a learning or communication tool.

I considered some technical features of forums to be additive factors in social learning, because they were designed to make forums more useful. If forums were more useful, I expected students may be more likely to use forums, and therefore experience an increase in interaction and opportunities for social learning. These features included search tools and organization techniques. Instructors would sometimes organize forums categorically by topic, lesson, assignment, or project. Another frequent forum feature, found in 72.6% of the courses, was the ability for students to vote for posts they liked. This allowed students to vote for a post, adding one to the number of votes, or in some cases vote a post down, with down votes being subtracted from the total of up votes. Students could typically sort forums by post votes, and in some cases, students could add voting criteria to their searches.

Courses on every platform offered at least one way to search for forum information, with the exception of FutureLearn, which used discussion forums in a very different and particularly purposeful way. Each of the thirteen FutureLearn courses reviewed, maintained an identical structure and method of using forums, relying on them almost exclusively for student communication. While FutureLearn forums could be sorted by votes, the only method for finding information in FutureLearn courses was through a user-based navigation system; a student could click another student's name and view all of that student's posts. From that page, a student could click on a particular comment and navigate to that particular discussion. Unlike most other courses, FutureLearn forums were not all located in one area of the course website, which made it impossible to browse topics or threads.

Instead, FutureLearn forums followed the course structure: courses were broken down by week, and each week consisted of a number of lessons. There were two areas for forums, called “Comments” or “Discussion Breaks.” Discussion breaks were part of the lesson plan, directing students to discuss a topic, video, or problem posed to the class. Comments were located next to each lesson, allowing students a chance to communicate about anything covered in that lesson.

Another way that instructors attempted to increase student participation on forums was the use of modeling, in which an instructor would make a forum post, wait for a response, and then engage a student or a few students in a discussion. While this kind of activity could be more prevalent, I only witnessed this in one class, where the instructor made an explicit announcement (in the weekly notifications section) that she would be modeling how she thought forums should be used.

Another method that aimed at improving social learning in the forums was the practice of student modeling: requiring students submit homework via a dedicated forum. This may not be effective for every kind of class – a quantitative course with homework yielding clearly right or wrong answers would be giving away the right answer after a few posts. The two courses I witnessed using this method contained homework assignments that were largely based on stating opinions and supporting those opinions with course materials. These courses appeared to suggest students build upon ideas of previous posts to improve their understanding. One of these two courses went so far as to use the forums as a means of peer assessment; requiring students respond to a few homework responses each week to receive full credit.

Finding #2: Peer Assessments

Peer assessments were used in 51 (19.1%) of the courses examined during this study. Peer assessments involved students viewing each other's work anonymously and grading that work according to a rubric provided in the course. Some (17.6%) of peer assessments were quantitative, where students were asked to grant points on a scale depending on whether the work met certain criteria. Assessments were sometimes (13.7% of the time) qualitative, being asked to provide a text-based response to the work. The most common practice (68.6% of peer assessments) was a combination of the two, whereby a student was asked to give a numerical assessment along with a rationale for the grade.

Aside from the nature of the assessments (qualitative or quantitative), another way to ensure student interaction through peer assessments was through incentives. Students in 32 of the courses were required to complete peer assessment activities to pass the course, while the other 19 courses made peer assessment optional. Some courses had requirements to receive a mark of distinction or award to signal that they had not only completed the course, but also had better than average mastery of course materials. Of the thirteen courses with optional peer assessment activities, six made them mandatory for students pursuing a mark of distinction.

Another way to incentivize peer assessment activities was by placing greater importance on them. While instructors typically accomplished this by changing the weight of a student's peer assessment grade, in two cases instructors increased the apparent importance of assessed grades. In one course, instructors awarded top scorers personalized feedback through their choice of a live TA session (via video conferencing software) or on a paper assignment. Instructors from the other course offered students a trip to Japan.

A course from a Japanese university asked students to develop future research ideas based on course materials, as part of an individual class project. Peers graded these projects, and were not only able to give feedback, but also had the option of forwarding a project to instructors for consideration. The instructors then reviewed the most forwarded projects and awarded the top three students an all-inclusive paid visit to their university for one week during the summer. While this kind of incentive is probably not economically feasible for most institutions, this particular university stated using the course, in part, to find potential future graduate students.

Finding #3: Groups

Some courses offered the ability for students to form small groups, some with group-specific methods of communication. MOOCs using small groups were relatively small in number; just 38 (14.2%) of courses made use of small learning groups, and even that number may have been inflated, considering that the majority of those courses appeared to have a built-in group feature from one platform. Of the 30 courses on the OpenLearning platform, 22 contained a section of each course set aside for groups, but there were rarely more than a few, and usually no groups created. The NovoEd platform also had group functionality in each course, suggesting a similar built-in feature, but the NovoEd courses all had a large number of created groups, though some courses contained many one-person groups.

With classes numbering in the thousands or tens of thousands, creating hundreds of small groups could be problematic. All but one course allowed students to self-select group membership; placing group management tasks squarely on the shoulders of students themselves. One exception was a course which used a self-diagnostic test to gauge existing knowledge and automatically sort students into groups of people at similar levels. This method of selection

seems reasonably sound, but could be problematic when students stop attending. Also, some students could have sought others at similar levels, while others might have benefitted from the assistance of students with more knowledge and experience.

While I placed the 23 groups on the OpenLearning platform in the minimal category of social learning, the remaining 15 courses used small groups in different ways. In the promotional category of social learning were courses that used groups as a means of completing their own assignments; groups that were little more than a forum with a much smaller audience. These courses encouraged students to check their homework with others and seek help from each other. These tasks did not require any more interaction than forums, and while more intimate, may not have contributed much more to student learning.

I placed groups engaging in collaborative work in the integrated category of the social learning spectrum. This work required the input of all members of the group, or at least acquiescence. While it would have been difficult to ensure that each group member took an equal part in completing group assignments, it was likely that group members would engage in these activities more than they would forums or even individual work shared in groups. There were a few tools offered to complete collaborative work in real-time. Typically, courses suggested that students use Google Docs, a web-based suite of applications similar to Microsoft Office, which allowed multiple people to edit a document at the same time. Another tool was Etherpad, a downloadable application with similar functionality. Yet another course on computer programming used a tool to allow two students to work together synchronously on a programming assignment.

One class with an interesting take on group assignments involved the study of an online game. In this class, marks of distinction were available to students who explored the game and

created *guilds* or groups of students that played the game and discussed their opinions and experiences. Students were encouraged to create groups with others in the class in the same or similar time zones, so that they could play the game together and collaborate on assignments, which frequently related to in-game experiences.

Finding #4: Face-to-Face Meetings

Students in many MOOCs were encouraged to meet each other in the real world by organizing meetings in their local cities or towns. While not feasible for every student, in-person meetings could have helped students create stronger relationships. Instructors typically suggested students arrange meetings through forums. In the forums I examined, students typically started a thread asking if there were other students near them, and then narrowed down times and places for a meeting. It was not unusual to see a city name mentioned in the United States, but often smaller countries would begin a country-wide search, e.g. “is anyone here from Nairobi?” and then narrow results further.

While only 74 (27.7%) of the courses offered a formal tool or dedicated forum section for face-to-face meetings, it was not uncommon to see students in the general forums, or in a forum dedicated to personal introductions, starting a discussion about meeting up in person. The fact that students found face-to-face meetings worthwhile enough to pursue on their own suggests that some students might find value in these activities. Even if they were popular or useful, course instructors rarely mentioned or encouraged students to interact in-person outside of the course.

Finding #5: Synchronous Communication

Synchronous communication, especially online video telecommunications, was the method used most similar to live, face-to-face communication. While 51 total (19.1%) courses offered a synchronous method of communication to students, those numbers alone are deceiving. The OpenLearning courses accounted for more than half (30 of 51) of the cases, and every course on the platform contained an apparently built-in synchronous chat tool. Further examination of the 30 courses revealed chat tools were generally unused, with the rare exception showing only minimal use.¹⁴

The bulk of the other 21 courses using synchronous communication, I placed in the promotional category of social learning, because they suggested students use the methods, or modeled their use by adding live content, which tended to be in response to questions on the forums or about specific homework problems. When categorizing these methods, I relied upon the principles of media richness theory (Bordia, 1997), and social presence in online courses (Lombard & Ditton, 1997). These theories imply that when people use communication media that is richer (i.e. face-to-face communication being the richest and text-only being the leanest), they are more likely to feel socially present. Social presence refers to the ability to communicate without interference caused by the medium of communication. Because text-based communication is very lean, I considered audio and video forms of synchronous communication higher on the spectrum of social learning, all other conditions being equal. My rationale for this was that on the one hand, a richer medium of communication should lead to increased sense of

¹⁴ Entering a chat room showed previous activity, even after logging out and in again, and even after several days. After posting a chat message, I was able to return several days later and still see my message. It is possible that there was a longer time-out for storing these messages and that I was not able to observe messages entered earlier.

presence and improve social learning. On the other hand, merely placing a tool in a course did not mean students would use it.

Other means of synchronous communication were through Skype (one course), appear.in (one course), or most frequently through Google Hangouts (26 courses). These three methods were a means by which a few users could communicate with each other using audio and video. Skype was a free stand-alone application, while Hangouts and appear.in were web-based. Google Hangouts used accounts in Google+, a popular social media site, which suggests that students who participated in a Hangout with another student might retain that connection through Google+ and either feel more connected or perhaps establish contact in the future. Instructors in four courses held Hangouts as a form of modeling; suggesting students follow suit and create their own Hangouts with one another.

The integrated method of synchronous communication was a variant of Google Hangouts, called the *unhangout*,¹⁵ used in one course. The unhangout was an open source platform designed at MIT to allow instructors to use Google Hangouts on a massive scale. While Google Hangouts only allowed ten concurrent users to interact via video and audio, Unhangouts allowed instructors to direct an unlimited number of students to a virtual lobby or landing page on its website. From that page, students would encounter a recorded video greeting from the instructors, and then be able to see other students who had connected to the unhangout and chat with them. When instructors were ready to begin a live session, they would sound an alert for students to return to a live, unidirectional broadcast. Instructors would then pause, and ask students to break up into groups to discuss questions raised by the instructors. Instructors would later sound an alert to bring students back into the main area for additional teaching.

¹⁵ <https://unhangout.media.mit.edu/about/>

Finding #6: Social Media

Many of the courses (106 or 39.7%) linked or integrated their activities with common social media sites. Facebook, Twitter, Google+, Linked-in, Pinterest, and Instagram, were the most common, with one course creating a forum on Reddit, which though not typically defined as a social networking site, had a dedicated following and established community. I placed courses which merely added a link to one or more social media sites, without any mention of its existence in the minimal category of the social learning spectrum. The majority of social media usage (65 courses) fell into this category.

The other courses at least mentioned to a presence on social media to students, or suggested students use social media as another means of connecting with fellow students. Instructors in four courses were at least marginally active in at least one social media platform, which may have encouraged students to take part and become more socially engaged in the course. The one social media method that I placed into the integrated category was a “Twitter conferences.” In one course, the instructor would use Twitter to ask and answer questions to students live via a dedicated feed. There was an indication that at least some students found value in using social media, because two courses had student initiated social media groups (one on Facebook and one on Google+).

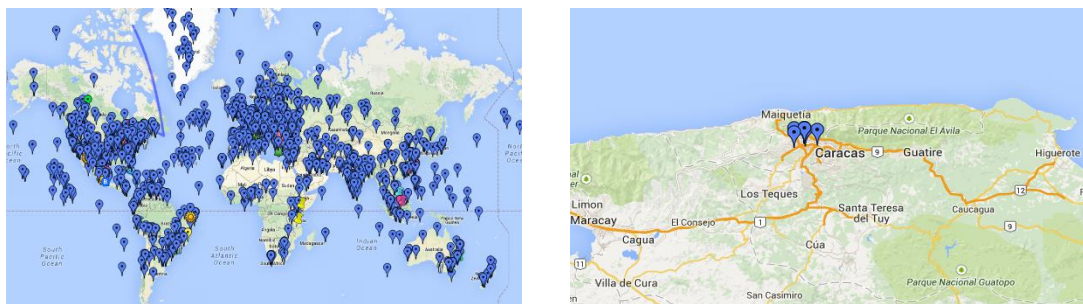
Finding #7: Social Presence

A great deal of the research discussed in the literature review indicated that student learning increases when they feel more connected or more socially engaged with an online course. A great number of different tools used in the MOOCs studied seemed to try to help students feel as though they were part of a class or more aware of their fellow students. If

successful, these activities may have helped reduce the psychological distance students felt from each other. Certainly, other social learning methods, such as group work, might have increased a student's feeling of connection to other students, but I designed this category to encompass methods which seemed to serve no other purpose than increasing social presence. With the exception of a handful of methods, it was difficult to say that one was more or less likely than another to increase a feeling of social presence.

Self-introductions, typically occurring in discussion forums, were the most frequently occurring method (67 courses) that educators used to share a sense of community with their students. Students were typically asked, and sometime coerced, into posting a self-introduction containing information about who they were, where they lived, or what they hoped to get from the class. The next most frequent method in this category was the use of student maps. These applications allowed each student to enter a name or pseudonym and location (city and country) to be displayed on a world map. By clicking or hovering on a point in the map, a student could see the name and location of a student studying there. In theory, a student could also zoom into the city nearest them and find others nearby.

Figure 1: Student Maps used to view all students, or those living nearby



Another method for creating a sense of social presence was the availability of class rosters and profiles. In most MOOC platforms and courses, students were able to create profiles,

often with the ability to upload a picture and write a brief biography. Two platforms went a step further and offered a means for students to view the full roster of students in the course. Seeing fellow students' names and pictures (when uploaded) could have given the students another way of feeling a connection to the others in the course, much like campus maps. Another platform, FutureLearn, which used forums to communicate almost exclusively, structured their biography pages to include all posts that a student had made, including those in other shared classes on the platform. This could have helped students to feel connected to each other outside of the environment of a single course, by showing shared classes spanning the entire platform.

One of the courses studied used a less passive method of creating social presence, which involved students pairing up to watch video lectures together. This course suggested students meet in person or virtually through a synchronous communication tool. Another course suggested students join a professional network related to the course, which may have helped students feel connected not only to others in the course, but also those with similar professional interests.

Another interesting technique, which I placed in the integral category of social learning, was the opportunity to read advice from former students. This involved a course which had already been taught. At the completion of that former course, but prior to its end, instructors had asked students completing the course to post advice and comments which they thought might help future students. Instructors organized those comments and placed them in the next offering of the course. I placed this higher on the social learning spectrum because it not only created a sense of connection with other students, but could also have improved students' learning.

Another social connection technique in the integral category, was that of peer modeling. I used peer modeling to describe methods used by educators for students to share their work with

each other. There is overlap here with forums, because students typically used forums to share work, but some students were able to share via specialized software. In one foreign language class, instructors asked students to create brief multimedia clips using images, video, music, and recorded audio of the student speaking in the target language. This had the benefit of not only creating a sense of community or connectedness to other students, but also allowed students to learn from others' work.

Phase Two Findings: Overview

I conducted the second phase of the study in February of 2015, using the data gathered during phase one to select four courses that appeared to embrace social learning principles and methods in a manner that some might describe as an analysis of "best practices." I chose courses that were using methods to increase student interaction and encourage social learning. The next most important consideration was to choose courses using a variety of social learning methods, so that I could gather data about how students experienced as many different social learning methods as possible. I selected courses from different platforms to further ensure variety of social learning methods, knowing that each platform had somewhat different interpretations or implementations of similar tools used as social learning methods. From each of the four courses, I interviewed three or four students (thirteen in total) about their learning experiences to answer the second and third research questions:

2. What do students report about their experiences with social learning and peer interaction methods used in MOOCs?
 - a. To what extent does student motivation to take a course influence students' reported experiences?

3. What learning outcomes or course-related benefits do students attribute to social learning experiences in MOOC environments?

Phase Two Findings: Four Selected Courses

Each of the courses were hosted on some of the larger MOOC platforms, most likely because they offered enough courses from which I could find one promising course. I chose to interview students in courses on the Coursera, edX, NovoEd, and FutureLearn platforms. In order to understand what students might mention during interviews, I engaged in each course as a student to study the first three weeks of content. Doing so was also the only way I could identify students that were actively engaged in the course and using one or more social learning tools. Because I chose courses on different platforms, I will refer to each course and student by platform.

Coursera Course

The Coursera course instructed over 10,000 students on the topic of environmental studies, taught by a team of instructors from a Swedish university. Sweden was apparently well known for strong environmental initiatives, and the instructors were part of a research organization focused on sustainability issues. The Coursera course used forums with powerful search features, also instructing students to “discuss some assignments with peers in our online learning community.” In addition, 10% of student grades were based on forum participation. This mix of additive social learning methods placed their use of forums on the higher end of the social learning spectrum.

Instructors based forum participation grades purely on the number of posts and were not “evaluated in terms of quality or length.” Forums were rich in features to enhance usability; they were text searchable and allowed students to vote posts up, down, or flag them as inappropriate. Instructional staff organized forums into categories, perhaps making browsing a little easier. Students were also able to follow a student’s post to their biography page, which displayed all posts made by the selected student, as well as a photo and personal interests, when present.

In addition to well-implemented forums, the Coursera course graded Peer Assessments, with 30% of a students’ grade resulting from the peer assessments they received and 10% for completing the assessments of other peers. In this sense, half of each student’s grade was composed of activities involving learning and interaction with other students. Peer assessment grades were strictly numeric, without an opportunity to explain or give additional feedback. The grading scheme allowed students to pass the course with a 60% score, but required 80% for a mark of distinction. This meant that a student could feasibly pass the course without reading forums and without completing peer assessments, but could not earn a mark of distinction.

This course also had a section dedicated to “community” in which students were pointed to a tool offered by the platform for creating face-to-face meetings. Aside from this tool, the instructors suggested students use a purposefully created “Study Group” forum to try to meet with others nearby. The community section also pointed students to a course map page with instructions on how to share and view the location of peers.

While course instructors used Google Hangouts for synchronous communication, they were non-interactive and used as a means to provide supplemental live instruction about questions posed on the forums. One interesting feature of the recorded Google Hangouts was a voting feature (thumbs up or down) located on the timeline of each recorded video. These

allowed students to vote for content of interest, with votes showing up along the timeline. Ostensibly, students could fast forward to particular points with a large number of up votes and see the content most interesting or useful to other students. Unfortunately, there were no instructions about how to use the voting features or what purpose they were intended to serve.

The Coursera course also made use of social media, hosting pages on Facebook and Linked-in. The Linked-in group appeared to be smaller and less active, while the Facebook group appeared to have a large number of visitors, with over 2,000 likes. The Facebook page was very active, with a large number of posts from instructors linking interesting videos or articles related to the course content. Several people *liked* and commented on the posts throughout the course, suggesting it had a large audience.

EdX Course

The course on edX taught personal development and communication skills, with goals of transforming business and society through cooperative activities. Enrolled students numbered over 27,000 and the nature of the content required students engage with each other socially to complete assignments, placing it higher on the social learning spectrum. Instructors based grading on social learning activities as well, but grades were self-reported, .e.g. “Yes, I wrote a reflection...and commented on at least three other people’s reflections.” The course made extensive use of peer interaction to complete coursework, and utilized a complex website outside of the platform. The course used this external site to create and manage both virtual and in-person groups, to host the course forums, as well as complete individual reflective activities. The instructor had strong ties to the organization hosting that site, whose purpose aligned with the activities completed for the course.

Instructors organized forums into categories to meet the different weeks of the course, had dedicated sections for special purposes, and students could text search or follow conversations of interest. There were no voting features, but forums offered an ability to sort by most recent post, or posts with the most replies. Students could also click on a student post and see their biography page. From there, students could see a picture and personal interests, when available; as well as view student posts and group membership information. Students could also send a personal message via the site from another student's biography page. The structure combined with prompts from instructors about when and how to use the forums placed this implementation at the high end of the social learning spectrum.

The course activities, outside of watching videos and reading course material, often involved small groups. The course began with instructors creating 1000 empty groups on the external site, with a dedicated forum section for finding group members. To start a group, a student could simply join an empty group. A student could also join any group with less than five members and exit at any time. There appeared to be no way to force a group member to leave or restrict others from joining a group.

Instructors asked groups to spend 75 minutes together each week practicing listening tasks via synchronous communication tools. Group pages had a rich toolset, offering an unthreaded message board for asynchronous text-based communication, with added features for sharing pictures, videos or other files. A group page also had seamless integration with Google Hangouts, the suggested communication medium for weekly meetings. The Hangouts integration not only allowed for a one-click creation of a Hangout, which anyone online and in the group could join, but also offered the ability to send invitations via email.

While there was a great capacity for students to meet their groups virtually, the instructors suggested students create in-person groups whenever possible. The course appeared to have a strong face-to-face component, as several groups mentioned meeting in person in cities around the world. Instructors mentioned sections of the class meeting in person as well; for some the class was a hybrid of online and live instruction.

EdX also made use of Twitter as a channel of communication. The Twitter feed appeared on the edX site, not the external site, alongside course content; students could see any new posts while reading or watching video lectures. While instructors seemed to use Twitter the most, the feed might have added an increased sense of social presence to students otherwise engaged in static content.

The edX course also used a class roster; instructors asked students to fill out their information at the start of the course before going into any course content. Profiles in the courses roster were contained on the external site. These were searchable by name, geographical location, preferred language, or area of interest. Of the 27,000 students, over 7,500 had created profile pages, with over 5,000 containing a photograph. The default view of the roster displayed students with photos first; browsing the roster gave an initial impression of a class full of faces, perhaps lending an increased feeling of social presence.

The content of the course: lectures, guest speakers, and reading, was primarily about connecting with other people. Students appeared to be engaged in learning how to change society and business practices through self-awareness and collaborative efforts. I thought it likely that the content of the course itself might have a metacognitive effect on students and contribute to their desire to engage in social learning activities.

NovoEd Course

The next course I selected was a NovoEd course on creating a technology start-up company. This class listed over 11,000 students and most assignments were group-based. Instructors asked students to form groups, share ideas, and decide on one idea for a technology product, eventually producing a business plan. This course was part one of a two part series; the second part of the course promised to guide students towards implementation of their business idea.

The NovoEd course used an organized forum that was searchable and offered up and down voting features. Instructors directed students to visit the forums when they needed help and as a way to find members for their groups. Because the course made groups essential to task completion¹⁶, and contained a full set of features to enhance usability, group use appeared to be high on the social learning spectrum. Students were able to create their own groups or ask to join a pre-existing team. A student creating a new group would be the leader and the only person in the group able to invite or accept others into the group.

Groups created deliverables in an area of the website devoted to group communication. This area offered groups a private message forum, or chat, for asynchronous communication, as well as a public¹⁷ facing forum for discussion of their progress and posting of assignments. Students were able to integrate their groups with Google+, allowing one-click access to Google Hangouts for synchronous audio and video communication. Team leaders could also poll group members for their availability, schedule, and create meeting invitations. Instructors asked student groups to seek guidance from a pool of almost 350 mentors. Students could approach a mentor through a private message feature in the mentors section of the website, or a mentor could offer

¹⁶ Though groups of one were permitted, most (61%) had more than one.

¹⁷ Viewable to anyone else enrolled in the class, not the general public.

to serve as mentor to teams of interest, based on information posted on the public facing team forums.

The NovoEd course also made use of a course roster, which contained biographical information, interests, skills, and often photos. The course roster data also contained information on an individual's current and past courses (on the NovoEd platform) as well as any formal endorsements made by another student. Additionally, the platform maintained a list of other students that had worked with that student in a feature called *network*. Students could search for each other via keyword, location (city, state, or country), or by their preferred language. Instructors asked students to complete their profile information at the start of the course, and browsing or searching through the course roster was one suggested method of finding group members.

Other than the ties to Google+, which appeared to be solely for using Google Hangouts, instructors used Twitter, which had over 100 members and over 50 subscribers, and a Facebook group. The instructors appeared to have created the course Facebook group in earlier iterations of the course, resulting in nearly 10,000 members from current and past courses. Several students reached out via the forums to make connections on Linked-in, however that connection appeared to be student initiated, and not a formal part of the course.

FutureLearn Course

I selected the FutureLearn course based primarily upon the platform's unique approach to learning through forums, guided by stated ideals about the importance of social learning in online settings. Because forums appeared to be the most prevalent means of student communication in MOOCs, I thought it important to see what kind of social learning experiences

students would have when relying almost solely on asynchronous text-based communication. From the several courses available, I selected a course on personal finance, because the subject matter was practical in nature and likely to be useful to students, which could provide added motivation and increase the likelihood students would interact and be successful. Also, while the subject matter tended to be quantifiable, providing many answers to questions that were either right or wrong, there was also room for opinion and discussion about personal best practices and sharing of experiences.

The FutureLearn course, like all other FutureLearn courses I examined in the first phase of research, was very homogeneous in terms of content structure and use of social learning methods. This course had a Twitter feed, but the link to that feed only appeared in the course information page, which contained an introductory video and course overview; Twitter was not mentioned again in the first three weeks of content I reviewed. Instead, all communication between students, instructors, or teaching staff, took place through the FutureLearn implementation of discussion forums.

This course took place over eight weeks; instructors released new content on the same day every week. Each week's content was broken into between 16 – 25 portions; some contained an audio-, video-, or article-based lesson, and the others were quizzes, tests, or discussion breaks. The course contained between two and four discussion breaks each week, which were directed prompts for student discussion on a dedicated, unthreaded forum. Discussion breaks asked students to consider a brief problem or situation and discuss their ideas for a solution. The questions asked tended to be debatable, without clear right or wrong answers.

Each audio, video, and article section offered a “comments” section to students. While there were no prompts to enter comments, the comments section were always populated;

typically with over 50 comments and sometimes hundreds. When on a given forum, whether it be a comment forum or a discussion break forum, a student was only able to see that forum; rather than being threaded, forums were attached to specific places in the course and only visible there.

Forums were also not searchable in the manner of forums found on most other platforms, though they did offer the ability to up vote a post or follow a student. Forums were sortable by most voted, or by posts made by followed students. This allowed a student, after reading many forums posts, to find and select a small group of other students who they wanted to follow, and then only read those select few students. In addition to sorting options, there was a means by which a student could click on another person's name to see that student's biography page. The biography page listed all forum posts made by the student in any shared courses on the platform.

Phase Two Findings: Student Experiences with Social Learning Methods

I conducted thirteen student interviews to find their experiences with the methods used to encourage interaction and social learning in each of the four courses: four from Coursera, and three from each of the other three platforms. Students ranged in geographical location; four were from the United States, three were from the United Kingdom. The others lived in the United Arab Emirates, India, Indonesia, Laos, or Estonia. I anonymized student names, giving each the name of the platform and a number representing the order in which I interviewed them (e.g. C4 for the fourth Coursera Student, or FL2 for the second FutureLearn student interviewed).

Each of the students considered themselves to have strong reasons for taking their respective courses. Four students were taking the course for personal development or interest in the subject, four students enrolled because of work-related reasons, and five students had both

personal and career motives for taking their courses. Some students stated seeking social connections through the course. Some of the students who sought social connections appeared to be searching for professional contacts, while a few appeared to want contact with others to make social or emotional connections.

Each of the students was actively involved in the course, and each was generally satisfied with what they had achieved. While I sought students who actively used each social learning method linked to their respective courses, I could not collect data about activity in some of the methods. While not all students used every method available in each of their courses, I was able to find students who had at least an opinion, if not direct experience with each method. The students also relayed different experiences and opinions about the same or similar methods, even when from the same course.

I asked students about each method they used in their course and how that method affected their learning experiences. Follow up questions probed students to describe how each method affected feelings of being connected to other students or the class population as a whole. Answering the third research question required specific questions about how each method affected their learning or other course related outcomes. Further questions sought to elicit experiences based on common social learning conjectures.

These interview questions were specifically about experiences learning metacognitively through teaching, learning from expert others, learning through cognitive conflict, learning through cooperative activities, and increased learning because of social connection. I coded student learning experiences based on these conjectures as: *metacognition*, *expert others*, *cognitive conflict*, *group*, and *social connection*. While students relayed experiencing social learning through these conjectures, students often did not specify their positive learning

outcomes as “learning.” Students usually had a difficult time defining these experiences. A commonly expressed sentiment was what student from England (FL3) described as, “contributed to my understanding... perhaps not in the same way as the lecture materials, but certainly in another way.”

When students were able to recall experiencing positive outcomes from social learning methods, they described their learning in three different ways: purely informational, awareness of different opinions, and sharing of experiences. I coded these learning experiences as *knowledge*, *opinions*, and *experiences*. Students described knowledge learning when they received information, or were able to strengthen their understanding of a concept through social learning activities. This occurred frequently when students learned by having a problem explained by another student, and sometimes when teaching or explaining a concept to another student.

Frequently students stated that while they did not in fact learn from interactions with other students, that they felt a broader understanding of topics by viewing different opinions on a subject. Students often remembered opinion learning through cognitive conflict. Students also typically valued hearing others’ experiences, but did not refer to this information as knowledge or learning either, instead stating that they appreciated hearing about others experiences and found value from that aspect of the course. Students often reported experience learning during cooperative learning activities, and interactions with small groups, but sometimes by reading forums.

How a student described their learning experiences also differed based upon how they saw their understanding of course materials, when compared to other students or even instructors. Students who felt a strong understanding of course materials, such as students E2 and

E3, did not describe increasing their understanding of the course, instead using descriptions like, “it stretched me” to describe their learning. If students were aware that their experiences with social learning tools contributed to their understanding, even if that just meant exposure to different viewpoints, they might have been more motivated to engage in social learning activities.

Table 5: Summary of Student Experiences – Social Learning Conjectures and Description of Learning

Platform Course and Student		Forums		Peer Assessment		Group		Face to Face		Synchronous Communication	
Coursera	Student 1	E	OX	E	OX						
	Student 2	C	O	E	KOX						
	Student 3	EC	K								
	Student 4	MEC	KO	E	O			CGS	KO		
edX	Student 1	EC	K			ECGS	KOX			ECGS	KOX
	Student 2	MCS	OX			EG	OX			MCGS	OX
	Student 3	MES	OX			MCGS	OX	S	OX	MCGS	OX
NovoEd	Student 1					ECGS	KOX			ECGS	KOX
	Student 2					MCGS	KOX			EG	KOX
	Student 3	E	K			MCGS	KOX			MCGS	KOX
FutureLearn	Student 1	MEC	KO								
	Student 2	EC	O								
	Student 3	CS	O								

Coding: Experienced Conjectures about Social Learning	
M	(Metacognition) Learning by teaching others
E	(Expert) Learning from others
C	(Conflict) Learning through cognitive conflict
G	(Group) Cooperative activities
S	(Social) Learning enhanced through social connection

Coding: Described Learning Experiences	
K	Knowledge
O	Opinion/ Viewpoint
X	Experience

While the data in Table 5 does answer the third research question, addressing the learning and other positive experiences of students, the findings may not represent a clear pattern of association. It is difficult to see a pattern between how students experienced peer interaction and

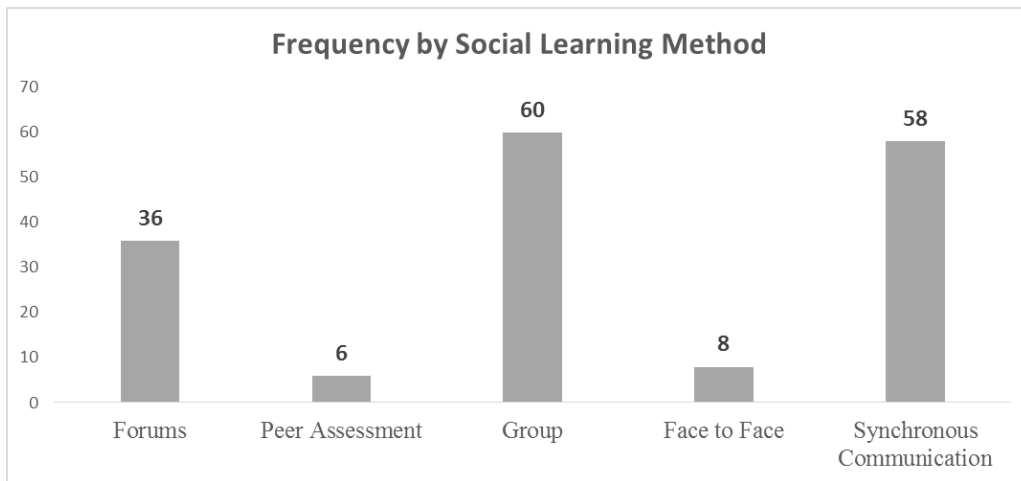
their descriptions of learning. The table does appear to show that both group and synchronous communication methods yielded fairly rich experiences for the each of the six students participating in them. While this sample size is too small to make a claim about the larger population of students in these courses, let alone other MOOC courses using groups or synchronous communication, the findings are at least interesting. Another way to look at this data, might be to examine the intersection between experienced conjectures and learning outcomes. Table 6 below shows this data for all social learning methods.

Table 6: Intersection between student reported conjectures and learning outcomes .

All Methods	Knowledge	Opinion	Experience	Totals
Metacognition	5	10	8	23
Expert	11	14	10	35
Conflict	12	17	11	40
Group	9	13	12	34
Social	8	15	13	36
Totals	45	69	54	168

The data in table 6 also does not suggest a pattern; both learning outcomes and social learning methods appear to be fairly evenly spread across categories. Dissecting this data by social learning method again highlights the apparent richness of learning experience reported by students using groups and synchronous communication methods. Of the 168 reported learning outcomes, over 70% (118) resulted in group or synchronous communication activities. Figure 1 below shows the counts for each social learning method.

Figure 2: Frequency of Student Described Outcomes by Social Learning Method



Again, while there are no immediate patterns between conjecture and learning outcome, it perhaps the richness of experiences in these two methods that are most interesting. These two methods consisted of the most learning experiences, even though less than half of the students (six of thirteen) participated in groups or synchronous communication methods in their courses. In comparison, discussion forums (in which each student participated) were the source of only 21.5% of learning outcomes. It is difficult to say that groups or synchronous communication alone are responsible for these learning outcomes, especially given the overlap between the two methods (all group members interviewed participated in synchronous communications), these findings do suggest that these two methods merit further consideration by educators.

Finding #8: Motivation

Part of the second research question concerned how motivation to take a course affected student learning experiences. While students did not appear to attribute their success to motivation, each interviewed student expressed strong desires and sound rationale for taking

each course. Motivation for taking a course fit into four different categories: personal, professional, networking, and social/emotional. Students with a personal motivation expressed a desire to enrich their own knowledge of a subject that was of interest. Professional motivation took the form of students who enrolled in a course to gain job skills or knowledge. Networking motivation was related to professional needs, but were specifically aimed at increasing a professional network of like-minded people, or to gain social connections with others to benefit their career goals. Students describing social/emotional motivation appeared intent on enriching their social connections and creating closer emotional connections with others.

While the fact that each student interviewed was both motivated and successful does not make a strong case for causality, none of these highly active and successful students came into the course just to see what it was like. This suggested that motivation for taking the course may have helped these students be successful, but it would be difficult to make that claim, given that different students attend MOOCs for a variety of purposes (DeBoer et al., 2014).

Other than the motivation that brought each student to the course, another theme of motivation to participate in social learning methods surfaced. Some of it was metacognitive; five of the students showed a strong understanding about social learning principles. Student E2 from Canada stated, “The very best way for human beings to learn is to be inside of a conversation.” Student C2 from Laos regarded another social learning activity as “one of the main sources of learning and information.” C2 also described creating social connections as a part of his reason for taking the course, “I want to discuss with people that are in the same situation and how we can work together.” This student’s only real disappointment with the course was the inability to find someone to meet those criteria.

The other eight students expressed a general awareness of the value other students played in their courses. Student C1 described the ability to interact with others the course as “a huge opportunity.” Some of these students described the value of interacting with others in emotional terms, such as student C4, who stated “seeing others having trouble was...reassuring.” Five of the eight students who described their motivation for taking the course as being work related, also explicitly mentioned a desire to meet other students. Two of the students realized that they needed others with different skills to start a business, another two students had a desire to practice skills with others sharing a similar framework of communication, and one was looking for ideas from others working in the same field.

Another theme that emerged from the interviews was the idea that motivation, rather than leading to an increase in social learning, was actually a product of some reported social connections. Almost half of the students interviewed (six of thirteen) reported experiencing a sense of motivation from social learning methods. Two of these students described being motivated through forum use, for example FL1 from the UAE stated “it is motivating to see that if I am not sure of something, that I can post and people will give an answer” Student C1 described how feeling connected to other like-minded students on the forums “really motive[d] me in learning, participating in the course and listening in the lectures.”

Four students described motivation to participate in the course due to group activities. Student NE2 from India said the other members of the group “were giving...energy to go ahead with this thing...meet all the time...and watch the lectures every week.” Student NE3 from the Midwest of the United States, described how a few group members “who were really go-getters” kept communication from faltering and gave a “sense of belonging to the group.” NE3 credited

this feeling for helping to stay motivated to complete the course, observing not feeling this way in other MOOC groups, which the student had failed to complete.

Student C4 was taking the course with a friend. C4 credited being accountable to the friend as contributing to motivation to complete the course. C4 also noted that while enrolling in many other MOOCs on different platforms, this was the only one C4 had taken with a friend and the only one that C4 had completed. Because of this experience, C4 stated, “I do believe there needs to be a connection in some way to stay motivated...you need to...have some social pressure.”

Finding #9: Forums

The experiences of the students using forums ranged very widely, though each found them useful in some way. Each of the students in the NovoEd course used forums the least. These students used the large class-wide forums primarily at the start of the course as a means to find group members. After that, they appeared to use them primarily to receive assignments from the instructor. Only one of the three NovoEd students described using the forums after starting work with her group, and even then, it was only to ask questions that her group was unable to answer. NovoEd students preferred their group-only forums, NE3 explained that “any of the questions, even administrative...I asked [the group].” While none of the students complained the forums were difficult to use, it was common for students say they contained too much information.

One method instructors used to increase participation rates in forums was basing part of the grade on forum participation. Two students offered very different perspectives on this method; C1 appreciated this option and credited it as a motivation for using the forums. C1, in

fact, wished that the grading option was worth more of the grade, so that more people would participate. C3, a student from Estonia, remarked that the grading option resulted in more students making posts that were “more on the surface... [not] anything that...turned into a deep discussion.” C3 had experience in another MOOC without posting requirements, which C3 felt made forums “more manageable.” C3 believed courses without posting requirements reduced the number of posts, while increasing the overall quality, noting “people will only participate when they have something they want to discuss, rather than just putting something out there.”

The students in the FutureLearn course, who used forums exclusively to communicate (none of them used Twitter, the only other method of communication available on the course website), agreed with most others that the forums were a bit too large to take in entirely, FL3 stating that it would be “impossible...well impractical to read through every comment.” Student FL3 from the UAE stated, “I think there is a tendency to go through the course, just comment, and continue...never go back and read people’s [replies to your comments].” Student FL3 from Scotland tackled this problem with a strategy, “one of my goals is in each section to [read] some of the posts until I...find something of value or interest...before moving on.”

FutureLearn offered the “follow” feature to help students select and pay attention to posts of a smaller audience. Although each of the students used the follow feature, none of them followed more than a few people. FL3 was even unclear of how to best use that feature, stating “I put some people onto follow. I haven’t gotten any feedback. I’m not really sure how that works.” The edX course allowed students to follow a thread, which might have helped them watch specific threads of interest, but the students interviewed did not make extensive use of these features. Voting features were another way for students to help filter quality content. While a few

students used it occasionally, or at least attempted to, they tended to agree with student C3 who remarked, “I don’t think many people make use of the feature, so no it isn’t very useful to me.”

While the NovoEd course forums offered powerful search tools and were organized, all three students tended to use their groups more often; student NE3 from the Midwest remarked, “...honestly, it is just easier to ask the smaller group than to use search. The search yielded a number of different potential...answers and going through them was a painstaking task.” The Coursera students found the search features useful, but their course did not have groups. On the edX course, which also used groups, the three students interviewed each found the forums useful and did not report needing to use the search tool much. Instead, the forums for this course tended to be more interactive, with a great deal of back and forth communication. The explanation for part of this may have been due to the interactive and communicative nature of the course subject matter.

Another point notably different in the edX course forums, was that students described a real feeling of community among forum members. Student E2 “loved the forum...loved the interaction” and described the forum as “a safe space in many ways, as much as you can [have] online in a discussion forum with 27,000 people.” While the other two students stated feeling closer to those in their groups, they did maintain a connection to the others in the forum as a whole, perhaps put best by E3 from the United States, “in the absence of this course, there wouldn’t be that community. I don’t have a strong connection [to students in the forum] but I do have *a* connection.” E3 went on to describe the interaction on their forums, “getting in the forum and commenting, even as superficial as it is in this course – there is a caring connection.” Only one other student, who was in the Coursera course on environmental studies, described feeling a

sense of community on the forums. Student C1 from Indonesia experienced finding those on the forum to be people who “have the same thoughts as me [about environmental issues].”

None of the other students interviewed described a strong connection or feeling of community with other forum members. Some cited the enormity of the forums as being impersonal, as C2 who stated, “I think the forum is a bit wide....it’s not really good to make the relationship deeper.” These students described their use of the forums as more of a source of information than connection. For these students, even when they were very happy with the forums and used them to learn socially (posed and answered questions, engaged in discussions or debate) they did not report feeling much of a connection.

None of the students in the FutureLearn course, which relied upon forums almost exclusively, reported feeling socially connected to their peers. Student FL1 remarked that to feel something would require seeing a recognized student in the next course, but even then did not think it would be a strong connection. Even students not experiencing a connection did report learning using the forums to communicate. Each of them also described experiences teaching, learning, and witnessing or engaging in cognitive conflict via the forums. This seemed to indicate that forums were a viable method for student interaction and social learning, but were less likely to allow students to feel connected, absent other activities or specific content.

Finding #10: Peer Assessment

The Coursera course was the only of the four courses to make use of peer assessment, incentivizing participation with graded credit. Each of the four students had different experiences with this method of social learning. Three of the four students stated they would have preferred more than a numbered grade, which was the sole form of feedback available. They stated having

difficulty with the scoring in general, which was based on a score of zero through three, which they found not granular enough. Student C3 from Estonia elaborated, “If you just give...numeric feedback you can’t really tell them any points for improvement,” and recalled learning more from another course which offered space for a text comment along with the score.

Student C3 also recalled feeling that some of the marks were undeserved, “It seemed like people weren’t being very thorough...just careless with giving you marks and not considering what you said very well.” C3 also thought some students might not be following the grading rubric, “It seemed like if they didn’t like your idea they would mark you down even though [the grading was based on] ...how you expressed your idea.” Whether or not students were following the grading rubric, the absence of text feedback seemed to create confusion and mistrust, which may have hurt students’ ability to learn from peer feedback.

Although the learning seemed to have been somewhat impeded by the inability to give or receive narrative feedback in this course, three of the students had positive experiences; C2 from Laos even remarked, “One of the main sources of learning and information... [is] to grade...or read the work of others.” This student was the only of the four that described knowledge learning through peer assessment, which prompted C4 to rethink ideas about the course material after realizing the answers were “not good.”

Two more students recalled opinion or experience learning when viewing different answers to questions. Student C1 appreciated seeing different solutions to problems, while another appreciated that it was a unique window into experiences of others from around the world; stating, “they help me learn...the students were from all different countries and I get to see their experiences... especially when one of the cities is not ...common...I may not [be able to] get ... news about that city [any other way].” None of the students felt an increased sense of

connection to the other students they were grading or receiving grades from. Student C3 commented that peer assessments were anonymous, and C4 raised the fact again that there was no ability to express more than a number as feedback to your peer.

Finding #11: Groups

I interviewed six students from two courses using groups. Each of the students was active with their groups' activities and reported successful completion of group assignments. The edX and NovoEd courses implemented groups differently, and use them as a means to achieve different objectives. In spite of these differences, students across both courses reported similar stories about learning and making social connections with group members. The students described social connections in the edX course as being close, possibly due to the nature of personal information they were asked to share. Even students who reported feeling close to their group members thought that their social relationships would end after the course, except for a few who managed to connect with group members in person. The NovoEd members, whose work could continue into not only a second course (part two of the same course), but also into the development of an actual company, often described strong social connections. Student NE2 from India even used the word "friends" to describe a few team members seen in face-to-face meetings.

Groups were at the core of much of the coursework in the edX and NovoEd courses. Assignments for the edX course required students to meet virtually or in person, every week for 75 minutes, and conduct communication exercises. These group members met weekly via Google Hangouts or on the phone; E3 described teams as being a "safe space" for "opening up...and showing the others that they could [too]." Two of the three students were well versed in

the subject matter, and like student E2, tended to describe their learning as “expanding [a] conversation” or receiving “reflective... feedback.” The third student, E1 from the United States described internal changes taking place through group work, which helped the course content “hit home.” Two of the edX students described learning by viewing different viewpoints. Student E3 stated the group was “pretty homogeneous,” describing a group that was “more about listening and understanding and not pushing back on difference of opinion,” though the other two learned through cognitive conflict.

The NovoEd course asked groups to discuss and decide upon a business idea and then work together to form a business plan. The main problem students reported having in their groups came from two of the three NovoEd students, NE1 and NE3. They recalled that after the initial discussion of different product ideas, some group members would lose interest and become less involved. They felt that group members had become less involved because their ideas did not “bubble to the top.” Each of the NovoEd students reported experiencing conflict in their groups, which they primarily attributed to the initial phase of deciding on a business idea. Only one of the three, NE3, described this as a learning experience, stating an appreciation for the method for group decision-making suggested in the course; a skill to be used with a team at work.

The NovoEd groups also described experiencing “learning” in their groups more often and more decisively than anyone else interviewed. Two of the students were from a strictly technical background and relied upon group members to either reinforce, or make clear the subject matter being discussed in class. One student seemed to have learned more from the group than from course content. NE1 recalled, “I learned some from the course, but my teammates went through each assignment with me, so that I learned all of the particular pieces....they

shared with me one by one why each part was important and why it has to be in the business model.” Another student, NE2 from India, remarked how the group gathered members with diverse skills, so that they could each rely upon a person with the right skills to complete certain tasks. NE2 recalled learning more from the course, but also “learned a lot from those guys.” The third NovoEd student had a technical background, and was also quite familiar with business ideas, but learned from the process. NE3 felt the primary learning experiences were about working with teams, particularly overcoming challenges working with virtual teams.

Thought this student appreciated the group work, NE3 felt that communication was difficult, in fact “probably the biggest challenge I see from MOOCs in general.” This group wanted to communicate, but did not like the toolset offered on the NovoEd platform (though it offered the most or as many group communication tools compared to any platform I reviewed in Phase 1). NE3’s group decided to use a tool external to the platform, called Redbooth, which was designed for business collaboration. NE2’s group used Slack, a platform for business communication and collaboration. Each of the groups chose different ways to communicate; both used the NovoEd tools as well as email, texting, or “WhatsApp” (a common chat tool for mobile phones). The group with NE1 had a few members living near each other, and preferred face-to-face meetings.

Finding #12: Face-to-Face Meetings

Three of the four courses offered tools or forums to encourage students meet each other in person. The remaining course on the FutureLearn platform offered a means of communicating the course details to others through email or social media, suggesting students click the links to invite a friend. While none of thirteen students interviewed successfully setup face-to-face

meetings using methods prescribed by the course, two students were able to meet members of their group outside of a virtual environment.

One student, E3 from the Midwest, met with some group members socially, strengthening their personal connections. E3 felt it likely to continue the relationship with those met in person, but was unlikely to maintain a relationship with group members only known virtually. E3 felt these increased social connections were an important part of the course, especially when comparing it to another MOOC “that did have a lot of personal work, but didn’t have the connection with other people in the course...I don’t think that [other course] was as effective.”

Student NE1, from India, was able to create a group with some local members. The local members arranged meetings through platform communication tools and email. This student credited face-to-face meetings with not only increased productivity and ease of communication but also noted, “now we are friends” which NE1 found an important part of group work and professional life. NE1 found friendship important, recognizing that such social connections meant an increase in sharing of ideas and experiences: “I am a friend and they will also share their personal experience and...ideas that they do not share in their professional lives.”

Only one other student interacted with a fellow student in face-to-face meetings. Student C4 started the course together with a friend and the bulk of their interactions about the course took place in person. C4 described this relationship as being beneficial to the course, in terms of motivation and ease of communication, “I invited another person to take the class...that was the only online class I completed and finished on time and got a certificate was this class.” While face-to-face meetings happened infrequently, they appeared to have strong learning and

motivational benefits. In addition, students who met in person each described close and long-lasting social connections.

Finding #13: Synchronous Communication

The two courses using synchronous communication between students were also those using teams. The edX course assignments required students to communicate synchronously; without synchronous communication, students would be unable to listen and respond to each other during communication exercises. Students did not readily discern between synchronous communication itself and the activities carried out during this kind of communication, like E1, who clarified, “what we were doing...that’s why we grew close.” Synchronous communication for these groups was typically through Google Hangouts, but took place at least once over the phone.

The NovoEd platform also integrated Google Hangouts into their group toolset, but only one of the three NovoEd students reported using it. Hangouts on NovoEd required some setup and integration by the group members in order to be able to start a Hangout; two of the students’ teams appeared to simply prefer using different communication platforms developed for virtual teams. One student, NE3, was displeased with the NovoEd toolset and using an external platform. NE3 reported that some team members experienced difficulty and confusion when switching between NovoEd and the external communication tools. This student remarked, “The communication challenge is something that I think needs to be addressed or should be addressed with a tool.”

Finding # 14: Social Media

Although courses that used social media tools suggested students use them, and some course instructors were very active participants, none of the students interviewed used them extensively. The NovoEd course had the most prevalent and active social media presence. This course not only shared a large number of items on Twitter, they also had an active Facebook group with a large number of members from previous offerings of the course. Students interviewed either did not visit the page much, or were busy with group activities. One student, NE1 remarked viewing social media channels as “a distraction.” Even when student NE3 stated, “I used [Twitter] as a source of information” NE3 qualified the statement by saying, “not formally...I would glance at it sometimes,” also explaining, “I don’t use Twitter.”

Student C4 recalled noticing the Twitter feed on the Coursera course page, but was “focused on learning” and “wasn’t looking to be social.” Unlike other social learning methods discussed to this point, there did not seem to be an explicit purpose for social media; even instructors using Twitter or Facebook did not explain a purpose for why students should use them. Instructors did not describe them as serving any particular function. While awareness of a social media presence might have led to increased feelings of social presence, none of the students reported such feelings.

Finding #15: Social Presence

Other than Social Media, instructors used introduction forums and course maps in their courses, but students did not report feeling increased connection to other students. Student C3 described the course maps as, “interesting,” though C3 “didn’t care that much about them.” Two courses offered rosters, but students did not use them in a social sense, but more as a practical

means of finding groups or group members. Student C4 remarked that, “I noticed people put more social stuff in their profile...describing themselves,” but stated “My goal was to gain particular knowledge and get answers, not to network or know another group of people.”

The Coursera course used Google Hangouts, but not interactively. The students on this platform did not have much to say about them; only two of the four students watched them and only one described them as useful. While C4 recalled learning from them, C4 also appeared to feel an increased social presence, describing that the Hangout “...made if feel more like a regular class that you go to...like a TA discussion section.”

Summary of Findings

I conducted this research project in an attempt to understand the landscape of social learning methods used in massive open online courses. Social learning methods offered a way for educators to harness massive student enrollments in a way that helped instructors teach the same way, regardless of class size. I first surveyed course data to find different social learning methods offered by MOOC educators, and then interviewed students about their experiences in a few select courses. I hoped to offer some insight to MOOC educators about what social learning methods were available and how students might have experienced them.

The first phase of the research involved a thorough examination of eleven different MOOC platforms, hosting 267 different courses. I organized findings into thirteen different categories of social learning methods, and placed them into four ordinal ranks along a spectrum of social learning. These methods were: Forums, Peer Assessments, Groups, Face-to-Face Meetings, Synchronous Communication, Social Media, and Social Presence. These categories

emerged from themes found in the learning literature combined with inductive observation of the methods instructors used to promote social learning.

The methods that appeared least likely to encourage student interaction, which I labeled *minimal*, fell at the lowest end of the social learning spectrum. These methods appeared in courses that offered a tool to facilitate social learning, but without guidance for students about its use. Methods ranked minimal represented the majority of social learning methods across courses and platforms. The next rank on the social learning spectrum, called *promotional*, contained courses which offered some combination of techniques which appeared intent on guiding or persuading students to use a method. While several courses combined many different informative and persuasive methods together, I reserved the highest category, *integrated*, for methods requiring students work together in order to complete course assignments.

The data from the first phase drove the selection of four courses, which appeared to use social learning methods on the higher end of the spectrum; in ways that appeared likely to result in students interacting and learning together. I selected courses from four different MOOC hosts (Coursera, edX, NovoEd, and FutureLearn) to represent greater variability social learning methods. In addition, the subjects of the courses ranged greatly: environmental sustainability, communication for business and society, small business startups, and financial planning. From the four courses, I interviewed thirteen different students who were actively engaged in their courses' social learning methods. I selected these students when they were close to the completion of each course, hoping to find students with as much experience possible using social learning methods from their courses. Though interviewing these students was likely to skew the findings towards more successful experiences using social learning methods, the scope of this research project was small and I hoped to gather as much data as I could from each interview.

While every student interviewed made frequent use of the social learning methods in their courses, they often reported experiencing the same or similar methods differently. Students reported feeling some methods affected their learning more than others, and reported several ways of learning from each other through social learning activities. Students tended to report successful learning outcomes across methods, though they often had a difficult time articulating the nature of their social learning experiences. In fact, many students who described hearing different opinions or ideas from fellow students, did not define these experiences as learning. While they tended to appreciate hearing from their peers, they generally appeared to value social learning less than knowledge gained from course materials.

Many students reported feeling some kind of social connection with peers. Students who met each other through small group work tended to be most likely to create social connections, which in some cases resulted in face-to-face meetings and even friendships. These personal connections were perhaps most noteworthy, because some of the students peers reported receiving a social motivation, which they felt helped them complete their courses. Students reporting a sense of motivation through social connections represented almost half of those interviewed, and two students specifically credited this motivation with their ability to complete courses.

While student interactions in smaller and more synchronous methods appeared to result in the closest feelings of social connection, forums were the most prevalent method for communication in MOOCs. Though most appeared satisfied with forum use, only three students described feeling connected to their forum communities. Two students reporting social connectedness with others in forums were from the edX course on communication, which contained group work and content that seemed to make them feel part of societal change. At least

some feelings of reported social connectedness appeared to be a result of course activities, particularly those with small groups, but one edX student described feeling connected because of a shared worldview with other students. E1 reported being unable to find people who thought in a similar way that lived nearby. Similarly, student C1 described finding a community online that shared views on environmental issues and reported feeling connected to peers immediately upon reading the forums.

Other than instances of feeling connected to students en masse, the forums did not seem to be a method that students used to create strong personal relationships. Every interviewed student did use forums in their courses, and reported value in the information or experiences found there. Students agreed that the size of forums was too large to be absorbed completely. With the exception of FutureLearn, forums across platforms and courses tended to offer similar means of dealing with size. Each platform had a different mix of methods for finding or filtering useful information from forums, but nobody described any as being particularly noteworthy.

Typically, students could search forum posts for any combination of words or phrases of interest. Often they could vote for posts they found useful, and then sort forums by those that received the most votes from other students. Some forums allowed students to follow or sort posts made by a specific student. FutureLearn students, who used the forums exclusively as their means of communication, did so without a search function. FutureLearn discussion forums were attached to course content, and students were only able to vote and sort individual threads, though none of the students described using these features often. While students reported FutureLearn forums large enough to prevent them from reading every post, none mentioned the absence of a search feature as being problematic. Students in the NovoEd course on business startups, reported the least amount of forum use, preferring group communication tools. One

student reported the ease of group communication made forums less useful, because students could receive a timely and accurate response to any question in his group, without sorting through numerous search results.

Peer assessments, while they appeared generally higher on the spectrum of social learning during the first phase of the research, only appeared in one of the four courses from the second phase. Students from the Coursera MOOC on environmental sustainability, while sometimes finding the peer feedback useful, tended to dislike the implementation of these assessments. This course used peer assessments in a purely numerical format. Absence of a means to communicate more than a score may have contributed to what one student described as not trusting results of her assessments. Students in this class would have preferred the ability to offer and receive an explanation of numbered scores. Additionally, students did not describe feeling connected to peers due to assessment activities, perhaps in part because they were anonymous.

The use of social media, like Facebook or Twitter, while present in a large number of courses, did not appear to contribute to the learning or feelings of social connection of students interviewed. Students reported using these methods the least, and appeared to have only resulted in increasing the awareness of peers. Similarly, students did not seem to be aware of course maps, forum introductions, and student profiles; methods that seemed intent on increasing social presence and reducing the psychological distance felt in virtual environments.

The number and variety of social learning methods was large, and student experiences tended to vary greatly. In the next chapter, I review the research project, discuss the implications of the findings, and suggest ideas for future research. I also address the many limitations present

in this research project, which prevent the findings from offering definitive answers to questions about teaching and learning in MOOC environments.

Chapter 5: Discussion

Over the last few years, an increasing number of universities around the world have engaged in new ways of online teaching, which some even refer to as a movement (Rhoads, 2015; Rhoads et al., 2013); at the heart of the movement is offering high quality, free education to anyone in the world connected to the internet. Hundreds of universities around the world now offer Massive Online Open Courses (MOOCs), teaching via a model that allows massive numbers of students to enroll in any number of classes free of charge. A number of different organizations have emerged to offer platforms, or unique sets of web-based tools, to allow a single or small number of instructors to teach classes to the tens or hundreds of thousands of enrolled students. Each MOOC host offered a different mix of tools to help instructors design and teach courses, but many instructors have had difficulty understanding such a large audience in a fledgling virtual environment. Early MOOC instructors experienced difficulty teaching some courses, which resulted in catastrophic consequences for students (Losh, 2014).

In considering the challenges instructors face, I sought to address a small part of the problem through this dissertation project, in terms of understanding the ways in which social learning is and may be used in MOOC environments. Social learning methods appeared to be a natural fit for MOOC environments; allowing students to help peers meet individual learning needs that may have otherwise been impossible in massive online environments. Accordingly, this research project studied the methods MOOC educators used to promote social learning in their courses. After studying the social learning methods offered by 267 courses on eleven MOOC platforms, I gathered data from students' perspectives. I hoped that educators would benefit from insight into how students experienced courses intent on promoting social learning. It

was my hope that the experiences of even a few students could help educators understand how social learning pedagogy might be interpreted through the eyes of their students. While this research could not hope to offer a definitive means of improving MOOC pedagogy, a better understanding of social learning methods may have helped educators design and teach their courses.

Summary of the Research Project

In 2011 the first organizations began to form to create and offer platforms for hosting MOOCs, partially in response to the success of an experimental course taught in the fall of that year, in which two Stanford faculty were able to reach an audience of over 160,000 students. These instructors and the majority of MOOCs to follow appeared to model courses as an extension of the Open Courseware (OCW) and Open Educational Resources (OER) movements (Haber, 2014; Rhoads, 2015). Those involved in OER sought to share educational resources with other educators to improve the quality of education. This idea became more powerful and plausible with increased adoption of the internet, which allowed educators to share digital media with relative ease and duplicate materials at essentially no cost.

The OCW movement seemed to take OER ideas of freely sharing information one step further by offering resources from actual college courses. The OCW movement attracted widespread attention when MIT announced a plan to offer all of their course materials online for anyone to use freely; posting syllabi, readings, and sometimes even audio or video recordings of course lectures on a purposefully built website. MOOC educators later expanded upon the OCW and OER foundations to create courses more like classes taught in universities, introducing

homework, due dates (MOOCs are typically synchronous), and a discussion forums for students communication.

While George Siemens and Stephen Downes were responsible for teaching the first credited MOOC in 2008, they used the massive online format differently than most MOOC educators to follow. They based their course structure upon a fledging theory of learning called connectivism, which defined learning in terms of finding and creating sources of knowledge and then creating networks around those repositories (Siemens, 2005). Connectivists focused on creating knowledge networks with other connected learners, but did not address how low quality information might degrade learning based solely on connection to resources (Rhoads, 2015).

MOOCs did not gain popular attention until 2011, when two Stanford professors, Sebastian Thrun and Peter Norvig, taught their artificial intelligence course to 160,000 students from 190 countries (Markoff, 2011). Although Thrun and Norvig adopted Siemens' MOOC model and moniker, they did not stress connectivist learning principles, instead teaching closer to direct instruction model. Perhaps, as Rhoads (2015) has argued, the connectivist model of the MOOC was not as easily scalable as adopting aspects of direct instruction.

By teaching through a direct instruction model, instructors shared their expert information with students, reinforced knowledge through assignments, and later assessed learning through summative assessments. Direct instruction was rooted in an objectivist theory of learning, whereby information was something held by experts and then transmitted to students, who could be tested to verify some level of mastery. Objectivist theory was akin to what one might have seen in an apprenticeship: an expert, who possessed knowledge, skills, and abilities, could transfer these to an apprentice through instructional activities. The objectivist theory of learning has existed since the earliest days of education in the United States, and while

other theories have evolved, part of the reliance on direct instruction may have been a factor of its evolution. After all, the OER and OCW movements sought to share educational resources (or knowledge) with others, and MOOCs appear to have been improving upon those models. It may have been natural for MOOC educators to view teaching as transmitting knowledge to their students.

A cursory comparison might have shown some OCW courses that contained content identical to many modern MOOCs: syllabi, reading, and video lectures. The MOOC model seemed to have taken OCW courses with the richest sets of materials and added a time component. MOOCs had a start and end date, deadlines, and offered a certificate to students who met grading requirements upon completion. Additionally, because MOOC students enrolled in courses together, and typically were able to communicate through discussion forums, the MOOC model offered a way for students to learn socially; similar to social constructivist learning theories, which suggest learning takes place through a construction of ideas brought about by social interaction.

Indeed, the practice of social learning, which could range from simply asking or answering peer questions on a forum, to participation in collaborative activities, may have been a natural fit for the MOOC model. Social learning may have helped educators provide individualized instruction to students in courses with massive audiences and limited instructional personnel. Traditional universities have been typically able to offer more personalized instruction to larger audiences by hiring a staff of teaching assistants to supplement student learning in smaller settings. Traditional teaching assistant solutions would probably not be economically feasible for many institutions teaching MOOCs. Courses of even 20,000 students would require

hundreds of teaching assistants and made the promise of free education implausible; the cost of instruction would have been too high for many teaching institutions.

The use of social learning may offer a means to allow instructors to teach MOOCs effectively and economically, regardless of the number of students enrolled. If educators are able to use students to assist with the instruction of their peers, large student enrollments could solve the very problems they create. If instructors are able to design and teach courses in a way that results in students helping teach each other, such a course might work regardless of the number of students enrolled; as enrollments increase, so would the number of peers helping each other learn. Social learning methods, if effective at promoting social learning and student interaction, might offer a viable means of teaching MOOC.

Many MOOC providers seem to embrace the concept of students learning from peers, stating beliefs about the importance of student interaction and social learning. In addition, many MOOC providers offer tools that enable educators to leverage the ability for students to learn with and from each other. Some platforms, like FutureLearn, provide social learning tools employed methodically; instructors build their courses using proscribed methods to encourage social learning. Other platforms appear to offer educators a highly customizable toolset and leave instructors to decide which, if any, social learning methods to employ. This results in a great variability in social learning methods used and experienced by MOOC students around the world.

To provide MOOC educators with advice on how to teach using social learning methods, it was important first to understand two things: the methods instructors were using to promote social learning, and how students were experiencing those methods. Presumably, to gain an understanding of students' experiences, it was necessary to speak with students who had used

social learning methods. The students most likely to have the most experiences of interest were those students who had engaged with social learning methods throughout their courses, requiring I speak with students who were among the most motivated to complete MOOCs.

Motivation was an important element in examining students' experiences. As early as 2011, Thrun spoke about motivation, attributing some of the success of his first MOOC to "the innovation of due dates."¹⁸ Thrun felt that due dates and a set course duration would act as a motivating force for students. While the MOOC model may offer more incentive to learn than earlier OCW courses, critics often point to low rates of completion as failures (Haber, 2014). Often, only around one in ten students enrolled in a MOOC will ultimately complete the course (Weller, 2014). There are many reasons why this may be happening, but some attribute the low completion rates to the ease of enrollment or a lack of motivation (Poellhuber, Roy, Bouchoucha, & Anderson, 2014; Rolheiser, 2014), while others point to the fact that many online users just want to explore a course, or seek different learning objectives (DeBoer et al., 2014; Nesterko, 2014; Rhoads, 2015). To understand student experiences with social learning methods, it was important to consider the influence of motivation, because I collected interview data from students who were likely to be more motivated than others typically found in MOOCs.

I designed a study to answer broad questions about social learning methods and student experiences. I studied MOOCs in two phases. The first phase involved collecting data about social learning methods from courses. I studied every course available to me that adhered to the common definition of a MOOC: those offered at no charge to students, available to anyone in the world, and without limits on the size of enrollments (Haber, 2014). I categorized the methods and evaluated their potential to promote social learning. During the second phase, I investigated

¹⁸ http://www.ted.com/talks/peter_norvig_the_100_000_student_classroom.html

four courses which appeared to be intent on promoting social learning through a variety of methods. From these courses, I interviewed a small number of active students about their experiences in the course, particularly their use of social learning methods. I conducted this two phase study to answer three specific research questions:

1. What are the different methods employed in massive open online courses to promote student social learning and peer interaction?
2. What do students report about their experiences with social learning and peer interaction methods used in MOOCs?
 - a. To what extent does student motivation to take a course influence students' reported experiences?
3. What learning outcomes or course-related benefits do students attribute to social learning experiences in MOOC environments?

Summary of the Findings

I gathered data from 267 courses from eleven different MOOC hosts (Coursera, edX, FutureLearn, Canvas/Instructure, CourseSites/Blackboard, Iversity, NovoEd, Open Course World, OpenLearning, Desire2Learn, and Open2Study). Each host offered different advice to students and educators about the importance of social learning. The majority of platforms were strong proponents of social learning in MOOCs, though many did not explicitly identify social learning or related pedagogical beliefs. At the minimum, hosts did at least discuss the use of tools which educators could have used to promote social learning.

The data collected from individual courses showed a much wider variety in social learning methods. There was great variation among courses from different platforms, but also

frequently between courses on the same platform. As I gathered data about how each course used a given method, I attempted to categorize methods along a spectrum of social learning, from those least intent on social learning to those that appeared most likely to promote peer interaction and learning.

Methods on either extreme were easy to see; those on the lowest end involved merely making a tool available by which students could interact, without prompting students to use them. Those methods at the highest end of the social learning spectrum stood out because instructors used them in innovative ways, often designing courses in a way that not only encouraged, but also necessitated student interaction as a means to complete assignments; these methods I called *integrated*. I found it difficult to quantify the methods in between with any certainty, because they typically involved a mix of different methods which Instructors combined to increase the promotion of social learning and student interaction. Many of the courses seemed to utilize a technique which might have increased the likelihood for students to participate or use that method. I called these methods *additive*, because they were not mutually exclusive with others in the same category, and could be mixed together for potentially greater success.

There were a large number of courses using a tool with one or more additive method, which I categorized as *promotional*; typically, this represented a course that stated a tool was important, or offered guidance on its use, but was below those that were exceptional. Further dissection of the methods along a social learning spectrum would have been not only difficult to quantify, but also would not have contributed much to the research. Because this research project did not attempt to measure learning outcomes quantitatively, the creation of additional categories would not only have been highly subjective, but would have not have contributed to the understanding of such subtle differences between methods.

A finding that was perhaps most surprising was the number of courses using tools at the *minimal* level: instructors offering tools in their courses without ever mentioning them. It appeared as though some instructors might not be aware of, or perhaps not feel the need to express, the value of social learning in their courses. Given that the majority of MOOC hosts had stated either outright, or alluded to, the importance of social learning on their platforms; there may have been problems with communication between hosts and instructors. Perhaps the instructors did not feel the need to repeat statements made by host websites, thinking that students might be aware of the importance of interaction.

If instructors had operated on this assumption, they may have been disappointed. During the data collection phase, finding the pedagogical beliefs or suggested use of social learning tools on forum websites was often difficult, even when actively searching. It is unlikely that most students would have seen social learning information on host websites. Some hosts, like Coursera and edX, offered links to instructional videos, and these often appeared on course pages as well. Watching these might also not have been sufficient to raise student awareness about social learning. Watching them would have necessitated that students be motivated enough to have spent additional time watching them. Also, the instructions tended to be more about technical use than about reinforcing pedagogy or educating students about learning from peers.

It may also be possible that instructors believed students who wanted to learn would have made use of whatever tools or materials were available to them. Perhaps instructors did not feel a need to explain forum use to students they may have rightly assumed to be internet-savvy. It may have been likely that simple instructions or a brief promotion about forum use might have had a positive influence on the quantity or quality of student interaction and learning. With enrollments in the thousands, even a small increase in the likelihood for students to use forums could have

resulted in overall improvements in social learning. If instructors knew this, perhaps they would have spent a few minutes adding this content to their syllabi.

Instructors, by making students aware of social learning methods and available options, might have also helped students be more aware of different kinds of learning. The students in this study did not frequently report social learning outcomes in terms of learning. Instead, students described their experiences as valuable, indicating they had benefited from other students' opinions or life experiences. Many educators would have described what students had experienced as not only valuable, but also a kind of learning that is difficult to attain without a social component. If students would have participated in courses with a better understanding of what they could learn from each other, they might have been more prone to engage in social learning methods. In addition, an increased awareness may have led to increased participation, stronger relationships, and perhaps even increased motivation to complete their courses. The findings suggested that close social connections and motivation may have been the result of students interacting in smaller audiences than discussion forums.

Most courses relied upon forums exclusively for social learning and did not engage in any of the other six categories of social learning methods (Peer Assessments, Groups, Face-to-Face Meetings, Synchronous Communication, Social Media, or Social Presence). Instructors seemed to use peer assessments in a manner that placed them high on the social learning spectrum; 49 out of 51 courses were promotional. Instructors gave instructions and a grading rubric with every peer assessment assignment, meaning none belonged in the minimal category. Instructors appeared to have held peer assessments in high regard, often mentioning them as important and typically grading assessment activities to encourage student participation. The high placement of so many peer assessment methods may be partially explained by the fact that

Coursera hosted 33 of these 51 courses, and Coursera had long used peer assessment as a foundation of social learning in its courses (Piech et al., 2013).

The use of groups was another category that yielded interesting data, though the raw data did not appear to be an accurate description of how instructors were using this method in their courses. The data appeared too skewed by one platform that offered groups as part of what seemed to be a homogeneous set of course tools. The 22 courses on the OpenLearning platform accounted for most MOOCs offering groups without integrating them into course content. It may have been unlikely for students to have created study groups without any obvious reason to do so; indeed, it did seem rare for the OpenLearning courses to have any student groups at all, and most courses had none. If I had excluded this platform's data, groups would have been the least frequently used social learning method, yet also one I would have placed highest on the social learning spectrum. A little more than half of courses used groups with seeming intent, and a full six courses stood out as integrated, making it the category with the most methods in the integrated category.

Another method that seemed promising was face-to-face meetings. This method appeared primarily on the Coursera platform, which offered a tool for arranging in-person meetings with other students. Other platforms offered built in tools or purposeful forums for the same purpose. Instructor use of these methods fell lowest on the social learning spectrum, with none classified as promotional or integrated, and only five of the courses promoting face-to-face meetings. This category of methods fell lowest on the social learning spectrum, the potential benefit of face-to-face interactions seemed high. Again, this raised the question of why most instructors had not taken the time to encourage students to use this method.

The most difficult category to interpret was social presence. A great deal of research about online learning and distance education suggested students may have felt disconnected from each other in virtual environments (Kim et al., 2011; Liu et al., 2009). Student communication in MOOCs was most often text-based and asynchronous, a very lean kind of communication that may have left students feeling psychologically distant from one another (Lombard & Ditton, 1997; Otondo et al., 2008). Some researchers described those feelings as a lack of social presence; suggesting increased social presence, or feeling more connected to other students in an online class may improve student learning (Kop & Fournier, 2013). I did not see any discussion of social presence or the importance of feeling connected to other students mentioned on any of the MOOC host websites or in any of the courses. I did see activities which seemed intent on closing the perceived feelings of separation brought about by virtual classrooms. These activities, unlike the other categories of social learning methods, seemed to serve no other purpose than to remind students that they were taking the course with others.

Instructors used activities like self-introductions, detailed student biographies, self-portraits, and course maps, all of which appeared to be purposeful methods to humanize peers. Perhaps by reminding students that there was more to an identity than a name or an email address, instructors were attempting to remove the isolation that online learners might have felt. I found no clear evidence that instructors had such intentions, but these activities appeared frequently enough (in about one of four courses) to suggest they were there for some reason. It is possible that instructors used these activities as a way to make courses seem fun, but these non-learning activities did seem as though they might have increased social presence. Whatever the intent of educators, the next phase of the project hoped to use the experiences of students to interpret how these and other methods affected social learning, if at all.

The first phase of the research project surveyed the landscape of social learning methods occurring in MOOCs. Without the experiential component of the second phase, the phase one data could only have offered a cursory examination, limited by the perception and objectivity of one investigator. The second phase of the research, while answering the second and third research questions, also contributed to the understanding of how students experienced methods that appeared intent on encouraging social learning in MOOCs. Because the scope of this phase of the research was relatively small, I gathered data I thought most likely to yield positive results. I first chose courses which appeared to be both using methods high on the spectrum of social learning, as well courses using a variety of methods. From those courses, I selected students who were actively using as many of the course's social learning methods as possible. These students were active and nearly finished with their courses, suggesting they were likely to have a great deal of experience using the social learning methods in their courses.

To answer the third research question, I asked specific questions about how various social learning methods might have influenced students' learning experiences. I asked questions about learning according to five conjectures about social learning, which I coded: *metacognition*, *expert others*, *cognitive conflict*, *group*, and *social connection*. Metacognition referred to learning through teaching. Expert others learning occurred when a student learned from a peer. Cognitive conflict learning occurred through disagreements and different opinions of peers. The group code described learning from cooperative group activities, and social connection represented increased learning from feeling socially connected to others.

One interesting finding from these questions was the nature of how students described positive outcomes from these five conjectures. In fact, while students described finding value in these different kinds of peer exchanges, they did not frequently describe learning in a traditional

sense. Instead, they focused on two other benefits: hearing others' opinions, and the value of others' experiences. While these two positive outcomes might perfectly describe particular kind of learning found through quality interaction with peers, students tended to rate these experiences as somehow less than other kinds of learning.

When examining the stated learning outcomes and other benefits described by students, it was clear to see that group work and synchronous communication methods yielded a rich set of experiences. Almost half of the students (six of the thirteen) participated in courses that used both groups and synchronous communication methods. These six students attributed the majority of their learning experiences to group and synchronous communication interaction, which in turn made up 70% of the total learning outcomes reported by all students across all methods.

It is difficult to tell from these findings if such rich learning is a result of either method, or some combination of the two. For example, the findings could have reflected increased learning from small group work, and the results of synchronous communication might have been merely a manifestation of learning gains made through groups. The converse may also be true. It is probably more likely that the two methods either worked together, or influenced each other in some way. It would be interesting to see how the two methods played out in isolation. The sample size of the second phase of this research was too small to make any real claims of generalizability, however the strength of these two methods together does suggest they are worthy of further inquiry. In addition to learning outcomes, these methods also seemed to help students in unexpected ways.

Perhaps the most interesting finding from the thirteen students interviewed was the interplay between motivation and social learning methods. All of the students expressed being motivated to take their courses, which I expected to be part of why they were close to finishing.

Many of the students, particularly those enrolled in courses to enhance professional skills or create business opportunities, stated a desire to create new relationships with other students as part of their motivation for taking a course. It may have been reasonable to expect students be more involved in social learning methods as a means to create professional relationships.

Perhaps the most interesting interaction between motivation and social learning methods resulted from students who stated finding motivation from social connections they made with other students. Six of the thirteen students credited social learning methods with providing motivation to stay active in a course and not drop out. Four students created connections during small group activities, which often involved synchronous communication, and occasionally face-to-face meetings. Another student experiencing social motivation, had signed up for his course with a friend the student regularly met with in person; this and another student also mentioned some forum activities as providing motivation.

Students who participated in face-to-face meetings tended to express the strongest feelings of social connection. Students engaged in small group work also tended to express strong feelings of being connected, and group members appeared more likely to want to meet in person. These results, when taken together, suggest that students were able to create stronger social connections through activities with smaller numbers of students. Because those strong social connections seem to have had a motivational effect on some students, group work in MOOCs may have resulted in closer social connections and ultimately helped motivate students to complete coursework.

Students in small groups were also the only ones to report using synchronous communication methods; communication which may have contributed to the feeling of closeness. The students in the NovoEd business startup course reported not only using the tools

provided by the course, but also reported using other methods to communicate. Students in this course shied away from the course forums, which they saw as less efficient, and reported relying more upon group members for quick answers to even simple administrative questions. Students described forums as being vast and infeasible to read in their entirety. Different platforms offered forum tools which allowed students to search for or filter forum data, but none of them stood out as being more or less useful to students. Even the FutureLearn platform, which relied solely on forums and yet offered no means of searching content, seemed a perfectly viable means of communication to those interviewed.

However, few students described feeling a strong social connection to others through forum communications; of the rare exceptions were two students who felt a connection to the class as a whole. These students suggested social feelings might have occurred because of other social learning activities, or because course materials resonated with personal beliefs, rather than being a result of forum interaction. These findings suggest that forums, while useful to the majority of students interviewed, may not have been an effective way of generating the close social relationships that students attributed to increased motivation.

At the very least, forums did seem to provide a way to learn from other students, and may have increased peer awareness, or social presence. Students reported similar experiences with social media. Though almost 40% of courses used social media in some way, the students interviewed did not report using these methods to learn or create social connections with others. These findings suggested that any impact at all may have only been an increase in social presence too small for students to report noticing.

Increased social presence may have resulted from any of the social learning methods, but the social presence category contained methods which appeared solely intent on reducing the

perceived psychological distance between students. It is difficult to say whether these activities were successful, because students did not report being aware of social presence or describe feeling changes in awareness of peers. Students were, when prompted, sometimes aware of increased feelings of connectedness with other students; typically when they created close relationships. It is difficult to say what kind of impact social presence activities may have played on students, if any.

Recommendations for Instructors

There are a few small additions or changes that instructors could easily adopt, which might influence students' propensity to use social learning methods. This research has shown that a majority of MOOCs offer social learning tools to students without guidance or encouragement. Helping students understand how and why they should use a method, even one as ubiquitous as a discussion forum, could add value to MOOCs. Most of the students interviewed did not seem to be aware of the benefits of social learning, or place a great deal of value on the kind of learning that resulted from peer interaction. An increased understanding could lead to more, higher quality student interaction through social learning methods, and in some cases may help students feel more connected socially. The evidence from this research project indicates that some students may derive a kind of motivation from closer relationships with online peers. Increased participation in social learning could help alleviate the low completion rates seen in many MOOCs.

I will first list recommendations that would be relatively easy for instructors to implement; those not requiring substantive changes to course design or teaching style. These easier recommendations, if followed, may not dramatically increase student participation or

affect learning for all students in a course, but even a small increase in student participation rates could translate into improved learning for hundreds or thousands of students. The potential reward, given the small amount of work required for the first few recommendations, suggests they should be important considerations for any MOOC instructor. The remainder of the recommendations may require more effort, and might even require educators re-think how to structure or teach courses, but offer the most potential to improve social learning and motivation in MOOCs.

Recommendation #1: Promote and explain the value of social learning to students.

MOOC instructors could mention the value of interaction, or discuss how social learning methods could help students learn; and many do so in their syllabi or course information pages. Every instructor could accomplish this with minimal effort, by writing a few paragraphs explaining why a student should engage in a course's social learning methods. Students who understand the educational and motivational value of interacting with peers may be more likely to engage in social learning methods, which could lead to increased motivation or other positive learning outcomes.

Recommendation #2: Explain how students can use social learning methods.

Building upon the first recommendation, instructors could also explain how students should use different social learning methods to improve their learning. Even simple instructions about how to participate, or how to offer and respond to criticism, may help students use social learning methods in ways more likely to result in quality interaction. Improving the quality of interaction could increase the learning potential for a number of students.

It may not take much time for instructors to write a brief description of the social learning methods they use in their course, and explain specifically how and why their students should engage in their use. If even a small number of students were to engage with each other in more meaningful ways, they might begin to change the culture of communication in a MOOC and improve learning. Such a shift could even span multiple courses and platforms if these students continued to participate in MOOCs.

Recommendation #3: Encourage students to use social learning methods.

This research project highlights several ways that instructors used to encourage participation in social learning methods. Other than incentivizing participation with some kind of reward, instructors typically used grades to encourage student participation. Findings from this study suggest grading incentives alone may lead to a perfunctory use of a method; students may grade each other's work without much thought, or participate in forums without contributing to a conversation. The massive size of enrollments prevents instructors from evaluating the quality of student interactions, but they might be able to use other students to aid in this task.

Forum contributions, for example, would be difficult for instructors to grade based on quality, because it would require an enormous staff or highly specialized software. If MOOC educators were able to take advantage of tools that already exist, they might be able to evaluate student participation using other students. Many forums contained voting features, for example, that in some courses did not seem frequently used. If instructors could find a way to persuade students to use voting features, students could sort higher quality forum posts from the rest. Voting could aid instructors in evaluating the quality of posts.

Instructors might use voting not only as a way to evaluate the quality of posts, but also for grading purposes. If instructors were to base grades on forum participation, voting participation, and quality of posts (as determined by the number of votes received from other students), forum content might improve. Students may be hesitant to post meaningless comments if they believe those comments are unlikely to receive votes (tied to participation credit). Furthermore, students might be more motivated to vote for posts if voting is part of their grade. This particular solution may not have the desired results in all courses; students might vote for posts at random without much thought. Yet, there may be some creative combination of the many tools instructors have at their disposal, which could be combined together to encourage meaningful student interaction.

If instructors, following the second recommendation, were more explicit about the value of social learning, and what kind of knowledge students could gain through interaction, they might incorporate social learning goals into their course activities. For example, an instructor might pose a homework question and ask students to discuss different possible responses. Instructors could direct students to the forums to discuss the merits of different answers, to be used to complete the assignment. Such an assignment could drive students towards forums, help students see the value of peer interaction, and increase student learning.

Recommendation #4: Model preferred use of social learning methods.

It may take a bit more effort for an instructor to model how a student should use a social learning method; certainly a bit more effort than in the previous three recommendations. Modeling expected student behavior may help drive home an instructor's recommendations for use. Some students may learn best by watching instructors perform these tasks, and all students

might benefit from an additional lesson on how to use social learning methods effectively.

Instructors could model how to use specific features of a social learning method or help students make use of underutilized, but powerful features like forum voting.

Modeling, even if done briefly at the start of a course, could help push an online learning community in a good direction. For example, an instructor could make a forum post, or reply to a post, to illustrate how they want student to participate. With a bit more effort, instructors could continue modeling activities throughout the course. Instructors might also offer formative feedback: highlight particularly good use cases, vote for quality posts, or correct students who exhibit suboptimal ways of engaging in a social learning method.

An instructor may be able to model forum use without spending a great deal of time or effort, but other methods may be more challenging. Something as time intensive as group work may not be feasible for a single instructor to model herself, but a small staff of teaching assistants might accomplish the same task. For such time intensive social learning methods, instructors might be also consider enlisting the aid of students. In this way, an instructor might more easily examine a few groups to find one operating at a high level, and then offer that group as a model for the other students. If finding an exemplar group is too time consuming, instructors might be able to use other students to screen out the majority of groups; perhaps by asking other students to report high quality group activities, which would yield a smaller number for the instructor to examine.

Recommendation #5: Allow and encourage students to explain peer assessment scores.

Courses using peer assessments should generally allow a text-based feedback component to allow students a means of clarifying feedback. Peer assessment use appeared generally well

implemented; instructors tended to offer instructions, encouragement, and grading rubrics, placing the methods high on the social learning spectrum. Even peer assessments restricted to numerical feedback appeared to be a good way to tackle the problem of grading assignments without a clear right or wrong answer.

There was no apparent reason for excluding a written component to this feedback. The data from this project suggests that absent a means for students to explain scoring, misunderstandings or mistrust might occur, perhaps leading to a decline in social connectedness. The written feedback need not be graded or required, and may not be used by every student, but could improve the quality of some peer evaluations. Considering the relative ease of adding this feature, it is difficult to see many cases when it would not be desirable.

Recommendation #6: Promote synchronous and face-to-face communication.

The students interviewed in this study who used synchronous communication methods, especially those who met other students in person, tended to experience the highest levels of connectedness, and in some cases described being motivated by close relationships with peers. An instructor could suggest students engage in synchronous communication with relative ease, using one of several tools freely available. Perhaps basing some course activities around live interaction would ensure that at least some students engage in this form of communication. This may be difficult for some instructors, who would need to alter courses to include exercises requiring synchronous communication.

Face-to-face communication may be difficult for most MOOC students to achieve, considering students typically reside in different parts of the world. However, the power that face-to-face communication seemed to have to increase student learning and motivation,

suggests it may be a goal worth pursuing. Even on a platform without a dedicated tool to schedule face-to-face meetings, Instructors could help students find each other through a dedicated discussion forum. Perhaps more students would seek out this kind of interaction if instructors spent time encouraging this behavior and informed students of its value.

Recommendation #7: Incorporate small group work into courses.

Small learning groups appeared to be an effective way of shrinking the massiveness of a MOOC and allowing students to connect to a smaller audience. Groups seemed to allow students to grow closer and even sometimes experience socially driven motivation. The students in this study who worked in groups were those most likely to feel connected and communicate with students synchronously and in person. Small learning groups, powerful though they may be, might also require a great deal of effort for instructors to integrate into their courses. Some courses contain content that might be a natural fit for small group work, like the edX and NovoEd courses in this research project. Other subjects, such as the hard sciences, may require more creativity to find activities which would require group work.

Such courses might need to include a component requiring the application of skills. For example, a math course may offer a problem which requires students apply one or more skills or techniques solve; perhaps even a problem which students could solve in different ways. It is difficult to fathom such a case made for simple arithmetic, but considering the content of most MOOCs is at or near college-level, it might be easier to think of something for a statistics or chemistry course. Creating problems like these may be taxing on instructors, but the interview data suggests they may be worth the extra effort; possibly resulting in improved student motivation and learning.

Recommendation #8: Exchange information about MOOC social learning methods.

MOOC Instructors, just like students, often seem to use tools they are familiar with; ways of teaching or communicating that they know to be effective. The data from this research project revealed several courses which hosted a portion of course content or activity on websites separate from the MOOC platform. It was not the norm, but also not uncommon to see a MOOC using a forum on a separate site, offering a different structure or toolset. Some students interviewed also indicated that they were unhappy with platform-provided tools and opted to use seek methods separate from the platform environment to supplement communication or collaborative work.

While this research project revealed that these activities were taking place, it is difficult to know exactly why instructors and students used other tools. If there was a place for students and educators to exchange experiences teaching and learning in MOOC environments, the community might begin to develop a sense of what best practices exist. In addition, the community could develop a sense of what features are available for different tools, and how educators might use them in their courses. Instructors may use social learning methods that would be useful to other instructors.

For example, while several instructors used Google Hangouts, the Unhangout variant appeared in only one of the 267 courses studied. Most instructors tended to use Hangouts as either a means of broadcasting live content, or a way for small student groups to interact synchronously. The Unhangout combined the one way broadcast feature with unlimited breakout rooms for small group communication, allowing for easy transition between the two formats. It is likely that some faculty using Google Hangouts would have appreciated the Unhangout tool if

they had known about it; perhaps these instructors might have hosted Unhangouts and made their courses more interactive.

It is likely that instructors and MOOC providers will continue to build tools that would be useful to many educators. Methods for encouraging social learning in MOOCs are likely to continue to evolve, but could remain hidden without a means of sharing ideas with others. MOOC providers may be aware of the best practices and methods they see on their platforms, but may be hesitant to share this information with other platforms, who they could view as competitors. An information exchange may function best if it were a product of a community of MOOC instructors and students, rather than an individual platform. This exchange would likely be web-based and could be maintained by a volunteer community of learners and instructors who care about improving learning. Many of the students interviewed in this research project seemed to care deeply about MOOC learning, suggesting there may be a community willing to participate in the maintenance of such an information exchange.

Recommendations for MOOC Providers

MOOC providers have a great deal that they can do to not only help instructors and students, but the research community as well. Some of the previous recommendations for instructors could be made easier with the aid of providers. For example, MOOC hosts might offer instructors a template or an easy means of including language about social learning through platform tools. While many MOOC platforms in this research project offered instructional videos to show students how to use platform tools, they typically did not explain social learning benefits. Teaching students how to learn may be important enough to separate from content about how to navigate a course website or change a password. Internet-savvy students might not

watch technical instructions, but may be more receptive to explicit instructions on how to learn with fellow students.

Every provider should be doing the most it can to improve learning, not only in their own courses, but also with anyone using the MOOC model to teach or learn. The MOOC industry and teaching model is still in its infancy. MOOC providers cannot hope to succeed, if the model itself fails to be fully realized. The overall viability of the MOOC model is probably more important to individual providers than their apparent desire to keep data from competitors.

Recommendation #9: Share MOOC data

The lack of available course-level data presents a barrier to MOOC research. It is understandable that there are many MOOC platforms struggling to find a way to profit using a model which does not charge students for their education. The lack of data may be seen as protectionary by MOOC hosting companies, but they may be doing more harm than good by protecting their data. Much of the data available about MOOCs appears to have been released by individual instructors. Initially the low completion rates appeared surprising, and may have led researchers to wonder if MOOC hosts were keeping their data private to hide problems with their implementation.

Not only would an open exchange of data be beneficial to other MOOC hosts, but also better and more available data may help educational researchers understand problems and spot areas which could improve teaching and learning across platforms. After a few years of popularized MOOC teaching, and millions of student enrollments in thousands of courses, many may still question the viability of the MOOC model.

Though the model may survive without the availability of course-level data, MOOCs will have a better chance if a wider audience is granted access. Some researchers are already looking at completion rates, attrition timing, and other outcomes and establish correlation with course methods, content, or other factors; typically with a small slice of data granted by former faculty or an individual platform. If researchers could access more course data, from a broader set of platforms, the findings of MOOC research are likely to become more accurate and perhaps help teaching and learning efforts. MOOC hosts, currently fighting for dominance in the marketplace, and trying to remain viable, may have a better chance of survival if all platforms had a better understanding of how to successfully implement MOOCs.

Recommendation #10: Provide training for MOOC instructors

The findings from this research showed an apparent disconnect between statements made by MOOC hosts and instructors. While this research project could not explain the apparent differences in pedagogical beliefs, it does seem as though MOOC providers and instructors should improve communication efforts. There was also a large gap in how many instructors promoted, or failed to promote, social learning method use in their courses. Some of these issues could be addressed through training, which would open up communication between providers, and instructors. MOOC hosts should recognize instructors as experts at teaching a given subject, but instructors should realize that platform personnel are likely more adept at teaching MOOCs.

There are many university professors who have taught for decades, but there are none who have taught using the MOOC model for more than a few years. MOOC student bodies, tools, and other factors are different enough that some instruction on how to best teach could benefit a large number of instructors. Instructors armed with a better understanding of the unique

needs of MOOC student audiences, and how different tools and strategies might meet those needs, should have an easier time teaching and understanding students in a massive virtual environment.

Recommendation #11: Offer a variety social learning tools to educators

It appears that groups and synchronous communication might have important benefits to students, but most MOOC courses did not use these, and many platforms appeared to not make these tools available to instructors. Every platform should offer these basic social learning tools to instructors. For example, though Coursera is probably the biggest MOOC provider, they currently do not have a means for establishing small groups. One Coursera course did use small groups, but relied on forums for students to self-select their groups. FutureLearn, which proclaims a pedagogy based on peer learning, should consider adding additional tools in which students can learn together. All MOOC providers should be aware of the different social learning methods available and build them into their platform toolsets.

Recommendations for Educational Leaders

Some of the findings from this research project raise questions and suggest ideas for leaders in education to consider, whether they work at the primary, secondary, or university level. MOOC students appear to have benefitted from social learning methods and frequently attributed positive learning or motivational outcomes to their use; this raises questions about the importance of social learning in traditional classrooms. Encouraging students to learn socially is certainly not new, but may also not be understood by many students or educators. Increased

awareness and use of social learning, and perhaps even integration of free online education into traditional classrooms, could help students learn and become aware of their own learning.

Recommendation #13: Increase the awareness of the value of social learning.

The findings from phase one clearly indicated that many educators understand the value of social learning. However, the majority of courses did not appear intent on providing stimulus to engage in social learning pedagogies. Even some of the students interviewed, who were selected for their heavy use of social learning methods, did not appear to fully understand the importance of learning from peers, or understand the value of social learning outcomes. Educational leaders, through policy or professional development, could help faculty of K-12 or college institutions understand and value peer interaction and learning. Additionally, the leadership should stress that students themselves must be aware of why social learning is important, and what kind of positive learning outcomes might be found therein. Increasing this awareness should not only guide students to engage in peer learning in their institutions, but also help them as they transition into self-directed adult learners.

Recommendation #12: Begin incorporating social learning methods into early education.

Educational leaders at all levels could lead efforts to increase the level of student interaction in K-12 or post-secondary classrooms. While some may be doing so, schools might benefit from policies addressing inclusion of group or collaborative learning. Not only could such efforts lead to improvements in learning, but also may have the added benefit of helping students develop social skills they need both personally and professionally. Some social learning pedagogy requires real intent in order to implement in classrooms. Educational leaders need to

understand this and allocate resources for professional development and activities to help instructors alter courses to include peer-based learning.

Recommendation #13: Experiment with online learning and MOOCs.

In addition to efforts within classrooms, educational leaders might collaborate with MOOC hosts or other low-cost providers of online education. K-12 institutions may find ways to bring university level discourse into their classrooms by having their students interact with other senior students from around the world. This could help students understand what it is like to learn from more expert peers, while also helping students learn to question data coming from non-traditional sources. If leaders would bring this kind of exposure to children before they reach postsecondary education, students may become comfortable with a model of learning that allows them to broaden their knowledge and skills well into adulthood. As the MOOC model continues to evolve, it is likely to offer a richer and more diverse set of content. Students graduating from high school with the skills necessary to take advantage of this free education should be better equipped to continue their adult education. Students entering college with MOOC exposure might also be able to experiment with different fields of study before entering college, perhaps helping them eliminate a change in major and saving them time and money.

Recommendations for Social Learning Scholars and Theory

The findings of this research also suggest ways in which social learning scholars might proceed with their research. A surprising and potentially remarkable finding from this research project concerned the interplay between motivation and social connection. Social learning

scholars, while they may see the value of learning outcomes resulting from social connectedness and interaction, might also try to account for the effects of motivation.

Recommendation #14: Investigate influences of motivation on social learning.

Exploring the relationship between motivation and social learning in depth may yield interesting results for both practice and theory. Scholars might benefit from a theory about how motivation influences a student's participation in social learning, and how the resultant social relationships might develop into motivation. Perhaps the relationship is cyclical; a student might be motivated to learn, engage in peer activities, develop relationships with the peers, and then find motivation from relationships. A well-developed and tested model may help educators guide students suffering from a deficit in one of those three areas (motivation, peer learning, or social relationships). Such research could offer educators a better understanding of the interplay between these three factors, and offer powerful implications for practice.

The findings of this research project suggest that motivation, especially in a MOOC environment fraught with low completion rates, may be a more important use of and goal for social learning activities. A conceptual framework or model describing the relationship could help educators actualize the motivational benefits of social learning methods. The potential for MOOCs is high, due to the large numbers of potential students affected, but there may be a benefit to the study of social learning in general. By better understanding the interplay between social, motivational, and peer learning, scholars may help educators develop a better understanding of learning in general.

Limitations

This research project was constrained by a number of limitations, which may have impeded the reliability, validity, and generalizability of the results. During the first phase of the research, the coding of platforms, courses, and methods were a result of the work of one investigator. It is doubtful that a single person could remain completely objective while collecting and analyzing the data, thus the findings may not be reliable. Additionally, part of the data collection concerned evaluating the stated intents of different MOOC providers to discern the value placed on social learning methods. Not only did my interpretation of these statements affect the validity of the findings, but also any statements about social learning (or lack thereof) on platform websites, may not have accurately reflected the true intentions of providers.

In a similar fashion, I examined various course elements to gain an understanding of the importance MOOC instructors placed on social learning. Only a small percentage of courses stated outright that social learning was important or included activities to increase student interaction. In those courses, it seemed likely that the data accurately reflected instructors true feelings about social learning. The majority of courses did not appear to contain stated instructions or beliefs about social learning methods, but it would be wrong to assume that none of the instructors from this group of courses were aware of or intended to use social learning in their courses.

Instructors may have found value in social learning and expected their students to interact and help each other learn, yet not have thought it necessary to encourage such behavior. In fact, the findings in this research project seemed to suggest that motivated students do find ways to learn, regardless of what methods are available, even if they needed to find tools outside of course websites. Instructors may have expected students to interact because of internal motivations to

learn, and may have thought prompting students to engage in social learning activities would be unnecessary for the group of students likely to complete their courses.

The fact that this research project did not gather data from MOOC instructors or hosts places severe limitations on the validity of data regarding their intentions. The scope of this research project was small, and there was not sufficient time to interview MOOC educators, which would almost certainly have added valuable data to the findings. The data in this research project does not claim to be an accurate representation of what educators thought about social learning, but instead reflects the attitudes that might have been apparent to a student reading course websites. Many findings from this research project cannot be validated without additional interview or survey data from MOOC educators.

In addition to time constraints, the findings were made unreliable due to the sheer size of the data collected. The MOOC forums were enormous, and data often appeared in forum threads that did not appear anywhere else in the course. I almost certainly missed data while searching through the materials of 267 courses over six months. Other than the vastness of the forums, the complex and differing structure of courses made methodical searching difficult; necessitating I change search protocols when moving from one platform to another. Data about social learning methods were often difficult to find. Even data on the same platform appeared in different locations, which required the examination of the forums, syllabi, introduction pages, and communication from faculty in every course. It is very likely that I failed to capture some social learning methods during the data collection phase; the findings concerning social learning methods is almost certainly inaccurate and unreliable.

The small number of courses included in this research, relative to the total number of courses taught, also detracts from the reliability of this study, and prevents the findings from

being generalizable. While the data collection spanned six months, the data for any one platform only represents the courses open during a few weeks. The findings may not be representative of any given platform's course offerings, and do not offer a reliable comparison of platforms; in part because of the timing of data collection. The period of data collection resulted in findings reflecting what some platforms offered during the summer and others during the fall.

The data collection methods may partially explain why the number of courses between platforms varied so greatly; Open Course World only offered two courses (less than one percent of those studied), while Coursera offered 75 (or 28% of total courses). The large gap in the number of courses resulted in skewed findings, in which Coursera courses were most likely oversampled. The overrepresentation of Coursera courses, combined with the homogeneous set of tools offered to Coursera instructors, has skewed the findings and prevent them from offering a reliable view of typical MOOC offerings. The findings, while they offer insight into the variety of social learning methods used in different MOOCs, may not accurately reflect ratios of courses or social learning methods across platforms.

The findings which categorized methods along to a spectrum of social learning were also unreliable, because they depended upon the objectivity and understanding of one researcher. I organized the data based on research from the literature review, as well as my own interpretation of how students may have likely reacted to different kinds of promotion and incentivization. While I attempted to maintain a high degree of objectivity, it is likely that another research team would have created different categories or placed methods differently along a spectrum of social learning. The results of this first phase of research were not definitive, but instead suggested how an outsider might perceive MOOC educators using different social learning methods in their courses. These findings also provided data to guide the second phase of research.

The second phase had several limitations as well that prevented the findings from being an valid representation of what students learned or experienced while using MOOC social learning methods. The primary limitations were twofold: the scope of data collection, and students' interpretations of their own learning. The scope of the research project made it infeasible to gather data from more than four courses or more than a few students from each course. The findings highlighted the experiences of a few students from a few courses, and were not likely to have represented what other students experienced. This data may be valuable to the research community, because it offered an insight into how some students experienced social learning activities, but it did not offer any concrete or absolute findings.

Other than the small size of students interviewed, the sample selection certainly skewed results away from representing a typical student. Much of this was intentional; I interviewed students that would be most likely to have extensive experience using the social learning methods in their courses. These students represented a typically small proportion of students that were highly motivated and very likely to complete their courses (Poellhuber et al., 2014). Students who finished MOOCs were rare, typically representing only a small portion of enrolled students. The student experiences discussed in this research project did not offer data about the majority of MOOC students, who did not complete their courses (Ferguson & Clow, 2015).

Interviews from students who did not complete courses might have revealed data that could help the research community understand a larger number of students. Furthermore, analysis of data comparing highly active students to less active students may have yielded additional information to help educators understand how students learn in MOOCs. Gathering data from only the subpopulation of MOOC students who would finish their courses, detracts

from the validity of findings about how students experienced social learning methods in their courses.

The method of data collection in the second phase of this research project also may have impaired the accuracy of the data. The student interviews contained questions about how students learned and how they experienced social learning methods, but students may not have remembered, been aware of, or been able to convey their experiences accurately. The findings themselves revealed a large number of students who had difficulty articulating learning outcomes, instead describing social learning as something not quite the same as the knowledge found in course materials. This suggests students may not have been precisely aware of what they learned, how they learned, or how different social learning methods may influenced them. Because the data collected in the second phase of this project was a product of student interviews, it was dependent on the accuracy of memories, thought processes, and communication abilities of students, which may have reduced the validity of these findings.

The limitations to reliability, validity, and generalizability suggest that this project, while it answers the research questions, does not provide definitive or absolute solutions to the problem of how to teach MOOCs effectively. The findings also cannot hope to offer educators an accurate picture of how most students might experience social learning methods. This research does not provide an end, but perhaps offers place from which the MOOC community might start a conversation about social learning. If educators hope to teach MOOC students in ways that do not require additional resources as enrollment sizes skyrocket, social learning methods may prove to be effective way to improving learning. Additionally, the findings suggest some students may find motivation through social connections with peers; MOOC educators may wish

to explore social learning methods as a means to assuage the problem of low completion rates found in many courses.

Future Research

This research project, while not conclusive in finding solutions guaranteed to be effective for every (or perhaps even many) students, has raised issues which beg further exploration. The resources and scope of this research project were only sufficient to have opened a door to view social learning in MOOC platforms and courses. The findings from a few student experiences could not offer sufficient data on which to base decisions about best practices for teaching or course design, but did seem to suggest social learning methods may be worth considering. There was scant time to gather data about a student experiences from a statistically significant number of courses or about the perspectives of MOOC educators. Comparisons between different kinds of courses, students, or any correlation with learning outcomes might have also provided useful information to educators. By examining these many additional factors, the research community may be able to understand the current learning situation in MOOCs; to understand what is working and perhaps discover feasible ways to improve student learning.

Future research should include the perspectives from a broader audience than the small number of students interviewed in this research project. In addition to MOOC students, the research community would benefit from understanding instruction through the eyes of platform designers and instructors. The findings in this project revealed an apparent disconnect between the stated social learning goals of some providers and instructors. This may have been the result of differing opinions or teaching styles, or due to a simple lack of communication.

Understanding the process of creating a MOOC, from both instructor and provider points of

view, may reveal opportunities to enhance learning through minor improvements in communication or collaboration. It would be difficult to know how to improve course design and instruction without understanding these activities from the perspective of educators.

While I have argued that social learning methods, particularly small group work, might be a good fit for meeting the teaching and learning needs of MOOCs, it is entirely possible that other techniques may be better suited for different kinds of courses. Social learning methods may play out very differently in courses with different content or different learning objectives. It would be interesting to see how results from courses in hard sciences compare to the humanities, for example. It is likely that more research controlling for factors like learning objectives or subject matter may introduce best practices that differ by course type.

This research project also brought to light the learning experiences of a few MOOC students attempting to use social learning methods. Understanding how students experience social learning methods and how instructors might alter their courses to improve student learning, requires insight from a much broader group of students. This project focused on the rare few MOOC students who successfully completed their courses. Future research might offer greater insight by gathering data from the majority of students who tend to drop out after the first few weeks of a course. The non-completing portion of students, being the largest, must have a story to tell. The students from this study who reported dropping prior courses before completion, suggested gaining motivation from social connections with other students.

It may be true that some students gain motivation from social connections, but other students may not engage in social learning frequently or at all and still finish. It would be useful to understand what drove these students to finish, and investigate motivation from different sources. A fuller understanding of different students with varying results could shed light on how

students experience learning, and may help educators determine when, or for whom, social learning methods may be most useful.

Additional research might also include experimenting with specific social learning methods, especially when compared to completion rates or learning outcomes. The findings from the second phase of the research about students' described learning outcomes points to two methods that beg further research: groups, and synchronous communication. In this research project, the six students interviewed who had worked with groups, had also used synchronous communication in their courses. While the students appeared to experience rich learning outcomes through these two social learning methods, it is impossible to discern which (if either) method was responsible.

If MOOC educators were to experiment with individual social learning methods in a course, or in the same course taught more than once, they may discover ways of teaching more effectively, which could then be brought to other courses. By isolating teaching methods which correlate with desired results, MOOC educators may find methods which they can use to increase the quality of learning. The findings from this study seem to imply value in mixed methods studies. While the massive enrollment sizes of MOOCs should yield powerful quantitative data, an understanding of student and educator experiences may help researchers interpret findings.

In this research project, the student positive learning outcomes from social learning findings might have raised more questions than they answered. Some of these questions might be addressed through future research projects. Although small group work and synchronous communication seemed to yield rich learning experiences from the students interviewed, it is unclear why this is the case. There may be something happening within individual social

learning methods that results in richer learning experiences. For example, delving deeper into the experiences of students who find successful learning outcomes in groups, might highlight a phenomenon that results in strong social connections or improved learning. Such phenomena could be present in other social learning methods; such a discovery would be important for research and practice. The findings may instead represent some combination of motivation, opportunity, or communication method. If educators had data beyond the simple descriptions of methods offered by this research project, they may be able to operationalize success factors in their own courses and improve student learning.

Furthermore, while this research project hinted at the possibility of students finding motivation through social connections and peer interaction, especially in small groups, it is difficult to know how this might occur. There may be a relationship between the motivation to take a course, and students' tendency to find motivation from socially connected peers. This research project illustrated four different categories of motivations that guided students to enroll in their courses, but did not explore the association between these motivations and the motivation received from peers. A better understanding of this relationship, if it does exist, would help educators determine if and when social connections might help different groups of students.

Additional research in MOOCs is not only possible, but also likely to continue as the model continues to grow in popularity. As more people become involved, and more hosts and researchers release data to the rest of the world, this model of instruction is likely to improve. If MOOCs were to remain stagnant, we might not see much improvement over current offerings. Fortunately, MOOCs have a growing contingency of educators and investors who promise to pioneer new techniques and technologies, pushing this model of instruction forward. Only time will tell how MOOCs will evolve; the MOOC model may someday be remembered as a step

towards a yet undiscovered model of teaching, just as some may view the OER and OCW movements. Whatever the future of massive online education, MOOCs appear to have created a way for many more people around the world to access education.

Appendix A: Electronic Request for Interview

Hello [name/pseudonym],

My name is Andrew Hill and I am a graduate student at UCLA and I am studying MOOCs like the one we are in together. I am interested in how people learn, particularly in how people learn from each other in these kinds of classes.

I have seen you are active in the [method, e.g. discussion forums] and I wonder if you would let me interview you briefly about how you see the class going. Anything you tell me will be completely anonymous. I will never use your name or any identifying features, and I will not share anything you say to me with any of the instructors of this course. The interview should only take about 20 minutes and I will not ask about anything personal. I also would not want to you to answer any questions that make you feel uncomfortable – we can just skip anything you do not want to talk about.

We could talk on Skype, through a Google Hangout, by phone, or anything else that might work for you. For your time and participation, I can offer you a \$20 gift card to amazon. I can send this to the email of your choice as soon as our interview is complete.

Appendix B: Interview Protocol

These interviews will be semi-structured and I will strive to use simple, and easily understandable English. The questions are designed to answer the research questions and address particular conjectures about social learning. I will conduct interviews for the purpose of answering research questions number two and three. I will conduct interviews via Skype, Google Hangout, phone, or text-based chat.

Introduction and explanation

Thank you very much for talking with me. I am very grateful for your time. I am talking to people like you who are taking MOOC classes because I am very interested in how people learn. People that study learning believe that we learn better, when we work with other students. I am interested in your experiences in this course. If it is ok with you, I would like to ask you some questions about how you have talked to or worked with other students. Does this sound ok to you?

Warm up questions

First, I have a few questions about how why you are taking the class and how you like it.

1. Would you tell me a little bit about why you decided to take this class?
 - a. *(If subject does not identify learning or other objective)* What do you want to learn from the class, or how do you think it could help you?
 - b. Do you think you have/are/will get what you wanted out of the class?
2. Is there anything that you really like about the class?
 - a. Why was [identified aspect] so good? *(repeat for each identified aspect)*
3. Is there anything you do not like about the class?
 - a. Why didn't you like [identified aspect]? *(repeat for each identified aspect)*

Interview Questions

Next, I have a few questions about how your experiences working and talking with other students in class.

4. Something neat about taking a MOOC, instead of just studying on your own, is that there are other students taking the class with you. How do you think the other students in the class affected your learning?

[Repeat for each method used]:

- a. Was there anything about [method] that changed how you learned?
 - i. Why do you think that was?
 - ii. Could the teachers have used [method] in a better way?
- b. Was there anything about [method] that changed how you felt about the other students in the class?
- c. Was there anything about [method] that made you want to talk to the other students more or less?
- d. Think about yourself before and after using [method]. Can you tell me anything you learned about yourself or about how you learn because of [method]?

[If necessary to narrow scope of methods]: In our class, the teachers used [list methods] to get us to talk to each other and work together. Which of these did you use the most?

5. *[Repeat for each method of interest]:* In our class, I noticed that there the teachers use [method, e.g. discussion forums] to let us talk to other students about coursework. How did you like using this to communicate?

[Conjecture: People learn through cognitive conflict/argumentation.]

- a. Sometimes when we talk to other students, we find other people with very different opinions than we do. Can you remember this happening in this class?
- b. [If needed] Can you tell me a little more about it?
- c. Did you learn anything when that happened?
- d. How exactly did it help you learn? [or] Why do you think you didn't learn anything from that?
- e. Did this kind of thing happen a lot in [method]?

[Conjecture: People learn through interaction with expert others.]

- f. In these big online classes we don't get much help one-on-one from the teachers, and sometimes we get help from other students. Did anyone help answer questions you had through the [method]? Please explain what happened.
- g. How did that help you learn?
- h. Did this happen often through the [method]?

[Conjecture: People learn through metacognition by expressing their own thinking to others.]

- i. We talked a little bit about how others helped you using [method]. Did you also explain things to other students or help someone else who didn't understand something?
[if yes]
 - i. Please tell me about it.
 - ii. Do you think that explaining those things made you learn any more or less?
 - iii. [if yes] How did that help you learn exactly?
 - iv. Did that happen a lot in [method]?

[For cooperative learning methods]:

[Conjecture: People learn from cooperative activities.]

- j. In this course, the teachers asked us to work together. Did you work with others using [method]? Please tell me about your experience.
- k. Did you learn anything while working with the other in [method]? Please tell me about it.
- l. How did you learn from this exactly?
- m. Did this kind of thing happen a lot?

[Conjecture: Students learn when they feel a social connection with other learners.]

6. Some people that take online classes say that they feel connected to other students or part of a larger community, but others say they feel very separated. In this course, it seems like the teachers used [method] to make people feel like they are part of a group.
 - a. What do you remember about [method]?
 - b. How do you think that using [method] made you feel more or less connected to other students in your class?
 - c. How did that affect how you learned?

Appendix C: Phase One Data Collection Worksheets

For recording the list of MOOCs, email addresses and passwords to be used in phase one data collection:

MOOC Name	Platform Website	Notes	Signup Email address	Email password	MOOC site password

For recording pedagogical beliefs, tools, and other information pertinent to social learning at the MOOC host level:

Platform	Stated Theory/Beliefs	Tools Available	Notes

For recording pedagogical beliefs, tools, and other information pertinent to social learning at the Course level:

Course Name	Course Stated Theory/Beliefs	Tools/Techniques Implemented	Notes	University or Organization

Appendix D: Phase One Results - MOOC Host Social Learning Statements

MOOC Host Name	Social Learning Statements
Coursera	"...peer assessments...shown in many studies to result in...a valuable learning experience for the grader."
edX	"Use the latest in peer-to-peer social learning tools and connect with smart and passionate people, just like you, from around the world."
	"It's a proven fact that if you engage with others while taking a course, you're more likely to succeed."
	"If you haven't already, consider finding a study buddy!"
FutureLearn	"Our aim is to connect learners from all over the globe...with each other. We believe learning should be an enjoyable, social experience, with plenty of opportunities to discuss what you've studied, in order to make fresh discoveries and form new ideas."
	"We learn best when we share and debate ideas with fellow learners, to understand their different experiences and perspectives and to fill the gaps in our own knowledge."
	"We'll be building on these concepts of 'discussion in context' and 'following' over the coming months, so that social learning feels less like a forced conversation and more like a chat with friends about your ideas and what you've learned."
	"An intensive tutoring model can't work for massive-scale free courses, so we need to offer online support without a large network of tutors. The solution is to harness the power of the community, where learners can make immediate use of their newly acquired skills by sharing their knowledge with their peers."
	"Conversation happens in context and is integral to the learning experience. Social interactions are open by default to encourage vicarious learning and allow all to benefit from the discussion. We encourage everyone to be sociable because one of the best ways to learn is through talking with others."
	"We encourage learners to make connections to provide mutual support, challenge their ideas and remove the loneliness of distance learning. We create spaces for small groups to come together and reach shared understandings."
	"We know that students will achieve at higher levels if they feel a personal connection with their teacher and are socially engaged with their peers."
Canvas (Instructure)	

MOOC Host Name	Social Learning Statements
CourseSites (Blackboard)	"The interconnected, interactive nature of social learning exponentially amplifies the rate at which critical content can be shared and questions can be answered."
	"At every age level, people often take their writing more seriously when it will be evaluated by peers as well as teachers"
Iversity	"...students...learn with and from each other..."
	"...peer to peer learning is a core component of an open online course..."
NovoEd	"Get to know your fellow students around the world as you collaborate with them on course projects."
	"Our courses are built on sound pedagogical foundations to help you learn to be a better team player, creative thinker and problem solver in an active, social, learning environment."
	"Our innovative technology keeps you connected with other students so that you can exchange ideas, work on group projects, get feedback, and form relationships with other learners..."
	Work together to uncover creative solutions to interesting problems.
Open Course World	"What makes a course great?... [students are] discussing content with their peers..."
	"...hand over the learning to the students and get them to discuss and interact."
	"Building community is key."
	"Active learning occurs through discussion and collaboration ..."
OpenLearning	"...we find that the students who get the most out of our courses are the students who are the most involved."
Desire2Learn	"[tools]Allow students and teachers to collaborate, share and discuss..."
Open2Study	"...we find that the students who get the most out of our courses are the students who are the most involved. You may find that some of your classmates have been pondering the same thing you have."

References

- Allen, I. E., & Seaman, J. (2013). Changing Course: Ten Years of Tracking Online Education in the United States: Retrieved from Sloan Consortium website: <http://onlinelearningconsortium.org>.
- Allen, I. E., & Seaman, J. (2015) Grade level: Tracking online education in the United States. Retrieved from Sloan Consortium website: <http://onlinelearningconsortium.org>.
- Arbaugh, J. B. (2005). Is there an optimal design for on-line MBA courses? *Academy of Management Learning & Education*, 4(2), 135-149.
- Baumann, J. F. (1988). Direct instruction reconsidered. *Journal of Reading*, 31(8), 712-718.
- Beaven, T., Hauck, M., Comas-Quinn, A., Lewis, T., & de los Arcos, B. (2014). MOOCs: Striking the right balance between facilitation and self-determination. *MERLOT Journal of Online Learning and Teaching*, 10(1), 31-43.
- Bernard, R. M., Abrami, P. C., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., . . . Huang, B. (2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research*, 74(3), 379-439.
- Biggs, J. B. (1993). From theory to practice: A cognitive systems approach. *Higher education research and development*, 12(1), 73-85.
- Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science & Technology Education*, 5(3), 235-245.
- Blaschke, L. M. (2012). Heutagogy and lifelong learning: A review of heutagogical practice and self-determined learning. *The International Review of Research in Open and Distributed Learning*, 13(1), 56-71.
- Bloom, B. S. (1984). The 2 sigma problem: The search for methods of group instruction as effective as one-to-one tutoring. *Educational researcher*, 13(6), 4-16.
- Bordia, P. (1997). Face-to-face versus computer-mediated communication: A synthesis of the experimental literature. *Journal of Business Communication*, 34(1), 99-118.
- Bransford, J., Brown, A. L., & Cocking, R. R. (2000). *How people learn: Brain, mind, experience, and school*. Washington, D.C.: National Academy Press.
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational researcher*, 18(1), 32-42.
- Bruff, D. O., Fisher, D. H., McEwen, K. E., & Smith, B. E. (2013). Wrapping a MOOC: Student perceptions of an experiment in blended learning. *MERLOT Journal of Online Learning and Teaching*, 9(2), 187-199.
- Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research*, 53(4), 445-459.
- Clow, D. (2013). *MOOCs and the funnel of participation*. Paper presented at the Proceedings of the Third International Conference on Learning Analytics and Knowledge.
- Cobb, P., & Yackel, E. (1996). Constructivist, emergent, and sociocultural perspectives in the context of developmental research. *Educational psychologist*, 31(3-4), 175-190.
- Coetzee, D., Fox, A., Hearst, M. A., & Hartmann, B. (2014). *Should your MOOC forum use a reputation system?* Paper presented at the Proceedings of the 17th ACM conference on computer supported cooperative work & social computing.

- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*: Sage.
- Curtis, D. D., & Lawson, M. J. (2001). Exploring collaborative online learning. *Journal of Asynchronous Learning Networks*, 5(1), 21-34.
- Daft, R. L., & Lengel, R. H. (1984). Information Richness: A New Approach to Managerial Behaviour and Organizational Design. *Research in Organizational Behaviour*, 6, 191-233.
- DeBoer, J., Ho, A., Stump, G. S., Pritchard, D. E., Seaton, D., & Breslow, L. (2013). Bringing student backgrounds online: MOOC user demographics, site usage, and online learning. *Engineer*, 2.
- DeBoer, J., Ho, A. D., Stump, G. S., & Breslow, L. (2014). Changing “course”: Reconceptualizing educational variables for massive open online courses. *Educational Researcher*, 43(2).
- Dewey, J. (1909). *How we think*. London: D.C. Heath.
- Dewey, J. (1938). *Logic, the theory of inquiry*. New York: H. Holt and Company.
- Dillenbourg, P., Baker, M. J., Blaye, A., & O'Malley, C. (1995). The evolution of research on collaborative learning. *Learning in Humans and Machine: Towards an interdisciplinary learning science.*, 189-211.
- Driscoll, M. P. (2005). *Psychology of learning for instruction* (2nd ed.). Boston: Allyn and Bacon.
- Eom, S. B., Wen, H. J., & Ashill, N. (2006). The Determinants of Students' Perceived Learning Outcomes and Satisfaction in University Online Education: An Empirical Investigation*. *Decision Sciences Journal of Innovative Education*, 4(2), 215-235.
- Ferguson, R., & Clow, D. (2015). *Examining engagement: Analysing learner subpopulations in massive open online courses (MOOCs)*. Paper presented at the Proceedings of the Fifth International Conference on Learning Analytics And Knowledge.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American Psychologist*, 34(10), 906.
- Ford, J. K., Smith, E. M., Weissbein, D. A., Gully, S. M., & Salas, E. (1998). Relationships of goal orientation, metacognitive activity, and practice strategies with learning outcomes and transfer. *Journal of applied psychology*, 83(2), 218.
- Garrison, D. R. (1993). A cognitive constructivist view of distance education: An analysis of teaching - learning assumptions. *Distance education*, 14(2), 199-211.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The internet and higher education*, 2(2), 87-105.
- Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The internet and higher education*, 13(1), 5-9.
- Glance, D. G., Forsey, M., & Riley, M. (2013). The pedagogical foundations of massive open online courses. *First Monday*, 18(5).
- Goldberg, C. (2001, April 4). Auditing Classes at M.I.T., on the Web and Free, *The New York Times*. Retrieved from <http://www.nytimes.com/2001/04/04/us/auditing-classes-at-mit-on-the-web-and-free.html>
- Goos, M., Galbraith, P., & Renshaw, P. (2002). Socially mediated metacognition: Creating collaborative zones of proximal development in small group problem solving. *Educational Studies in Mathematics*, 49(2), 193-223.

- Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation*. Newbury Park, Ca: Sage Publications.
- Guo, P. J., & Reinecke, K. (2014). *Demographic differences in how students navigate through MOOCs*. Paper presented at the Proceedings of the first ACM conference on Learning@scale conference.
- Haber, J. (2014). *MOOCs*: MIT Press.
- Hase, S., & Kenyon, C. (2000). From andragogy to heutagogy. *Ultibase Articles*, 5(3), 1-10.
- Herring, S., Job-Sluder, K., Scheckler, R., & Barab, S. (2002). Searching for safety online: Managing "trolling" in a feminist forum. *The Information Society*, 18(5), 371-384.
- Heutte, J., Kaplan, J., Fenouillet, F., Caron, P.-A., & Rosselle, M. (2014). MOOC user persistence. In L. Uden, J. Sinclair, Y.-H. Tao & D. Liberona (Eds.), *Learning technology for education in cloud. MOOC and big data* (Vol. 446, pp. 13-24): Springer International Publishing.
- Jaggars, S. S., & Bailey, T. (2010). Effectiveness of fully online courses for college students: Response to a Department of Education meta-analysis. *New York, NY: Columbia University, Teachers College, Community College Research Center*.
- Jonassen, D. H. (1991). Objectivism versus constructivism: Do we need a new philosophical paradigm? *Educational technology research and development*, 39(3), 5-14.
- Karpicke, J. D., & Roediger, H. L. (2008). The critical importance of retrieval for learning. *science*, 319(5865), 966-968.
- Kim, J., Kwon, Y., & Cho, D. (2011). Investigating factors that influence social presence and learning outcomes in distance higher education. *Computers & Education*, 57(2), 1512-1520.
- Knowles, M. S. (1975). *Self-directed learning*. New York: Association Press
- Knowles, M. S. (1980). *The modern practice of adult education: From pedagogy to andragogy*. Wilton, Conn.: Association Press.
- Kop, R. (2011). The challenges to connectivist learning on open online networks: Learning experiences during a massive open online course. *The International Review of Research in Open and Distance Learning, Special Issue-Connectivism: Design and Delivery of Social Networked Learning*, 12(3).
- Kop, R., & Fournier, H. (2013). *Social and Affective Presence to Achieve Quality Learning in MOOCs*. Paper presented at the World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2013, Las Vegas, NV, United States. <http://www.editlib.org/p/115169>
- Kozinets, R. V. (2010). *Netnography: Doing ethnographic research online*: Sage Publications.
- Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in human behavior*, 19(3), 335-353.
- Kulkarni, C., & Klemmer, S. (2012). Learning design wisdom by augmenting physical studio critique with online self-assessment *Technical Report*: Stanford University.
- Lindeman, E. (1926). *The meaning of adult education*. New York: New Republic.
- Lipman, M. (2003). *Thinking in education*: Cambridge Univ Pr.
- Liu, S.-H., Liao, H.-L., & Pratt, J. A. (2009). Impact of media richness and flow on e-learning technology acceptance. *Computers & Education*, 52(3), 599-607.
- Lombard, M., & Ditton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer Mediated Communication*, 3(2), 0-0.

- Losh, E. (2014). *The war on learning: Gaining ground in the digital university*: MIT Press.
- Maor, D. (2003). The teacher's role in developing interaction and reflection in an online learning community. *Educational Media International*, 40(1-2), 127-138.
- Markoff, J. (2011, August 15). Virtual and Artificial, but 58,000 Want Course, *The New York Times*. Retrieved from <http://www.nytimes.com/2011/08/16/science/16stanford.html>
- Marton, F., & Säljö, R. (1976). On Qualitative Differences in learning: I - outcome and process*. *British Journal of Educational Psychology*, 46(1), 4-11.
- McGuire, R. (2013). Building a sense of community in MOOCs. *Campus Technology*, 26(12). Retrieved from <http://campustechnology.com>
- Merriam, S. B. (2001). Andragogy and Self-Directed Learning: Pillars of Adult Learning Theory. *New Directions for Adult and Continuing Education*, 2001(89), 3-14. doi: 10.1002/ace.3
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.
- Meyer, K. A. (2002). Quality in distance education. *ASHE-ERIC Higher Education Report*, 29(4).
- Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco, CA: Jossey-Bass.
- Moore, M. G. (1989). Editorial: Three types of interaction.
- Moore, M. G., & Kearsley, G. (2011). *Distance education: A systems view of online learning*. Belmont, CA: Wadsworth Publishing Company.
- Nesterko, S. (2014). MOOCs personalization for various learning goals *MOOC Research Initiative Final Report*: <http://www.moocresearch.com>.
- Otondo, R. F., Van Scotter, J. R., Allen, D. G., & Palvia, P. (2008). The complexity of richness: Media, message, and communication outcomes. *Information & Management*, 45(1), 21-30.
- Palincsar, A. S. (1998). Social constructivist perspectives on teaching and learning. *Annual review of psychology*, 49(1), 345-375.
- Pavlov, I. P., & Anrep, G. V. (1927). *Conditioned reflexes*: Courier Dover Publications.
- Peltier, J. W., Drago, W., & Schibrowsky, J. A. (2003). Virtual communities and the assessment of online marketing education. *Journal of Marketing Education*, 25(3), 260-276.
- Perna, L. W. (2014). The life cycle of a million MOOC users *MOOC Research Initiative Final Report*: <http://www.moocresearch.com>.
- Phipps, R. A., & Merisotis, J. P. (1999). *What's the difference?: A review of contemporary research on the effectiveness of distance learning in higher education*: Institute for Higher Education Policy Washington, DC.
- Piaget, J. (1952). *The Origins of Intelligence in Children*. New York: International Universities Press.
- Piech, C., Huang, J., Chen, Z., Do, C., Ng, A., & Koller, D. (2013). *Tuned models of peer assessment in MOOCs*. Paper presented at the The 6th International Conference on Educational Data Mining (EDM 2013).
- Poellhuber, B., Roy, N., Bouchoucha, I., & Anderson, T. (2014). The relationships between the motivational profiles and persistence of MOOC participants *MOOC Research Initiative (MRI) Final Report*: <http://www.moocresearch.com>.
- Press, A., & Tripodi, F. (2014). The New Misogyny. Retrieved from <http://chronicle.com/blogs>

- Reiser, R. A. (2001a). A history of instructional design and technology: Part I: A history of instructional media. *Educational technology research and development*, 49(1), 53-64.
- Reiser, R. A. (2001b). A history of instructional design and technology: Part II: A history of instructional design. *Educational technology research and development*, 49(2), 57-67.
- Resta, P., & Laferrière, T. (2007). Technology in support of collaborative learning. *Educational Psychology Review*, 19(1), 65-83.
- Rhoads, R. A. (2015). *MOOCs, High Technology, and Higher Learning*. Baltimore, MD: Johns Hopkins University Press.
- Rhoads, R. A., Berdan, J., & Toven-Lindsey, B. (2013). The Open Courseware Movement in Higher Education: Unmasking Power and Raising Questions about the Movement's Democratic Potential. *Educational Theory*, 63(1), 87-110. doi: 10.1111/edth.12011
- Rolheiser, C. (2014). Hatch, match, and dispatch: Examining the relationship between student intent, expectations, behaviours and outcomes in six Coursera MOOCs at the University of Toronto *MOOC Research Initiative Final Report*: <http://www.moocresearch.com>.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (1999). Assessing social presence in asynchronous text-based computer.
- Russell, T. L. (1999). *The No Significance Difference Phenomenon*. Chapel Hill, N.C: Office of Instructional Telecommunications, North Carolina State University.
- Rust, C., O'Donovan, B., & Price, M. (2005). A social constructivist assessment process model: How the research literature shows us this could be best practice. *Assessment & Evaluation in Higher Education*, 30(3), 231-240.
- Sadler, P. M., & Good, E. (2006). The impact of self-and peer-grading on student learning. *Educational assessment*, 11(1), 1-31.
- Seely Brown, J., & Adler, R. P. (2008). Minds on fire: Open education, the long tail, and learning 2.0. *EDUCAUSE review*, 43(1), 16-32.
- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for information*, 22(2), 63-75.
- Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, 2(1), 3-10.
- Smith, B., & Eng, M. (2013). MOOCs: A Learning Journey. In S. S. Cheung, J. Fong, W. Fong, F. Wang & L. Kwok (Eds.), *Hybrid Learning and Continuing Education* (Vol. 8038, pp. 244-255): Springer Berlin Heidelberg.
- Speck, B. W. (2002). Learning-teaching-assessment paradigms and the on-line classroom. *New Directions for Teaching and Learning*, 2002(91), 5-18. doi: 10.1002/tl.61
- Stahl, G., Koschmann, T., & Suthers, D. (2006). Computer-supported collaborative learning: An historical perspective. *Cambridge handbook of the learning sciences*, 2006.
- Strijbos, J.-W., Martens, R. L., & Jochems, W. M. (2004). Designing for interaction: Six steps to designing computer-supported group-based learning. *Computers & Education*, 42(4), 403-424.
- Suler, J. (2004). The online disinhibition effect. *CyberPsychology & Behavior*, 7(3), 321-326.
- Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, 50(4), 1183-1202.
- Swan, K. (2002). Building learning communities in online courses: The importance of interaction. *Education, Communication & Information*, 2(1), 23-49.

- Thorndike, E. L. (1906). *The principles of teaching: Based on psychology*. Syracuse, New York: The Mason Press.
- Tolman, E. C. (1932). *Purposive behavior in animals and men*. New York: The Century Co.
- Toven-Lindsey, B., Rhoads, R. A., & Lozano, J. B. (2015). Virtually unlimited classrooms: Pedagogical practices in massive open online courses. *The internet and higher education*, 24, 1-12.
- Tu, C. H., & McIsaac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education*, 16(3), 131-150.
- Vygotskiĭ, L. S. (1978). *Mind in society: The development of higher psychological processes*: Harvard Univ Pr.
- Wang, Y., & Baker, R. (2014). Learner motivation and course completion rates *MOOC Research Initiative (MRI) Final Report*: <http://www.moocresearch.com>.
- Watson, J. B. (1913). *Psychology as the behaviorist views it*: Psychological Review Company.
- Weller, M. (2014). Characteristics and completion rates of distributed and centralised MOOCs *MOOC Research Initiative Final Report*: <http://www.moocresearch.com>.
- Wen, M., Yang, D., & Rosé, C. P. (2014). Sentiment analysis in MOOC discussion Forums: What does it tell us? *Proceedings of Educational Data Mining*.
- Williams, E. (1977). Experimental comparisons of face-to-face and mediated communication: A review. *Psychological bulletin*, 84(5), 963.
- Xu, D., & Jaggars, S. S. (2014). Performance Gaps Between Online and Face-to-Face Courses: Differences Across Types of Students and Academic Subject Areas. *The Journal of Higher Education*, 85(5), 633-659.
- Zhao, Y., Lei, J., Yan, B., Lai, C., & Tan, S. (2005). What makes the difference? A practical analysis of research on the effectiveness of distance education. *The Teachers College Record*, 107(8), 1836-1884.