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Understanding Learners' Experience in MOOCs:

A Review of Literature

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Understanding Learners' Experience in MOOCs:

A Review of Literature

by

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Dedication

To my family, Mom and Dad

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Abstract

Understanding Learners' Experience in MOOCs:

A Review of Literature

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MOOCs have become a popular topic in the educational field since 2008. This report reviews the literature from 2008 to March 2014 on the development of MOOCs with a focus on learners' experience. By looking into the topics researchers have been investigating, this review identifies eight themes on this topic: (1) Platforms and Technology, (2) Instructional Materials and Assessment, (3) Instructors, (4) Participants' demographics, (5) Motivation and Engagement Patterns, (6) Self-directed Learning and Learner Interaction, (7) Blended Education, and (8) Completion rates. The review also indicates that MOOC course design (pedagogies, technical support, assessment and instructors) and learner characteristics (motivation, engagement levels, self-directed learning and digital literacy) influence learners' experience. Possible future research questions are also proposed in this report.

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Chapter 1: Introduction

The first MOOC (Massive Open Online Course), *Connectivism and Connective Knowledge(CCK08)* was offered by George Siemens and Stephen Downes at the University of Manitoba in 2008. Since then, the term "MOOC" has become a "buzzword" (Stewart, 2012) in the educational field and a driving force to reform the landscape of education (Pappano, 2012). The Oxford Dictionary defines a MOOC as "a course of study made available over the Internet without charge to a very large number of people." Many blogs, journalistic articles and university reports dealing with major developments in MOOCs have been published in the last few years. Academic research on MOOCs has also started to appear. Some researchers are very enthusiastic about the potential of MOOCs (Kop, Fournier, & Mak, 2011; Stewart, Siemens, & Cormier, 2010; Waite, Mackness, Roberts, & Lovegrove, 2013) while others remain cautious about whether MOOCs can become a critical force in the educational field (Bady, 2013). However, without a doubt, MOOCs have become a popular trend in online education since 2008.

McAuley, Stewart, Siemens, and Cormier (2010) argued that "MOOCs build on the engagement of learners who self-organize their participation according to learning goals, prior knowledge and skills, and common interests." In other words, learners can be the dominant factor in shaping their learning experience in MOOCs, which is very different from traditional education held in a classroom, where instructors usually hold most of the control.

Liyanagunawardena, Adams, and Williams (2012) reviewed 45 academic articles on MOOCs published between 2008 and 2012. In their review, Liyanagunawardena and her colleagues categorized the current literature into eight areas: interest, introductory, concept, case studies, educational theory, technology, participant focused, provider focused, and other. They also provided a review based on publication type, year, and contributors. They listed nine participant-focused articles from various sources ranging from journal articles to blog posts.

Liyanagunawardena et al. (2012) identified "participant focused" (p. 212) as a theme and collected articles talking about aspects regarding MOOC learners, but they did not pursue the subject further nor discuss specific findings regarding it. However, MOOCs have been evolving quickly these last few years and more research has surfaced.

This report intends to do a literature review from 2008 to the 2014 to provide an updated literature review of the development of MOOCs with a focus on learner experience. Given the speed at which online education is evolving, the results of this literature review can provide insight into more efficient use of MOOCs for researchers as well as practitioners and students.

OUTLINE AND PURPOSE OF THE REPORT

The purpose of this report is to conduct a literature review of relevant articles on MOOCs focusing on learner experiences, including empirical studies and theoretical articles from 2008 to present. The research questions are:

1. What issues have researchers been investigating on the topic of MOOC in terms of learners' experiences?
2. What factors seem to contribute learners' experience in MOOCs?
3. What are the implications for future research?

CHRONOLOGICAL EVENTS OF MOOCS

The idea of free academic knowledge online is not new. The Massachusetts Institute of Technology began the OpenCourseWare project in 2000, which enabled much wider distribution of high-quality university lectures and tools. In 2008, Salman Khan started Khan Academy, a non-profit organization that provides video lectures on a variety of subjects. It is one of the predecessors of today's MOOCs.

The origin of the term "MOOC" can be traced back to the 2008 course, *Connectivism and Connective Knowledge,* offered by George Siemens and Stephen Downes at the University of Manitoba. The course was designed for 25 for-credit students as well as for more than 2300 online learners all over the world for free. All the content was accessible through RSS feeds. Dave Cormier and Bryan Alexander from the University of Prince Edward Island then coined the acronym for "Massive Open Online Course" to describe this approach to instruction (Mackness, Mak, Williams, & Roy, 2010; Yeager, Hurley-Dasgupta, & Bliss, 2013). This model of MOOCs emphasizes the connection and interaction among students. This branch of MOOCs is later referred to as connectivist MOOCs (cMOOCs). It follows the theory that an educational system should "provide all who want to learn with access to available resources at any time in their lives; empower all who want to share what they know to find those who want to learn it

from them; and, finally furnish all who want to present an issue to the public with the opportunity to make their challenge known" (Illich, 1971, p.75). Other MOOCs like PLENK (Personal Learning Environments, Networked Knowledge) (Kop et al., 2011) followed. These early MOOCs were "experimental, non-linear, and deeply dialogic and participatory" (Stewart, 2013, p. 230).

MOOCs started to gain more attention when Stanford University offered a free, online course on *Artificial Intelligence* in 2011 (the course would later be known and referred to as "AI-Stanford" by MOOC researchers), which drew more than 160,000 people to enroll. Sebastian Thrun, one of the faculty members involved, left Stanford and founded his own company Udacity to offer MOOCs with a focus on science and technology. Soon, Daphne Koller and Andrew Ng founded Coursera. MIT, together with Harvard, formed edX. These three big three players – Udacity, Coursera, and edX – have continued to provide xMOOCs offered by prestigious instructors and universities, attracting tens of thousands of students. The following Figure 1 shows a clear timeline of

the phenomenon of MOOCs as they emerged.

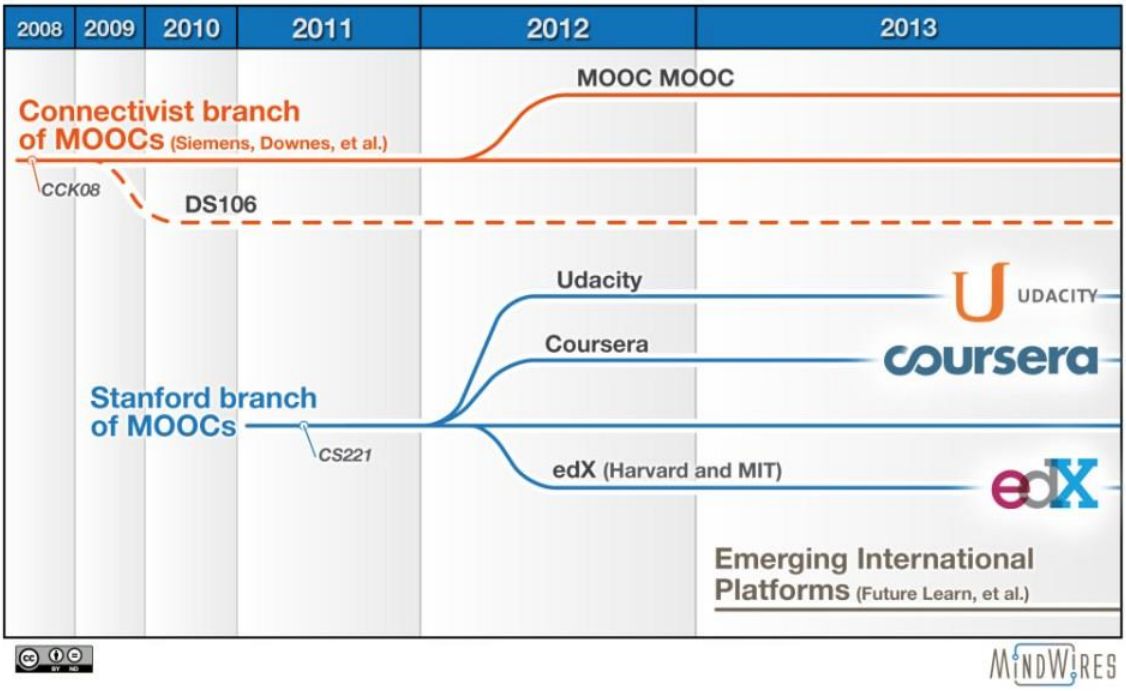

Figure 1. MOOCs and Open Education Timeline.

Note. Reprinted from MOOC history as presented at AACN13 conference, by P. Hill, 2013, Retrieved March 31, 2014, from http://mfeldstein.com/mooc-history-presented-aacn13-conference/. Copyright by n.d..

DEFINING "MOOC"

As a fast-evolving phenomenon, the definition of Massive Open Online Courses (MOOCs) is still vague and often contested. The acronym MOOC made the Oxford Dictionary in 2013 with the definition of "a course of study made available over the Internet without charge to a very large number of people." A more updated definition is

proposed by MOOC News Reviews, an online publication aimed to provide insights about MOOCs. Marques and McGuire (2013) defined a MOOC as "an educational resource resembling a class, that has assessment mechanisms and an endpoint, that is all online, that is free to use without admissions criteria and that involves hundreds of students or more."

Though usually mentioned as one general term, MOOCs actually have bifurcated into two types, which are referred to as cMOOCs and xMOOCs (Daniel, 2012).

cMOOCs are based on the theory of connectivism, developed by George Siemens. Connectivism (Siemens, 2004) argues that learning happens within a network. Learners make connections with content and learning communities via digital platforms, like Twitter or blogs, to generate and learn knowledge. According to the connectivism theory, four activities are essential to a cMOOC: aggregation, remixing, repurposing and feeding forward (Downes, Siemens & Cormier, 2011). Aggregation is achieved through an initial list of resources on the MOOC website and a daily newsletter with aggregated information. Remixing refers to reproduction of information documented and disseminated through blogging, tweeting and social bookmarking. Repurposing means learners are the ones who create their own connections. Feeding forward is sharing connections with others. The typical examples are *Connectivism and Connective Knowledge* (CCK08) and *Personal Learning Environments Networks and Knowledge* 2010 (PLENK2010) (see Figure 2).

Figure 2. Screenshot of PLENK2010 (http://connect.downes.ca/)

The second type is xMOOCs, which follow a more behavioral approach. These xMOOCs are usually offered on university-based platforms and are modeled on traditional classroom instruction. For example, learners are given lecture videos, assignments and quizzes. They can discuss questions and share thoughts in built-in discussion forums. The first xMOOC was Artificial Intelligence taught by Sebastian Thrun and Peter Norvig from Stanford University in 2011 with more than 160,000 enrolled students.

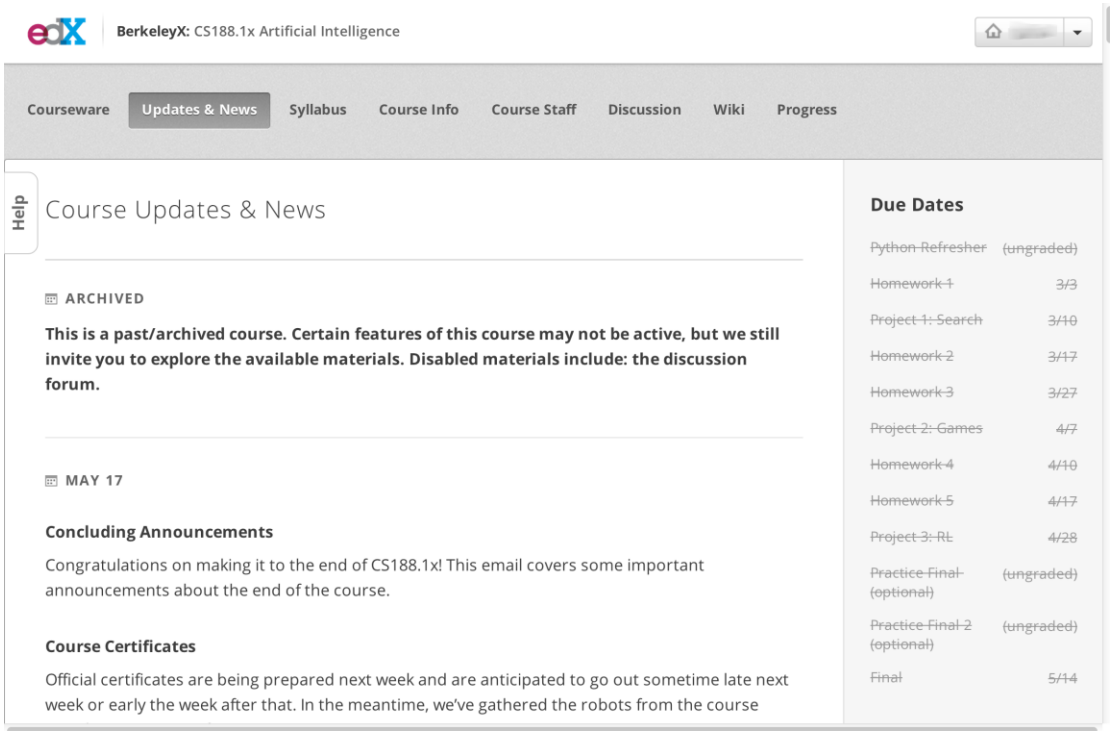

Figure 3. Screenshot of Artificial Intelligence

(https://courses.edx.org/courses/BerkeleyX/CS188.1x/2013_Spring/info)

Chapter 2: Method

This report reviewed the literature published in scholarly journals about MOOCs with an emphasis on learners' experience. Although there are many articles from blog posts, editorials, conference papers and the like, the focus of this report is exclusively academic papers in peer-reviewed journals from 2008 to the present.

The review process took two steps. First, the keyword "MOOC" is searched in the following library databases:

(1) ERIC

(2) EdITLib

(3) Education Full Text

After the initial search, 81 MOOC-related articles were found, including academic papers, conference paper, and editorials.

Second, the results from step one were narrowed down by using the following criteria:

(1) Appeared in peer-reviewed academic journals (not including editorials, book chapters or conference paper)

(2) Focused on MOOCs

(3) Emphasized on learner experience

Studies that did not satisfy at least one of the criteria were excluded. After this process, 15 articles were found to meet all the criteria and were used for this literature review. Relevant information was collected as outlined in Table 1.

Table 1

Evidence-based studies on Learner experience

#	Reference	Title	Research Focus	Methodology	Type of MOOC	Data Source with Number of respondents	Findings
1	Ahn Butler, Alam, & Webster (2013)	Learner Participation and Engagement in Open Online Courses: Insights from the Peer 2 Peer University	Learners participation and engagement	Mixed	P2PU courses	Survey: 90 Interview: 22	Alternative, participatory forms of education production and delivery can develop within and be supported by social platforms such as P2PU
2	Breslow, Pritchard, DeBoer, Stump, Ho, & Seaton (2013)	Studying Learning in the Worldwide Classroom Research into edX's First MOOC	Learner demographics and learning strategy	Mixed	Circuits and Electronics (xMOOC)	Data mining: 154,763 Survey: 7161	1. Student learning strategy differs when solving homework problems and solving exam problems. 2. Whether or not the students worked offline with anyone on the MITx material.
3	Bruff, Fisher, McEwen, & Smith (2013)	Wrapping a MOOC: Student Perceptions of an Experiment in Blended Learning.	Blended education	Mixed	Machine Learning (xMOOC)	Focus group: 10	While students regarded some elements of the course positively, they had concerns about the coupling of online and in-class components of this particular blended course design
4	deWaard, Abajian, Gallagher, Hogue, Keskin, Koutropoulos, & Rodriguez (2011)	Using mLearning and MOOCs to Understand Chaos, Emergence, and Complexity in Education	Learner participation, the use of mobile technology and social media	Mixed	Mobi-MOOC (cMOOC)	Survey: 40	Four conditions regarding the course were identified: internal diversity, internal redundancy, neighbor interactions and decentralized control.

Table 1 (continued)

#	Reference	Title	Research Focus	Methodology	Type of MOOC	Data Source with Number of respondents	Findings
5	Fini (2009)	The Technological Dimension of a Massive Open Online Course: The Case of the CCK08 Course Tools	Multi-tool environment and learners' use of technology	Mixed	CCK08 (cMOOC)	Survey: 83	Participants have varying opinions about the tool based on time constraints, language barriers, and ICT skills. A more traditional approach is preferred
6	Jordon (2014)	Initial Trends in Enrolment and Completion of Massive Open Online Courses	Enrolment and completion	Quantative	/	Enrollment: 91 courses Completion: 42 courses	The average MOOC course is found to enroll around 43,000 students, 6.5% of whom complete the course. Enrolment numbers are decreasing over time and are positively correlated with course length. Completion rates are consistent across time, university rank, and total enrolment, but negatively correlated with course length.
7	Kop, Fournier, & Mak (2011)	A Pedagogy of Abundance or a Pedagogy to Support Human Beings? Participant Support on Massive Open Online Courses	Technology, Roles of educators and learners	Mixed	PLENK (cMOOC)	End of Course survey: 62 Active Producers survey:31 Lurkers survey:74 PLENK2010 survey: 55	It is important to make connections between learners and fellow learners and between learners and facilitators. Different learning objectives and different life contexts of learners lead to different levels of participation and learning outcomes. A community where people feel comfortable, trusted, and valued, and where people can access and interact with resources and each other can support better learning experience.

Table 1 (continued)

#	Reference	Title	Research Focus	Methodology	Type of MOOC	Data Source with Number of respondents	Findings
8	Kop (2011)	The Challenges to Connectivist Learning on Open Online Networks: Learning Experiences during a Massive Open Online Course	cMOOC challenges	Mixed	PLENK2010 (cMOOC)	Data mining:1610	People need to have the ability to direct their own learning, a level of critical literacies, and confidence to use technology to be successful in cMOOCs.
9	Mackness, Waite, Roberts, & Lovegrove (2013)	Learning in a Small, Task–Oriented, Connectivist MOOC: Pedagogical Issues and Implications for Higher Education	Design principles, learner participation, small task-oriented cMOOCs	Qualitative	FSLT12 (cMOOC)	Survey: 21 Interview: 4	Small task-oriented MOOCs can effectively support professional development of open academic practice.
10	Milligan, Littlejohn, & Margaryan (2013)	Patterns of Engagement in Connectivist MOOCs.	Patterns of engagement	Mixed	Change11 (cMOOC)	Survey1: 35 Survey2: 27 Interview: 29	Three types of engagement: active participation, passive participation, and lurking. Key influential factors: confidence, prior experience, and motivation
11	Rodriguez (2013)	Two Distinct Course Formats in the Delivery of Connectivist MOOCs	To compare two types of cMOOCs and their learner experience	Mixed	CCK08, PLENK2010, Change11 and LAK12 MobiMOOC, EduMOOC (cMOOC)	N/A	Two connectivist MOOCs delivered share many common features but that their differences are such that the learner's experience and the outcome of the courses are very different depending on the format used.

Table 1 (continued)

#	Reference	Title	Research Focus	Methodology	Type of MOOC	Data Source with Number of respondents	Findings
12	Rodriguez (2012)	MOOCs and the AI-Stanford Like Courses: Two Successful and Distinct Course Formats for Massive Open Online Courses	To compare two types of MOOC	Mixed	CCK08, PLENK2010, MobiMOOC, EduMOOC (cMOOCs); AI- Stanford CS221 and CS101 from Udacity (xMOOCs)	N/A	Common features of cMOOCs and xMOOCs include worldwide participants, big dropout rate and massiveness. They differ in many aspects including pedagogy, technology and so on.
13	Wait, Mackness, Roberts, & Lovegrove (2013)	Liminal Participants and Skilled Orienteers: Learner Participation in a MOOC for New Lecturers.	Learner experience and interaction	Mixed	FSLT12 (cMOOC)	Data mining: 206 Survey: 21	Diverse participants experienced the course differently. Three major themes are navigation, transformative learning and reciprocal relationships.
14	Yeager (2013)	cMOOCs and Global Learning: An authentic alternative	To explore cMOOC	Mixed	CMC11 (cMOOC)	Data mining: 515 Blog: 67	Scaffolding and a core of active particiapnts contribute to the success of CMC11.
15	Zutshi, O'Hare, & Rodafinos (2013)	Experiences in MOOCs: The Perspective of Students.	Learner experience	Qualitative	cMOOC and xMOOC	Blog posts: 21	Students reported mixed experiences and identified both positive and negative aspects on assessment and measurement, instructional materials, learner interaction and engagement and course technology

It is easy to see a growth of research articles about learners' experience in MOOCs as outlined in Figure 4. There is a significant increase in 2013 with 8 studies and 25 authors. The articles mostly appear on online peer-reviewed journals, like the International Review of Research in Open and Distance Learning and Journal of Online Learning and Teaching. Table 2 shows the names of journals and numbers of papers focused on learners' experience.

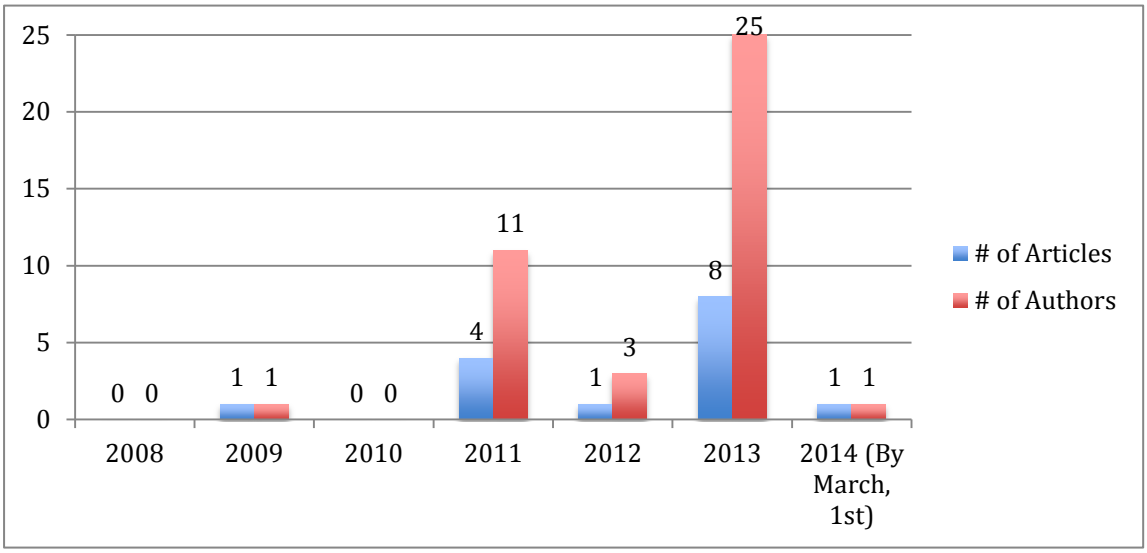

Figure 4. Article Published by Year

Table 2

List of Journals with MOOC papers focused on learner experience

Journals	Number of Papers
Journal of Asynchronous Learning Networks	1
MERLOT Journal of Online Learning and Teaching	4
Research & Practice in Assessment	1
The American Journal of Distance Education	1
The International Review of Research in Open and Distance Learning	6
Turkish Online Journal of Distance Education	1

The research on cMOOCs and xMOOCs is imbalanced. There are nine articles on cMOOCs, three on xMOOCs and two on both as shown in Figure 5. The lack of

xMOOCs research is probably due to several reasons. First, it appeared later than cMOOCs. The early xMOOCs did not start until 2012. Second, the amount of data xMOOCs collect is huge. xMOOCs usually can store all the log data of tens of thousands of students including hits, views, scores of quizzes and so on. To process such big data, it requires much more time and energy. Third, most of the data is not open to public, which means only a few institutes and educators can access the data and analyze it.

The emergent theme of articles on cMOOCs is engagement patterns and connectivism. Themes of xMOOCs research are about data mining and assessment. With an increase of xMOOCs and gradual openness of xMOOCs data, it is likely to see a rise on xMOOCs research in the future.

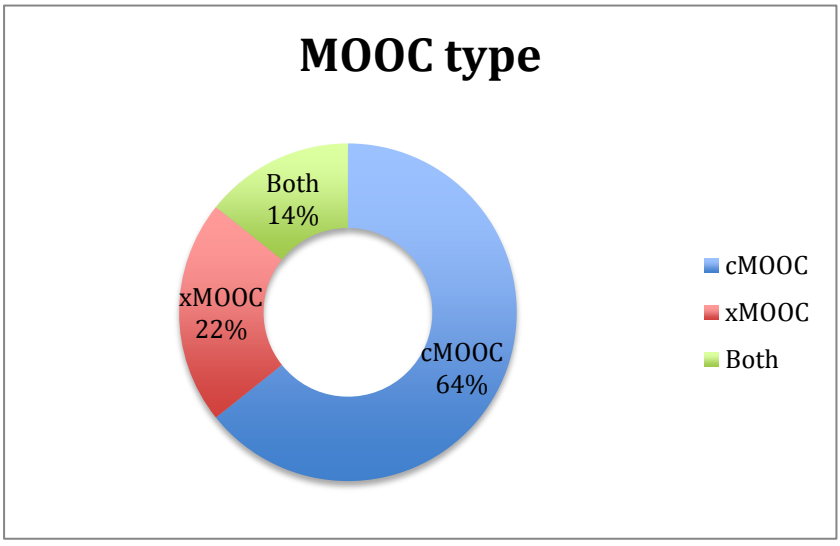

Figure 5. Articles by Type

Chapter 3: Findings and Discussions

In this chapter, the first and second research questions will be addressed based on the findings from the literature.

1. What issues have researchers been investigating on the topic of MOOC in terms of learners' experiences?
2. What factors seem to contribute to positive or negative learner experience in MOOCs?

CURRENT RESEARCH TOPICS OF MOOC LEARERNS' EXPERIENCE

Eight themes were identified as shown in Table 3: (1) Platforms and Technology, (2) Instructional Materials and Assessment, (3) Instructors, (4) Participants' demographics, (5) Motivation and Engagement Patterns, (6) Self-directed Learning and Learner Interaction, (7) Blended Education, and (8) Completion rates. The themes will be elaborated in the following section.

Table 3

Articles by Theme

Theme	Reference
Platforms and Technology	Ahn Butler, Alam, Webster (2013); deWaard, Abajian, Gallagher, Hogue, Keskin, Koutropoulos, Fini (2009); Kop (2011); Wait, Mackness, Roberts, Lovegrove (2013); Rodriguez (2011); Rodriguez (2012); Zutshi, O'Hare, Rodriguez (2013)
Instructional Material and Assessment	Ahn Butler, Alam, Webster (2013); Breslow, Pritchard, DeBoer, Stump, Ho, Seaton (2013); Zutshi, O'Hare, Rodriguez (2013)
Instructors	Breslow, Pritchard, DeBoer, Stump, Ho, Seaton (2013); Bruff, Fisher, McEwen, Smith (2013)
Participants demographics	Ahn Butler, Alam, Webster (2013); Breslow Pritchard, DeBoer, Stump, Ho, Seaton (2013); Kop, Fournier & Mak (2011); Kop (2011); Zutshi, O'Hare, Rodriguez (2013)
Motivation and Engagement Patterns	Ahn Butler, Alam, Webster (2013); Kop, Fournier & Mak (2011); Mackness, Waite, Roberts, Lovegrove (2013);Wait, Mackness, Roberts, Lovegrove (2013); Zutshi, O'Hare, Rodriguez (2013)
Self-directed Learning and Learner Interaction	Bruff, Fisher, McEwen, Smith (2013); deWaard, Abajian, Gallagher, Hogue, Keskin, Koutropoulos, Rodriguez (2011); Fini (2009);Kop, Fournier & Mak (2011); Kop (2011); Mackness, Waite, Roberts, Lovegrove (2013);Wait, Mackness, Roberts, Lovegrove (2013); Zutshi, O'Hare, Rodafinos (2013)
Blended Education	Breslow, Pritchard, DeBoer, Stump, Ho, Seaton (2013); Bruff, Fisher, McEwen, Smith (2013)
Completion rates	Breslow Pritchard, DeBoer, Stump, Ho, Seaton (2013); Jordan (2014)

Platforms and Technology. In essence, MOOCs are platforms that promote learning in a similar way as Facebook, Twitter and iTunes. MOOCs allow for many opportunities to develop a special ecosystem. The difference between cMOOCs and xMOOCs results from the different purposes they serve. According to Siemens (2012), the cMOOC model emphasizes "creation, creativity, autonomy and social networking learning", while the xMOOC model stresses "a more traditional learning approach through video presentations and short quizzes and testing." Daniel (2012)

argued that cMOOCs focus on "knowledge creation and generation" while xMOOCs on "knowledge duplication."

Researchers compared cMOOCs and xMOOCs. Although the two kinds of MOOCs share similarities including worldwide participants, large dropout rates and a massive number of participants, they still differ in many aspects, such as pedagogies, role of facilitators, learner goals, digital tools employed. These differences cause divergences in the learners' experiences (Rodriguez, 2012).

cMOOCs usually extend to multiple platforms. Although the distributed nature of cMOOCs makes novices feel initially overwhelmed, facilitators and expert learners can help make the transition smoother (Kop, 2011; Waite et al., 2013). On the other hand, xMOOCs usually stays on one single platform, offering course content, assessment and discussions. According to current literature (Fini, 2009; Kop, 2011; Waite et al., 2013; Zutshi et al., 2013), xMOOCs learners are less confused compared to cMOOCs since the pedagogy and structure of xMOOCs are more similar to the ones in traditional classrooms.

The technologies cMOOCs usually use include blogs, learning management systems, social bookmarking, Twitter and daily newsletters. Fini (2009) examined the technological dimensions of CCK08, one of the early cMOOCs. Fini explored participants' perceptions of the course toolset and the course as a whole. Learners valued daily newsletters that aggregated daily course content and were distributed to the participants, which helped filter and organize information. However, the daily newsletter also made it hard for participants to "sense the presence of other learners"

other than the active ones, who seemed to possess a degree of "expertise" and "confidence" (Rodriguez, 2012). In this way, the daily newsletter diminished the sense of interaction between the learners.

One of the most utilized technologies for xMOOCs is the lecture video. Research found students allocated most of their time to watching video lectures (Breslow, Pritchard, DeBoer, Stump, Ho, & Seaton, 2013). Some of the videos even started to develop interactive features such as built-in exercises, which helped practice and retain knowledge (Zutshi, O'Hare, & Rodafinos, 2013).

Despite the differences, cMOOCs and xMOOCs share some common uses of technologies. For example, both rely on discussion forums for participants to express their opinions or turn in assignments. Participants found discussion forums both interesting and overwhelming because of the lively interaction and the large volume of information (Fini, 2009; Zutshi et al., 2013). Also, given that interaction has been one of the essential challenges of online learning, live synchronous online webinars emerged as an efficient tool for overcoming communication and personal connections (Mackness, Waite, Roberts, & Lovegrove, 2013). Social media and other platforms including Twitter, Google Plus, Facebook and built-in discussion forums are also popular choices to facilitate interaction (deWarrd, Abajian, Gallagher, Hogue, Keskin, Koutropoulos, & Rodriguez, 2011; Zutshi et al., 2013). Learners suggested more access to technical tools that effectively support group collaboration (Zutshi et al., 2013). However, traditional technologies can still have glitches. For example, Zutshi et al. (2013) noted that the problems of video quality and volume could be annoying if

not done right. The affordance of some technologies is also put to test with the large number of participants.

Besides built-in technologies in the course, learners have more technologies to access the course. In deWaard et al.'s research (2011), 77.5% of learners accessed the course with a mobile device because of the time and location flexibility.

To sum up, a variety of technologies constitute MOOCs, so the level of digital literacy is an important factor for learners' experience. Sufficient digital skills can help learners navigate through the course with less difficulty. The lack of digital literacy can lead to much frustration on the learners' side (deWaard et al., 2011; Fini, 2009; Kop, 2011).

Instructional Materials and Assessment. cMOOCs allow much flexibility in the content aggregation stage. Yeager et al. (2013) argued that "content from a cMOOC can be easily reused and remixed" (p. 145) to fit different learning goals, which is beneficial for lifelong learning. New participants and even facilitators can benefit from exchanging ideas in a thriving cMOOC. But at the same time, the distributed nature adds to the challenge on learners' part. The ability to find current information and filter extraneous information can influence learners' experience (Kop, 2011).

xMOOCs, have a more strict and regulated format, which usually includes lecture video, reading, discussion, wikipages and quizzes. Learners adopt different strategies towards these materials based on different needs. Breslow et al. (2013) found out that learners spent most of their time watching lecture videos. According to

Zutshi et al. (2013), more involvement on the participants' part to generate learning content can contribute to better satisfaction levels. Learners prefer to have all materials provided including video lectures.

Assessment has proved to be a useful "facilitative tool to stimulate personal reflections" and a way for participants to interact with course content (Waite et al., 2013, p. 208). It prompts participants to do more reflective practices and promotes participation. Zutshi et al.'s research (2012) added to the finding and suggested the importance of design of assessment considering the voluntary nature of MOOCs. Poorly designed or non-authentic assessments repel learners while well-designed ones hook learners and contribute to positive learning outcomes.

Besides assessment designed by instructors, Yeager et al. (2013) also suggested to incorporate more self-assessment, which can be an effective tool. Self-assessment can take the form of rubrics to help participants assess their "metaliteracy skills" (Yeager et al., 2013, p. 144).

Some platforms adopted more novel assessments. For example, P2PU has started to employ gamification features to engage learners. P2PU provides tasks and badges. A badge is not only an interesting feature but also an alternative way to measure learner achievements (Ahn, Butler, Alam, & Webster, 2013).

Instructors. Researchers noticed that instructors have taken on different roles. Rodriguez participated in several cMOOCs and described the role of instructors as "facilitator" (Rodriguez, 2012). This corresponds to the finding by Cormier and Siemens (2010) that "Educators continue to play an important role in facilitating

interaction sharing information and resources, challenging assertions, and contributing to learner's growth of knowledge" (p. 36). Cormier and Siemens suggested the following roles for instructors in cMOOCs as amplifying, curating, way finding, aggregating, filtering, modeling and staying present. In contrast, the role of instructors in the xMOOCs resembled the conventional classroom, where teachers lecture, explain exercises and prepare exams. There was little direct interaction between learners and instructors.

Participant Demographics. To investigate learners' experiences, researchers have to know who are taking MOOCs. Every evidence-based study on MOOCs provides similar demographics. Participants came from all over the world and differed widely in age, gender, education background, occupations and level of preparedness. But there are still some trends in the demographics report. For example, the average age of the MOOC students is decreasing. Fini (2009) studied the first cMOOC CCK08 and noted the students were mostly middle age professionals. Similar trends were found in CritLit, PLENK, MobiMOOC (Kop, 2010; deWarrd et al, 2011). However, among 1100 participants who completed the survey in edX's first MOOC "Circuits and Electronics"(6.002x) offered in 2012, most were in their 20s and 30s (Breslow et al., 2013).

Motivation and Engagement Patterns. Researchers have investigated the motivations for taking MOOCs. Active participants embraced a clear aim associated with their participation while passive learners did not. Zutshi et al. (2013) identified from twenty-one blog posts that learners shared "a desire to explore, learn and

develop" (p. 219). Only one mentioned the importance of the certificate of completion.

Milligan, Littlejohn, and Margaryan (2013) and Mackness et al. (2014) identified motivation as one of the most critical factors affecting engagement. Fini (2009) studied CCK08 and discovered different behavior patterns exhibited by participants based on "personal objectives, background, and levels of engagement." These distinct engagement levels were identified repeatedly in other research (Ahn, Butler, Alam, & Webster, 2013; Breslow et al., 2013; Kop, 2011; Milligan, Littlejohn, & Margaryan, 2013).

Researchers all discovered similar engagement patterns which best explained by Milligan et al. (2013). Milligan and the other researchers observed the course and categorized participants into three categories based on survey responses: active participants, lurkers and negative participants, which were affected by three major factors – confidence, prior experience and motivation. Milligan et al. (2013) noted that the biggest difference lied in the "location of the primary network for each individual," either "internal or external to the course" (p. 152). Motivated and persistent, active participants represented the ideal learners. They usually formed vibrant internal networks, actively connecting with other participants via blogs and Twitter as well as external channels like Facebook. They "consume, connect, create and contribute" (Littlejohn, Milligan, & Margaryan, 2011, p. 26). However, the number of active participants was much smaller than lurkers, who constituted the largest category of MOOC engagement type. Milligan et al. (2013) claimed that

lurking was “an active choice” (p. 154) for lurkers who could not be deemed “disengaged with the course” (p. 154). Lurkers lurked for different reasons including personality, lack of confidence or over confidence. Passive participants were generally frustrated and dissatisfied with the course. Researchers shared the consensus that more research on lurkers is needed (Kop, 2011; Milligan et al., 2013; Yeager et al., 2013).

Self-directed Learning and Learner Interaction. MOOCs usually have a few instructors or facilitators but a lot of learning materials and information. It is crucial for learners to possess a high level of autonomy (Kop, 2011; Mackness et al., 2013). This also means learners have to be comfortable with self-directed learning. To be able to maneuver around the big amount of information, they also need to process “critical literacies” (Kop, 2011, p. 22) and the ability to multitask. Some learners enjoyed the flexibility and power to design their own learning experience, while others wanted more guidance. More often than not, active and experienced MOOC participants feel positive toward this new empowered learning approach. On the contrast, lurkers often feel less comfortable or confident.

Besides the importance of self-directed learning, research has also explored the benefits of engagement in a learner community. McAuley, Stewart, Siemens, & Cormier (2010) suggested that the way participants engaged or interacted with each other was poorly understood and required much more research. Recently more research is aimed to understand this issue (Kop, 2011; Rodriguez, 2013; Waite et al., 2013; Yeager, 2013, Zutshi et al., 2013).

Kop (2011) and Waite et al. (2013) highlighted the importance of participant support community, especially the scaffolding by experienced MOOC learners. The peer facilitation and support could be helpful for novices who usually felt overwhelmed by the new way of learning. Other researchers supported this idea. Yeager (2013) and Rodriguez (2013) found that participants who actively involved in the course were very beneficial to success of MOOCs, because the more experts, the more peer scaffolding and supporting to foster vibrant community interaction. It is the content created and shared by these participants that makes up MOOCs, especially cMOOCs.

Despite the advantage of robust interaction among participants, Zutshi et al. (2013) discovered that learners found it both exciting to be in a "learning community" as well as disconnected with the fellow learners because of the anonymity and massive volume of learner body. Learners reported "disappointed with missed opportunities for building international relationships" and "traditional dialogue with the teacher" (Zutshi et al., 2013, p. 222). Some courses required group work from a distance including peer review and group projects, which made students struggle because of the timeframes and disagreement among members. It brings us to question if it is necessary to consider the purpose of engagement at the beginning of a course to be a gradual process for participants to dig deeper. Some participants suggested more time to form stronger connection (Zutshi et al., 2013).

Anderson and Miyazoe (2013) attempted to use interaction equivalency theorem to shed light on interaction design in informal learning contexts including

MOOCs. They looked at the MOOCs through the lens of the amount and costs of the three types of student-centric interaction. Besides xMOOCs and cMOOCs, they added another model sMOOCs, an acronym for Small Massive Open Online Courses or for Social Massive Open Online Courses, which adopts "social constructivist learning environment of LMS-based online courses", featuring extensive group interactions, disscussion They then rated each kind of MOOC with the three types of interaction: student-content interaction, student-teacher interaction and student-student interaction.

Based on the analysis of the three types of MOOCs, Table 4 indicated the comparison of student interaction for each MOOC.

Table 4

Comparison of interaction in xMOOCs, cMOOCs, and sMOOCs

MOOC/Interaction	Student-Content	Student Teacher	Student-Student
xMOOC	High	Low	Low to Medium
cMOOC	Medium	Low	High
sMOOC	Medium	High	High

Note. From "Interaction Equivalency in an OER, MOOCS and Informal Learning Era," by T. Miyazoe & T. Anderson, 2013, *Journal Of Interactive Media In Education, 2*. Adapted with permission.

The analysis revealed that xMOOC is most easily scaled up, cMOOC requires much student self-direction and sMOOC is most expensive and time-consuming to

sustain. Three models can all produce high quality interactive learning despite different constraints. Also, it is of great importance to have the ability to "manage the cost and time for learning" (Anderson & Miyazoe, 2013).

Research by deWaard et al. (2012) found out that besides great amount of interaction and sharing among participants in the course, participants even went beyond the communication within a MOOC and shared ideas learnt from the MOOC with other networks ranging from colleagues, friends to family.

Blended Education. Though sometimes portrayed as a threat to higher education, MOOCs are still likely to keep coexisting with higher education (Siemens & Matheos, 2010). It does mean higher education should think more actively about how to adapt to the new challenges of MOOCs and make the best use of educational technologies while asserting the value of traditional college and universities.

Having realized the potential of MOOCs, some educators experimented blended courses. Blended Learning integrates live classroom activities and online learning instructions. MOOCs provide a new way for blended courses design. Instructors can build their face-to-face course on the existing MOOCs.

Bruff, Fisher, McEwen, and Smith (2013) reflected on their experiment to integrate a Stanford University Machine learning MOOC with a graduate course on same subject at Vanderbilt University in 2012. The instructor Fisher described the course design as a "wrapper" approach because he wrapped the on-campus course around the online MOOC course. Student response was generally "enthusiastic" (Bruff et al., 2013). Flexibility appeared to be the biggest advantage of the MOOC

over a traditional lecture-based course. In general, students valued the "self-paced learning" despite the difficulty to "stay on schedule" (Bruff et al., 2013, p. 192). The different roles of instructors from the MOOC and from campus did not affect learners. Instead, students gave positive reviews of both instructors, one served as an informative lecturer and the other as an effective facilitator. Although MOOCs proved to be a useful learning resource as a component of a blended course, the research discussed some remaining challenges, especially the "misalignment of face-to-face and online components" (Bruff et al., 2013, p. 193). In this case, some topics covered in on-campus class does did not go along with online video lectures. Student expressed confusion because of the disjointed materials. The paper suggested future courses should pay more attention to "greater customization", "stronger coupling between face-to-face and online components" (Bruff et al., 2013, p. 197).

Completion Rates. MOOCs are known for low completion rates. Jordan (2014) compiled data found the enrolment numbers of 91 courses and completion for 42 courses, and found that an average MOOC course enrolls about 43,000 students, 6.5% of whom completed the course. According to Jordan (2014), the definition of completion rate applied here is "the percentage of enrolled students who satisfied the courses' criteria in order to earn a certificate" (p. 136). She also explored possible elements affecting enrolment and completion. Course length is found to be positively correlated with enrollment but negatively correlated with completion.

Breslow et al. (2013) described the 5% completion rate in the edX *Circuits and Electronics* course as "a funnel with students 'leaking out' at various points along

the way" (p. 21). Low completion rates have been regarded as part of MOOCs, where a majority of learners were not intending to complete the course nor actively participating in the course (Scholz, 2013).

To take another stance, Daniel (2012) cited Anant Agrawal, one of the founders of edX, that despite the seemingly high attrition rate, the absolute number of students who completed the course may equal to the number of students taking the on-campus course in 40 years at MIT. In other words, MOOCs are able to reach out to many more people than traditional courses.

FACTORS CONTRIBUTING TO LEARNERS' EXPERIENCE

The previous section discussed themes researchers have been investigating on the topic of MOOCs relevant to learners' experience. This section will analyze the specific factors influencing learners' experience from the perspective of MOOC course design as well as learner characteristics.

MOOC Course Design. First, pedagogies. cMOOCs and xMOOCs follow different pedagogies. There is no definite conclusion whether connectivism is better or behaviorism is better. Each pedagogy has its own purpose: connectivism focuses more on knowledge creation through connection, while behaviorism emphasizes more on knowledge distribution (Daniel, 2012). Thus, learners may find a certain course more enjoyable if it fits their learning goals and learning habits. If the learner prefers to actively contribute and navigate through a sea of information, he may find cMOOCs more enjoyable than xMOOCs. On the other hand, if the learner is more

comfortable with the traditional learning method, he may find xMOOCs more suitable. For example, the cMOOC PLENK incorporated open learning with distributed content, meaning the course content was not in only one place, but located anywhere on the Internet. The course encouraged participants to find resources and add to the collective distributed content network. Learners who were used to taking initiative of their study might find it rewarding, while others who were less confident might find it hard to involve in the course (Kop, 2010).

Second, technical support. MOOCs are made possible with various platforms and technologies such as LMS (learning management system), lecture videos, discussion forums and social media. According to the research on technologies used in the first cMOOC CCK08 conducted by Fini (2009), participants held different opinions towards the tools based on learning styles, personal objectives and time availability. Fini categorized the tools to three types according to how frequent the learners used them: (1) Definitely useful, relevant, significant tools (the daily newsletter was the only one in the category); (2) Definitely not useful, not relevant, not significant tools (most social networks and tools were regarded as less useful); (3) Controversial tools. The results showed that most of the tools fell into the controversial type. Learners held various opinions toward the tools due to the difference of "learning styles, personal objectives, time availability" (Fini, 2009, p. 16) and so on. This finding aligned with facilitators' goal of distributing knowledge via multiple platforms through a range of various technologies (Siemens, 2009). This finding also conformed to the core idea of PLE (Personal Learning Environments)

where learners have their freedom to choose their own learning tools. Learners' technical background is another factors influencing their experiences. Research found that learners, especially novices, initially felt overwhelmed when faced with such diversity (Fini, 2009; Zutshi et al., 2012). To yield better learning experiences, educators are expected to design the course with appropriate use of technologies as well as consistent and clean design towards different types of learners. For example, Fini suggested that future MOOCs should highlight the purposes of various tools and inform learners that it is not mandatory to use all the tools. Along the course, there should be built-in scaffolding and support structures (Kop, 2011) to familiarize learners with various technologies. Instructional materials like videos should be free of glitches (Zutshi et al., 2012). Also, before adopting certain new technology like live streaming, educators should research on its affordance and make sure it allows a large number of participants.

Third, assessment. Well-designed assessment is not only a way for learners to measure their learning outcome, but also a way to scaffold them to better understand and participate in the course. Assessment can be in various forms including quizzes, peer review, projects and tasks. Learners complained about quizzes being too easy and instructions for group work too vague, but they like interesting project involving multimedia and creative design (Zutshi et al., 2012). They also commented that peer review was rewarding because it not only helped other learners but also provided opportunities to reflect on their own work.

Fourth, instructors. In cMOOCs, instructors are often described as "facilitators" who aggregate information and monitor the course. In xMOOCs, instructors are usually the lecturers who distribute knowledge via video lectures and have little interaction with individual students. Both roles of "facilitator" and "lecturer" proved to be beneficial to learners' experience. For example, Bruff et al. (2013) experimented with wrapping xMOOCs with face-to-face course and stated that students thought instructors were helpful both as "facilitator" and "lecturer." But most courses were only equipped with one instructor and a few teaching assistants. Compared to the huge number of students, this help was not enough. But currently there is limited research on the impact of instructors' role on learners' experience.

Learner Characteristics. Besides external elements of MOOC course design, the internal elements of learners themselves also influence learning experience.

First, motivation. Motivation is considered one of the most crucial factors affecting engagement. People are motivated to take the course for various reasons like curiosity, professional development or personal development. One particular theme was to evaluate MOOCs (Zutshi et al., 2013). A few of participants themselves were educational professionals, so they wanted to experience MOOCs as a student. So far there are not enough results to compare the effect of different motivations. However, it is agreed that learners who have clear objective and strong willingness to learn and participate are more active and respond more positively. Learners who have less well-formed aim might fumble in the course and give up easily (Mackness et al., 2014; Milligan et al., 2013; Zutshi et al., 2013).

Second, engagement levels. Learners participate in the course at different levels. Milligan et al. (2013) categorized participants into three types: active participants, lurkers, and negative participants. Each group interacts with the course in its own way. Active participants are motivated, persistent and reflective. They get most out of the course by actively engaging themselves with course content and other learners. The more they do so, the more positive they feel towards the learning experience. Negative participants are the opposite. They are disengaged and dissatisfied with the course. Lurkers are more complicated. They observe the course but do not actively contribute. Some of them are novice and not confident enough, while others do not feel the need to participate. Their learning experience does not leave much of a trace. More research is needed to investigate this community.

Third, self-directed learning. Whether learners are comfortable with self-directed learning can influence learning experience. The open and flexible nature of MOOCs requires learners to acquire a high level of autonomy to keep on track (Kop, 2009). Also, few instructors and a lot of information require learners to be very self-disciplined at managing time and tasks. As mentioned in the research by Zutshi et al. (2013), blog posts suggested students who had better time management skills and better understanding of course requirements gained a more positive experience. But this kind of participants was not the majority. Many novices feel confused and overwhelmed, which hurt their learning experience. At the same time, many newcomers realized that it was very helpful to draw experience from other MOOC learners including some veterans (Waite et al., 2013).

Fourth, digital literacy. Digital literacy is another factor that acts on learning experience. As mentioned in the previous section, MOOCs are constituted of many new technologies. If learners are not familiar with the technologies, they have to take time to learn the tools first. When given many choices of technologies, which was often the case in most MOOCs, learners were sometimes confused and overwhelmed (Fini, 2009). These feelings can sacrifice learning experience.

In summary, this chapter discussed factors influencing learning experiences from two perspectives: MOOC course design as well as learner characteristic. MOOC course design can be broken down to pedagogies, technical support, assessment, and instructors. Learner characteristics have to do with motivation, engagement levels, self-directed learning, and digital literacy. These elements are not clean-cut or independent. Instead, they are interrelated (see Figure 6). The pedagogy determines the choice of technologies, the type of assessment and the role of instructors. cMOOCs adopt connectivism as pedagogy, which encourage learners to choose from many technologies and develop their own learning environment. There is no set assessment. The role of instructors is mostly facilitators to help participants aggregate information and monitor the class. xMOOCs follow behaviorism so that xMOOCs are more like traditional classroom with one main platform offering lecture videos and assessment. Instructors usually serve as lecturers distributing knowledge via video lectures. The features of cMOOCs and xMOOCs can cater to different learners, resulting in different engagement levels, which are affected by the motivation to take

the course and how comfortable learners are with independent learning and technologies. Also, the technologies adopted by MOOCs require learners to have relatively high level of digital literacy. In sum, it is imperative to consider these factors as a whole.

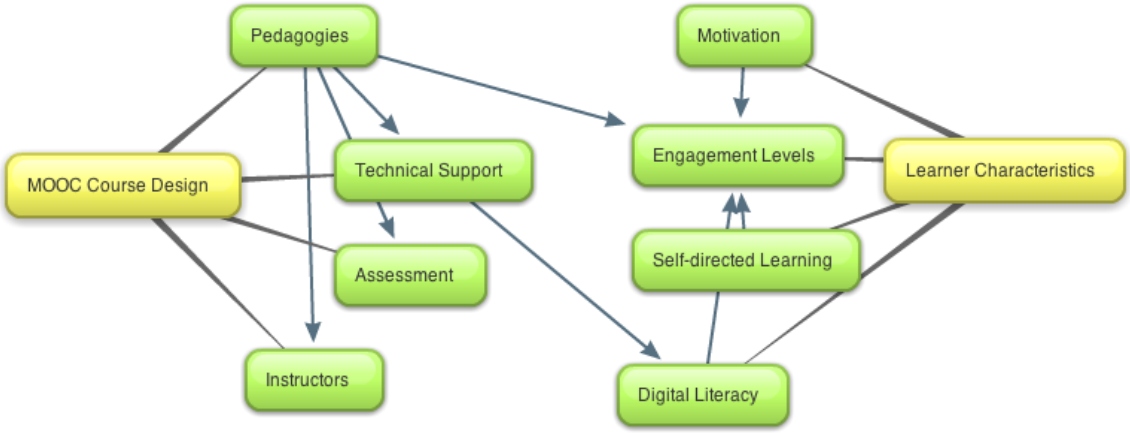

Figure 6. Relationship of factors influencing learners' experience

Chapter 4: Conclusion and Implications

This report reviewed scholarly journal articles about MOOCs focused on learners' experience from 2008 to March 2014. Although there are many media reports and personal reflections of MOOCs, this review exclusively focused on academic peer-reviewed articles.

As to the first research question, about topics regarding MOOC learners' experience researchers have been investigating on, eight themes were identified: (1) Platforms and Technology, (2) Instructional Materials and Assessment, (3) Instructors, (4) Participants' demographics, (5) Motivation and Engagement Patterns, (6) Self-directed Learning and Learner Interaction, (7) Blended Education, and (8) Completion rates. It is agreed by most researchers cMOOCs and xMOOCs follow different pedagogies.

In regard to the second research question, about factors contributing to positive or negative learners' experience, the findings were discussed from the perspective of MOOC course design and learner characteristics. Under MOOC course design, pedagogies, technological support, assessment and the role of instructors are the main affecting learning experience. Concerning learner characteristics, motivation, engagement levels, self-directed learning and digital literacy play a role in shaping learning experience. These factors are interconnected.

There are several limitations of this review. It is primarily limited by its sample size. Although there is more and more research in MOOCs, the limited number of peer-reviewed journal articles focused on learners' experience in MOOCs may not be

a comprehensive representation of this topic. In addition, the review is intended to include all the academic articles from the perspective of learners, there might be articles missing.

The disruptive new technology MOOCs sparked the interest in academics. However, MOOCs are still in its infancy and will be evolving constantly. To address the third research question, this report outlined the following areas for future research.

(1) The relationship between learner demographics and course design

(2) The roles and responsibilities of instructors and the effect of instructors on learners

(3) The general principles of effective MOOC course design

(4) The interaction and engagement levels between learners

(5) The use of big data

First, the relationship between learner demographics and course design. The open and diverse nature of MOOCs challenges educators to develop more appropriate design principles to accommodate diverse learner levels and needs. Although the demographics of participants have been studied, more specific questions regarding important factors like motivation, learning goals and previous experience of online education including MOOCs have to be asked. Also, the link between learner background and the course design is not obvious. Therefore, they should be better explored.

Second, the roles and responsibility of instructors and their impact on learners. There is very limited research regarding the expectation of instructors. Some research

highlighted the insufficient support structures of facilitators in terms of their weak presence (Kop et al., 2011). But there is no suggestion of how to improve this. Bruff et al. (2013) explored different roles of MOOC instructor and face-to-face instructor in the experiment of blending a MOOC course with an on-campus course. They suggested instructors as lecturers and facilitators are both crucial for the success of the course. Current MOOC instructors, however, usually only take up one role. Research on how to improve instructors' presence and effectiveness can help improve learners' experiences. Also there is no research from the perspective of instructors themselves. All the articles reviewed in this report examined this topic from student feedback. It can be helpful if researchers conduct surveys from the instructors' side in the future.

Third, interaction between learners and their peers. Realizing the importance of self-directed learning, researchers also advocated active peer mentoring. MOOCs are consisted of a large learner community with various backgrounds from all over the world. Since it is difficult to balance the ratio of instructors and learners, promoting an active learner community can be beneficial in terms of scaffolding novices and mutual learning. Now researchers only observed the voluntary support among learners. Future research can dig deeper and suggest ways of boosting lively learner interaction.

Fourth, the general principles of effective MOOC course design. This can be a broad topic to explore in terms of pedagogies, technologies, assessment and so on. Currently the MOOC design follows more traditional online education design. But

with many unique features of MOOCs, it can be constructive to contribute customized principles for MOOC course design.

Fifth, the use of big data. One of the most common limitations of current MOOC research is the relatively small sample, which makes it hard to generalize the results. But with more advanced data mining method, it is possible to implement more detailed and intensive data analysis, thus shed more light on participants' demographics, learning strategies and experience.

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