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Public Perceptions towards MOOCs on Social Media: An alternative perspective to understand personal learning experiences of MOOCs

Abstract

This study attempted to assess public perceptions of and interest in MOOCs by examining how Weibo increases public discussion of MOOCs as well as by interpreting how individual learners talk about their learning experiences. Over 4,000 microblog posts were collected and analysed between 2013 and 2018. The findings showed that Weibo is used as a public service medium to augment the publicity of the MOOC movement and increase the accessibility of MOOC portals. The results also demonstrated that Weibo acts as a space for learners to share their personal learning experiences, which reflect aspects of autonomous, self-regulated, interactive and cooperative learning. By posting on Weibo, close peer connections and learning groups were established to encourage MOOC learning. This study's findings further the scholarly understanding of how MOOCs are discussed on social media and address an important gap around what is known in one of the largest and most under-researched sites of informal online

learning.

Keywords: MOOCs, microblogs, content analysis, learning experience

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1. Introduction

Since 2011, massive open online courses (MOOCs) have become immensely popular around the globe. In China, since 2015, MOOCs have been integrated into Chinese national policy to augment the quality of teaching and learning and promote the global reputation of Chinese institutions (Zhang, Sziegat, Perris, & Zhou, 2019). A report released by Ministry of Education China in early 2018 showed that over 460 universities and colleges had implemented approximately 3200 courses in which more than 55 million learners had registered (Zhang, 2018). The profile of MOOC learners is diverse with respect to age, educational background, and work experience, which poses great challenges for gaining access to this group of learners to collect their learning experiences. Most previous studies either collected anecdotal data from a single MOOC (e.g., Fang, Tang, Yang, & Peng, 2019; Sunar, White, Abdullah, & Davis, 2017) or analysed only quantitative responses collected from surveys or clickstream data (e.g., Kloft, Stiehler, Zheng, & Pinkwart, 2014; Li, Wang, & Wang, 2017; Sinha, Jermann, Li, & Dillenbourg, 2014). Some other research collected MOOC-related messages on microblogs but only did sentiment analysis (Shen & Kuo, 2015).

Weibo, similar to Twitter, is the most popular microblogging service in China and disseminates a wide range of high-profile information on politics, life, entertainments,

economics, education, etc. Weibo is one China-based microblogging service. Posts on Weibo are unsolicited and tend to represent authentic perceptions about phenomena (Holotescu, 2015; Khan, Ali, Abbas, Khan, & Zomaya, 2018). As such, the "big data" generated by Weibo users have also become a reliable source to gauge the attitudes towards, popularity of and persistence of social occurrences. Public perception and discussion of MOOCs have increasingly appear on Weibo, from simple message delivery to detailed personal learning experience in MOOCs. In line with this perception, we focused the current study on content on Weibo about MOOCs, particularly on those messages describing personal learning experiences to understand how social media could facilitate MOOCs learning.

2. Literature Review

A systematic review of MOOCs and microblogging (Costello, Brown, Mhichíl, & Zhang, 2018) has shown a growing body of studies with a wide range of research lines (i.e., topic, scale and scope of the study and research design). Some literature has explored the use of social tools such as Facebook, Twitter and Google+ as the means for mass communication and collaboration to sustain and inspire the contributions of MOOCs (Alario-Hoyos, Pérez-Sanagustín, Delgado-Kloos, Parada, & Muñoz-Organerom, 2014). Some MOOCs integrate built-in blog posts as the main forums for discussion (Chen, 2014). Some researchers found that the combination of MOOCs and social media tools are beneficial to learners as they provide easier ways to connect with individuals in more informal, narrative styles but, nonetheless, in deep cohesive ways (Joksimović et al., 2015). Students showed higher engagement and persistence in social media

than in MOOC forums (Zheng, Han, Rosson, & Carroll, 2016), suggesting that social media can act as a powerful complement to individual learning. Social media offers a virtual meeting place where learners are connected by and cooperate with peers. Here, learners can inform each other about learning activities, comment, collaborate, and express themselves more generally about their learning (Liyanagunawardena, Adams, & Williams, 2013; Rodriguez, 2013; Rothkrantz, 2015).

It is also common for MOOC lecturers to augment their courses with microblogging as an alternative learning site (Salmon, Ross, Pechenkina, & Chase, 2015; van Treeck & Ebner, 2013). The aforementioned feature of openness for microblogging space enables Weibo to be an effective tool for follow-up discussions of MOOCs (Preston & Younie, 2014). In microblogs, learning experiences in MOOCs are shared, and individuals enrolled in these MOOCs regard Weibo as a space in which to discuss course-related materials or to share their experiences. In some particular cases, instructors even consider microblogging sites such as Twitter interactive tools for tweeting about upcoming assignments, reading a running news feed, tracking a hashtag or coordinating assignments for MOOC courses (Bozkurt et al., 2016). Some mentions of MOOCs on microblogs are for the purpose of learning in a specific course. Other discussions may go beyond a specific MOOC course and be related to MOOCs in general or may comprise personal perceptions, informal conversations and loose discussions (Zhang, Perris, Zheng & Chen, 2015 ;Shen & Kuo, 2015; Veletsianos, 2017).

MOOC providers and other stakeholders also use Twitter as a marketing tool to promote enrolment. Although a growing body of evidence has shown that the purposes of using microblogging in MOOCs differ greatly, the underlying ideology reflects upon the characteristics of the 5 Cs of social media, communication, collaboration, community, creativity, and convergence, which boost opportunistic interaction and informal exchanges among learners (Friedman & Friedman, 2008, 2013). Furthermore, microblogs are openly accessible to a massive number of people who may not be registered as MOOC learners. Hence, we have a picture of a vast number of disparate conversations revolving around MOOCs in microblogging platforms. This approach can provide us with the opportunity to collect public sense of MOOC, which are not revealed in the institutional or providers' reports.

This research attempted to explore MOOC-related messages on Weibo as well as what traits of MOOC learners were. We intended to make an longitudinal observation on aggregated views over time towards MOOCs and learning experiences in MOOCs on microblog sites like Weibo. On basis of this, we intended to have a deeper understanding about how social media actively shaped the development and evolution of MOOCs. .

3. Research Methods

To evaluate the overall pattern of how MOOCs have been discussed on Weibo, a qualitative approach was adopted in this study. Different analytic approaches, either computational methods or traditional qualitative methods, can be employed for different research purposes depending on the size and the scope of datasets (Costello, Brown et al. 2018). For

example, researchers such as Chen (2014) performed analyses on blogs with a concept analysis and mapping technique (CAAM) to find clusters of concepts through data mining. Such machine-learning-generated approaches can programmatically extract common themes and threads by computing measures of word prevalence and co-occurrence in a form of content analysis known as topic modelling. While such approaches can be powerful, microblogs are also complex sociotechnical spaces in which individual presentations and expressions can be very nuanced. Manual coding approaches that investigate different perspectives of social interactions and data are hence valuable to complement computational methods. In our research, in terms of the size of the dataset collected from Weibo and the subtleties the study intended to examine, a grounded theory approach was employed between 2014 and 2015 to form a framework of MOOC discourses, and a qualitative content analysis was conducted between 2016 and 2018 to refine the framework previously generated.

3.1 Data Collection

Sina Weibo offers an advanced research engine for its posts. A search of Weibo posts containing the term “MOOC” or “Muke/慕课” over an eight-year time frame from 2010 to 2018 generated over 300,000 posts. From seven posts in 2010 to 54,763 in 2018, the upward trend reflects the popularity of MOOCs, particularly after 2013 in China when interest in them grew dramatically. Even in 2010, the prevalence of smart phones was miniscule in comparison to 2014. The ease and accessibility of posting comments online has naturally led to a greater volume of individual posts.

As shown in Figure 1, there has been a sharp increase in the number of Weibo posts since 2014, with only 944 posts published before 2013. This finding is perhaps due to the fact that Chinese MOOCs were offered by Tsinghua University and Peking University in 2003. The year 2013 was recognized as the Chinese year of the MOOC, and the number of posts about MOOCs increased sharply to 54,763 in 2018. Thus, in the first stage of this study (in 2016), from the datasets derived from the "MOOC" keywords, we randomly sampled several months during the period of 2014 to 2015. We employed the search application programming to collect posts that added new information to an emerging framework in an iterative process of reading and coding. In total, approximately 2,000 posts published from 2014 to 2015 were randomly selected and analysed in their entirety. In the second stage of the study (in 2019), we further randomly sampled same months as that in the first stage, collecting approximately 2,000 posts between 2016 and 2018, which were similarly subjected to an in-depth qualitative content analysis.

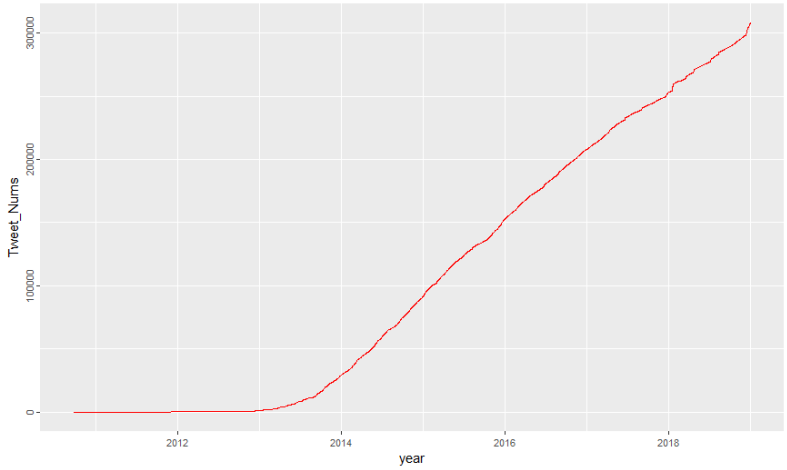

Figure 1. The increasing number of MOOC related Weibo posts (2010 - 2018).

3.2 Qualitative Content Analysis

A grounded theory approach utilizes a systematic set of processes to develop an inductively derived grounded theory about a phenomenon, which is appropriate for creating a theoretical model, giving conceptual labels to the data, and placing interpretations on them (Charmaz, 2006; Mehmetoglu & Altinay, 2006; Pandit, 1996; Walker & Myrick, 2006). This study built on previous work that examined (Costello, Brown et al. 2018), with the objective of interpreting authentic data to deepen our understanding of perceptions of and interests in MOOCs and the experience of learners. The thematic analysis started by looking for themes in the datasets. Two coders then engaged in successive refinement throughout the data collection and analysis (Corbin & Strauss, 1990; Danzig, 1985). The process continued by redefining the themes, developing and reformulating research questions over the course of the research, and modifying and refining them based on subsequent data collection phases. Axial coding was performed after the last data collection, and thematic analysis was completed. In the initial stages of the coding, content reliability checks were undertaken as two coders coded the same content. Discussion took place until there was intercoder agreement. Further reliability checks took place at the time of each new data collection for consistency.

3.3 Development of multi-level categories

A multi-level theme was established as the data analysis went on. Two axial categories were identified as the Dimension of Information and Resources and the Dimension of Personal Experiences. The former focused on posts that aimed to disseminate information about MOOCs, which ranged from news stories on MOOCs being posted (or re-posted) to course updates,

schedules, or announcements. The axial categories of Personal Experiences focused on individuals' learning experiences in MOOCs. Fourth-level subcategories in this dimension ranged from sharing knowledge acquired in a given MOOC to collaborative problem solving. Seven subcategories emerged under the Dimension of Information, and four subcategories were identified under the Dimension of Personal Experiences. Table 1 shows the two axial categories and second-level subcategories.

Table 1

Axial Categories and Second-Level Subcategories of MOOC Posts from Weibo Data

Axial categories (First level)	Second-level subcategories	Examples
Dimension of Information and Resources	Newsletters	*Open MOOC WEEKLY and find the featured contents of the week.*
	Resources	*Do you know MOOC, the fashionable new online course? Now, we have initiated 6 new courses of HUNAN ONLINE on the coursestore, including courses from HUAN Technical University and HUNAN University*
	Events	*#MOOC College seminar # Seven O'clock this Saturday evening, Seminar Room, Library, See you there!*
	Technical Support	*It's a new season! Any new Apps arrived? Yes, get your phone and search our new product "MOOC NET", http://t.cn/8kqAYpr*
	Updates from Campus	*#Wanke MOOC Scholarship# Mates in the second round are mostly from the universities. Let's have more people engaged in learning through MOOCs !*
	Courses Related	*Pre-announcement: "Traditional Culture and Traditional Chinese Medicine" lecture will be taught jointly by Dr. Zhu Xinyu and Dr. Liu*

		Zhigang on September 10th. Everyone from AIKECHENG can participate in the study. This is a practical and interesting course; we look forward to your participation!
	Imported from a different platform	*[After the first test, the University of New Mexico expanded the scale of its MOOC school] (imported from @ Today's headlines) http:t.cn/RPYXgRV*
Dimension of Personal Experience	Self-Expression	*It's better to take one MOOC course each time, otherwise I can't catch up with them all!*
	Social Interaction	*Help! Help! Who has used the MOOC Academy? Tell me how to submit homework! I can't find a place to submit it! ! !*
	Open and Sharing	*Do you know the MOOCs around you; do you know what creatures are on the map? Image from @霜天蛾 →http:t.cn/Rz763yV*
	Gained Knowledge	*After watching the "re-construction of the 'Internet Age'", I feel that the social structure has begun to evolve at a certain level from a hierarchical type to a horizontal type. First, human autonomy is enhanced. Second, the Internet can transmit value, regardless of whether or not everyone knows each other first.*

In total, 145 fourth-level subcategories were extracted. As is typically performed in coding the concepts, the process consisted of the primary coding, subsequent comparative and continuous analysis and classification-generated secondary codes, which are listed as the 11 second-level sub-categories (see Table 1). For instance, we first identified the fourth-level subcategories, such as "A030401 lecture notice", "A030402 lecture briefing" and "A030403 lecture summary"; then, third-level subcategories were merged, e.g., "A0304 lecture", by constantly conducting comparisons, and finally, a second-level subcategory "A03events" emerged. From these 11 second-level sub-categories, the two axial categories were identified and

created.

4. Results

Weibo was found to enhance the publicity and expand the accessibility of MOOCs learning as institutional and personal links of MOOC courses were referred on Weibo.

4.1 Augmenting the Publicity of MOOCs via Weibo

As shown in Table 1, the Dimension of Information and Resources contains 7 second-level subcategories, which mostly illustrate that Weibo is used as a channel to publicly broadcast information and resources about MOOCs. *Newsletters* on MOOCs are announced on Weibo for example. The "one-sentence news" format appears to be the most common way to summarize news about MOOCs. One posts is for one event, situation, or point of view and is often followed by an external link. Example 1 below shows the most typical form of "one-sentence news" microblogging on Weibo.

Example 1: "MOOC: how can I learn programming on an iPad?"

http://t.cn/RAKbASF

Apart from "one-sentence news", other *Resource* posts, such as interviews, reports, articles, observations and stories about MOOCs, are prevalent. Notes, tutorials, curriculum schedules, learning materials and MOOC experiences are shared, and notifications of exhibitions, featured forums and recruitments related to MOOCs are also found on Weibo. It is very common to share information or knowledge in descriptive posts. The topics of these posts can be divided into two categories. The first category of knowledge sharing consists of related

notes, stories, recommendations, information, experiences, cultures and introductions. The second category includes blogging, exclusive reports, and interviews that are concerned with a particular issue. Since usership on Weibo has become more prevalent, people have gradually tended to learn about MOOCs in a fragmented way. That is, the brevity of posts aims to highlight the main content to attract readers and to create a cascade effect that will widely disseminate information.

Weibo also plays a role in MOOC event management to publish diverse information about MOOC-related events, such as conferences, meetings and forums, that often inform participants or prospective participants about activity schedules, places, related persons and content by means of posts on Weibo. Apart from pre-publicity, these activities also have real-time follow-up reports and broadcasts about meeting processes. After the event, a related summary may be posted.

As most MOOCs are developed and maintained by Chinese universities (Zhang, Perris et al. 2015), Weibo acts as an extended online campus news agency. Posts that relate to academic trends, societal practice, and school information contribute to the spread of information via publications form the school, societal institutions and reposting by users.

One of the most notable features that emerged from the data was the use of Weibo for MOOC course management. Course-related logistics, such as course announcements, registration, introduction, recommendations and summaries, are shared on Weibo, and votes for courses, curriculum updates and special reports during a MOOC are managed through Weibo

messages and links. This use of Weibo for managing course logistics commonly starts before the MOOC is offered. A concise description of a course provides a summary of a MOOC that learners are likely to access and add to their favourites. The following example presents a typical release of a MOOC course:

Example 2:

Chalmers opened the first MOOC course! Professor Sun Jie will teach "Graphite Science and Technology": http://t.cn/RzVtIGN. “Graphene Flagship” is a flagship project that was in place for approximately 10 years and was funded by the European Union. Chalmers, with its strong scientific research, became the coordinating agency for this project last year! Http:t.cn/RzVt6Y8

Table 2 shows the top 20 subcategories that contained the largest number of posts between 2013 and 2018.

Table 2

Number of Keyword References of a Subcategory in the Dataset (Top 20)

Rank	Subcategories	Keyword references	Rank	Subcategories	Keyword references
1	A040202“IMOOC”	55533	11	A030103eventspread	16366
2	A060101Newcourse	54920	12	A040301Huawen MOOC	15086
3	A070101MOOC College	53896	13	A020301MOOCbrief	11051
4	A021601Exeperiences hare	39563	14	A021501courseshare	10257
5	A040401Platformshar e	38879	15	A030303conferencecon tent	9370

6	A070201ChineseUNIMOOC	30436	16	A021001Newarticles	8741
7	A070106Guokr	26481	17	A0207MOOC&culture	3906
8	A020601MOOCsuggestions	19669	18	A030110eventregister	3645
9	A050101MOOCspread	18072	19	A060301courseintro	3530
10	A020801MOOCcertificate	17862	20	A070301study163com	3065

New courses and the associated event announcements seem to be more common than all other forms of course management, with 54920 references in all the Weibo messages containing new course information in our study (ranked Top 2). This finding indicates the potential of Weibo as an important channel to promote an institutional profile to attract more enrolments to MOOCs and enlarge the number of their participants. The means of advertisement, such as building a presence, picture branding, and providing engaging content, all lead to the dissemination of MOOC profiles. Additionally, quoting and linking from influential microblog accounts in China, such as Youku (equivalent to Youtube), Zhihu (a Chinese question-and-answer website organized by the community of its users)), Toutiao (a news and information content platform), Zhihu daily (a Chinese Internet newspaper), 36kr (an Internet newspaper for entrepreneurship), Ximalaya (a user-generated-content online radio station), Netease open class, Sina education, and China University MOOC, also contribute to course promotion, although these may not all be institutional actions.

Our findings indicate that Sina Weibo is being heavily used as a marketing mechanism and a form of online world-of-mouth branding for MOOCs. Of all the Weibo microblogging

messages, the most common were mentions of “IMOOC” (in the top ranked category A040202 in our study). “IMOOC” therefore appears to play a key role in disseminating and promoting MOOC-related information and resources in China

4.2 Increasing Accessibility to MOOC Portals

In addition to global MOOC portals such as Coursera, Udacity, and edX, more local MOOC portals in China, such as the Xuetangx, CNMOOC, MOOC China, MOOC College and Guokr platforms, provide a great deal of choices for learners, meaning that there is tough competition among different MOOC portals. Quite a few recommendations from individual learners were found on Sina Weibo that promote users’ favourite MOOC portals and methods of access. Recommendations also involved sharing sites of MOOC collections for flexible learning resources choices (*see Example 3*).

Example 3:

I just saw a microblogger mentioning the micro-course, and suddenly thought that, in addition to the Five-minute Course Network, there is also a platform for MOOCs (www.mooc.cn). On the platform, there are many MOOC courses from international elite schools, such as Harvard, Yale, MIT, Tsinghua University, National Taiwan University, and other online open courses. Very good ~ For instance, "Introduction to Psychology" from Tsinghua University, "justice" from Harvard ~

The second axial dimension identified was Personal Experience in Table 1. Self-Expression, Social Interaction, Open and Sharing, and Gained Knowledge were four

subcategories summarized in this dimension to classify the self-expressed experiences of MOOC learners on Weibo. Of the characteristics of microbloggers' behaviours examined, autonomy was the most prevalent.

Our research uncovers the student MOOC experience from naturalistic microblogging expressions.

4.3 Personal MOOC learning experience

Learning experience in MOOCs posted to Weibo

4.3.1 General perceptions about MOOC Learning.

Weibo has the capacity to allow MOOC learners to express themselves informally and talk about their learning. The most noticeable perceptions were expressed as either positive or negative attitudes, through emotional icons (emoticons) or through the use of punctuation in microblogs. Negative words referring to regrets, anxiety, sadness, stress, confusion and frustration turn out to be the most frequent negative emotions, and difficult to understand, hard to persist, complicated to comprehend, fail to complete the course were found to be the negative feelings conveyed about MOOC learning. Regret for missing a course seems to be the most prominent emotional words expressed about MOOCs in the dataset. However, excitement and pride were the top positive emotions found in relation to expressions about MOOCs. Some posts were provided a space to give thanks to another person or an organization for some positive aspect of the learning.

4.3.2 Strong educational purpose for MOOC certification

Gaining MOOC certification appears to be the most prominent issue for microbloggers. The word “certification” emerges 17862 times in posts, ranking NO.1 of all keywords in our second axial dimension. Setting a goal is the first step in self-regulation. Many MOOC learners direct and regulate their own actions towards a specific learning goal, such as earning the certification. When the final outcome of a course is determined, learners express their happiness and sadness regarding succeeding or failing to obtain the MOOC certification.

Concerns about a MOOC’s course content is ranked second place among all the posts we collected, following concerns about certification. The contents of MOOCs are often presented in the form of a brief introduction to a course by the MOOC providers on Weibo. The providers normally include the name of the course, teacher of the course, highlights of the course and benefits of learning the material. Descriptions about course content from individual learners seem to focus on the perceived key points of the course followed by some personal comments. Quotes together with personal views of the content of MOOCs or regarding a specific knowledge point in a course are the most common patterns of microblogging about MOOC content.

4.3.3 Weibo as a tool to maintain self-regulation

Weibo also appears to be an open space for individuals who monitor, direct, and regulate their own MOOC learning process. Messages on Weibo show that some MOOC learners have repertoires of strategies that they apply to tackle the day-to-day challenges of learning tasks. Certification of MOOCs as proof of course completion and the content of MOOC courses are the two core issues exposed on Weibo posts as being of greatest concern for learners. On Sina

Weibo, active MOOC learners show a sense of self-regulation in regard to learning. Posts on Weibo display some evident features of self-regulated learning that is occurring for some active MOOC learners. These learners make specific plans for MOOC learning and share them on Weibo for the purpose of persistent schema on individual learning. Many learners were found to post messages in an attempt to motivate themselves from the outset. A large number of personal stories about persistence in learning can be found on Weibo. Time management seems to be the most challenging issue for MOOC learners. Learners were sometimes found to monitor their own learning activities using "Daka" as a form of whip to keep them focused. Learners were found to count the days in their daily Weibo posts to share the fact that they had completed the learning task of that day. This sense of self-efficacy corroborates the self-regulation of MOOC learners in their learning. Example 5 provides an example of this phenomenon.

Example 5:

#Scallop Daka # Day 177 I haven't been reciting the words for more than a month since I started learning Japanese. I didn't cook for myself. I am very dissatisfied with myself. How could those capable learners finish dozens of MOOCs ? Don't they sleep, don't they bathe, don't they make a mask? http:t.cn/8sggATz

4.3.4 Autonomy of MOOC Learning.

Both MOOCs and Weibo are autonomy-supportive contexts for learning. MOOCs, as a form of online course, have distinctive characteristics of autonomy, diversity, openness, connectedness and interactivity. MOOCs provide learners with "autonomy" when learners have

many choices regarding where, when, how, with whom and even what to learn (Mackness, Mak, & Williams, 2010). Microblogging tools, such as Twitter and Sina Weibo, might increase user autonomy, participation and communication (Shepherd, 2009). Microblogs provide a stream of quick updates from friends, family, scholars, news journalists, and experts. Learners have great freedom to choose how to make connections and select information, minimizing the traditional control of instructional processes and power structures.

Our Self-expression subcategory in the Dimension of Personal Experience presents three aspects of public perceptions of MOOCs on Sina Weibo: personal choice, self-control and self-presentation. This finding echoes the theoretical accounts of three elements of autonomy proposed by Tschofen and Mackness, i.e., choice, control, and independence of learning (Tschofen & Mackness, 2012). Personal choice is involved in decision making around what and when to learn with MOOCs and is also reflected in the attitudes and perceptions of learners when they choose their course. While MOOCs may help provide autonomy for their learners, some Weibo bloggers nonetheless expressed “helplessness” when frustrated at the lack of control in choosing the right course. The following example demonstrates the confusion and difficulty a MOOC learner encountered with the MOOC learning community called “masochist”, which encourages continuous learning.

Example 4:

“I’ve been typing all morning, to learn about ‘Masochist’. #Rock the MOOC# Which course should I choose?”

The broader autonomy and openness of MOOC and social media did benefit individuals for freedom of learning. However, other than locus of control, MOOC learners seem to need external guides for choosing suitable information and courses.

Self-reflections on MOOCs were also found on Weibo; these involved personal procedural reflections on the process of learning as well as summative reflections on course(s) individuals had studied. Personal impressions, self-satisfaction and inner feelings about authentic learning experiences were revealed and shared on Weibo. Course summaries, courses comparisons, course feedback, course notes, course evaluations, and course recommendations were recorded for personal review and sharing.

As we can see from the information above, some aspects of self-regulated learning behaviours were reported on Weibo. Three important characteristics of self-regulated learning were specified to some extent: self-observation, self-judgement, and self-reactions to performance outcomes (Zimmerman, 1989). MOOC learners were found to be very goal oriented about obtaining certification and self-reflective regarding observing and judging themselves from time to time. All these behaviours are evidence of self-regulated learning.

4.3.5 Communities and groups for MOOC learning Serious learning communities or groups were formed through close peer connections and continual interactions by microbloggers on Weibo to assist MOOC learning. Diverse interactions among learners, between learners and learning content, between learners and MOOC teachers, or between learners and the MOOC

management team co-existed on Weibo sites. On large networks such as Weibo, we even found meaningful clusters of MOOC learning communities that organized regular activities and updated the posts frequently. In our study, these dialogues on Weibo went far beyond chatter. The use of replies, re-microblogging and mentions were common in interpersonal interactions. Highly interactive microblogging allowed users to create and/or follow a thread of discussion by prefixing messages with a couple of '#' characters (Kwak, Lee, Park, & Moon, 2010). In these Weibo streams, 17,223 pairs of hashtags were included. The word "cooperation" appeared over 3000 times in the Weibo streams. The cooperation appears to include group management and mutual assistances in learning. Well-organized activities executed by institutes, learning communities or self-organized learning groups (on basis of close relationship within individual Weibo bloggers) regularly appear on Weibo. Some portions of Q&As involved learners helping each other understand the content of MOOC courses. Reminders and statement of encouragement were also found on Weibo during the period of learning as learners urged each not to fall behind or drop out of MOOC courses.

Personal connection on Weibo might be a motivation for taking a MOOC course through peer recommendations. In our study, 15.49% of the Weibo streams contained the word "share" or "sharing". As mentioned above, the threads about the open sharing of MOOC contents originating from institutions or from individuals were different, which also indicates the different interactions that the microblog authors intended to carry out. Microblogging threads and the replies from followers constituted the interactions among learners, between the MOOC

management team and learners, and especially between teachers and learners. A large portion of these kinds of interactions were learning-content centred.

Detailed discussions of MOOCs may be limited on Weibo due to the concise nature of the medium, yet Q&As about MOOC courses often appear. Discussions are often initiated in the form of re-microblogging with short questions followed by simple replies. Few deep discussions were found in our analysis. Individual questions usually covered problems regarding the usability and accessibility of a MOOC platform, the need for help to get a signature track or downloading MOOC certification, direct-hit themes, and doubts about specific knowledge. The word “Why” had a high rate of occurrence in questions found in these threads. The other vital function of Weibo is its textual notification for offline discussion. Institutes or learning communities often inform their MOOC learners about the times and places of offline discussions through Weibo microblogs. Interestingly, discussions about what a MOOC itself is, how a MOOC should be executed, how a MOOC can benefit learners and the diversity of MOOCs were also discussed.

5. Discussions and Conclusion

The findings of this study on how learners and other stakeholders discuss MOOCs on Sina Weibo addressed an important gap by developing an increased understanding of the forms of discourse conducted on social media in China on the topic of MOOCs. From the Weibo datasets we analysed, we have gained a deeper understanding of publicly expressed perceptions of and interest in MOOCs. We have demonstrated that members of the public in many instances

hold positive attitudes towards MOOCs, that MOOC learning may provide autonomy for learners, and that elements indicating self-regulation were evident among learners who posted frequently on Weibo as they utilised Weibo as a tool for learning reminder. Surprisingly, we also found that learners sought additional communication through social networks on Weibo, in addition to interacting with their classmates or teachers within the MOOC, to enhance their learning. Learners can gather course information before they start learning from the public platform and communities, by reading information shared by other learners and school communities, or by receiving notifications through application platforms. This information can arouse prospective learners' interest in related courses. In the learning process, learners can interact with Weibo regarding peer reminders and discussions in a more informal setting if the discussion is not led by organizers. When a MOOC course comes to an end, learners can share their evaluations, perceptions and what they learned and accomplished on Weibo. Learners' knowledge can be expanded by receiving replies from, or through, interactions with other learners, teachers and even from non-MOOC learners and the general public.

Although on the Weibo site it is difficult to distinguish groups of learners, regardless of whether MOOC forums are active, passive, reacting, acting or supervising/supporting learner groups (Zhang, Perris et al. 2015), the huge social network of Weibo embraces them all. In particular, we can have a sense of informal learning on Weibo, which complements formal learning in MOOC platforms and their forums. We suggest that MOOC providers extend their service to Weibo to better promote their profiles and increase course enrolments. Individuals'

informal chats and the sharing of learning experiences indicate that learners have more autonomy for self-expression on Weibo than on MOOC platforms and forums. To a certain extent, as MOOC participants are sufficiently connected to take advantage of all the convergences of Web technology, i.e., across MOOC platforms, forums and social media, we can conclude that discussing, communicating and sharing on Weibo has some semblance of connectivist learning.

Our qualitative analysis of Weibo posts provides an in-depth review of learners' perceptions of MOOCs. Nevertheless, these microblog posts might have an inherent bias, for example, as the authorship of some microblog posts is unknown, it raises the question of whether the posts truly reflect perceptions. To improve research validity, the findings in this research could be triangulated using data sources from LMS or MOOC platforms. Other methods, such as data mining and cluster computing, could also be applied to identify collective perceptions, which might minimize the biased views that emerge from a small sample. The grounded theory method was employed to synthesize related statements in Weibo to provide an in-depth review of MOOCs, and to identify future trends and challenges. This method itself is subjective. In considering a larger amount and scope of data, this approach could be rather time consuming. Different analytic approaches, either computational methods or manual qualitative methods, can be employed for different research purposes (Costello, Brown, Mhichíl, & Zhang, 2018). To mitigate these limitations, a machine-learning approach should be added to future research in this area to complement the qualitative approach.

This study has sought to shed light on conversations from the fastest growing but most

under-researched populations of online learners in the world. Through this in-depth study, we uncovered authentic accounts from learners of their practice, highlighted concrete areas in which social media can support learners and course providers, and consequently helped advance the scholarly understanding of informal online learning at scale.

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Availability of data and materials

The data that support the findings of this study comprise Weibo data are available in our database. We include full references to all of the papers in this article text.

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