

# The Role of Social Media in MOOCs: How to Use Social Media to Enhance Student Retention

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## ABSTRACT

The Massive Open Online Courses (MOOC) have experienced rapid development. However, high dropout rate has become a salient issue. Many studies have attempted to understand this phenomenon; other have explored mechanisms for enhancing retention. For instance, social media has been used to improve student engagement and retention. However there is a lack of (1) empirical studies of social media use and engagement compared to embedded MOOC forums; and (2) rationales for social media use from both instructors' and students' perspectives. We addressed these open issues through the collection and analysis of real usage data from three MOOC forums and their associated social media (i.e., Facebook) groups as well as conducting interviews of instructors and students. We found that students show higher engagement and retention in social media than in MOOC forums, and identified both instructors' and students' perspectives that lead to the results. We discuss design implications for future MOOC platforms.

## Author Keywords

Massive Open Online Course; MOOCs; Social Media; Facebook; Coursera; Mixed Method.

## INTRODUCTION

Massive Open Online Courses (MOOCs) are a recent innovation in online learning and distance education that has developed rapidly and garnered extensive attention from a broad range of populations. The MOOCs paradigm is built on the principal belief that knowledge should be shared freely, and that learning aspirations should not be constrained by socioeconomic or geographic limitations [18]. In comparison to conventional online courses, MOOCs are in massive scale and distributed worldwide across a variety of educational platforms (e.g., Coursera, edX, Udacity, etc.) with no physical presence restrictions.

Recent work has shown that people who join MOOCs have

diverse motivations, which lead to a variety of learning behaviors and innovative uses of MOOCs [13, 24]. For example, some students enroll in a MOOC is to meet social needs (e.g., make friends) rather than to learn *per se* [13, 24]. Others participate in MOOCs for both learning and entertainment [13]. As more MOOCs are emerging and as they are being used to meet more diverse goals, it seems that the online courses should no longer be viewed simply as a means of disseminating educational content, but rather as a *virtual organization* where people learn individually and collaboratively, make friends, exchange learning insights, and interact with people who come from different countries and disciplines [24, 25].

However, current MOOCs platforms are limited to playing videos, sending announcement, and hosting a discussion forum; there is little support for social activities [25]. A vast body of literature regarding classroom learning and distance learning has shown the importance of forming a sense of community [9], enhancing social interactions [9], and encouraging collaborations [24] to improve student retention and program success. Indeed, as retention issues become increasingly prominent in MOOCs [1, 4, 8], studies have identified the lack of one's sense of community, and ineffective social interactions and collaboration contribute to the high dropout rate in MOOCs [24, 25].

To cultivate an active learning environment, MOOC instructors have often recruited a variety of external tools, such as Facebook, Twitter and Google plus, etc. into their MOOCs [24, 26, 29]. However, these initiatives have not yet presented in-depth analyses of social media usage, the relationship of usage between a MOOC platform and social media and the rationales of the social media use from both instructors' and students' perspectives. Thus, there are not many insights that we could consider in order to provide design principles for the future MOOC platform and to help instructors and students better use social media to enhance engagement and retention.

In this paper, we investigate the role of social media in the context of MOOCs. We applied quantitative and qualitative methods through the analysis of usage log data of three MOOCs from Coursera and each MOOC's Facebook groups. We present comparative analysis results regarding the level of usage and engagement between two platforms. We also interviewed 4 instructors and 12 students of three

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MOOCs to unpack their motivations and experiences in both platforms.

Our comparative analysis shows that although there were more people enrolled and more posts shared in Coursera relative to the smaller group of people who joined the Facebook groups, when it comes to user engagement, Facebook was a more attractive place for them to stay actively and longer. Our interviews with students highlight four main reasons of why they prefer to use Facebook — *a real community in Facebook, instructor imitated discussion forum, a better collaborative place, and more convenient to communicate with others*. Our interviews with instructors unveil four main motivations of using Facebook from their perspectives — *enhancing student retention and engagement, cultivating a sense of community, advertising their MOOCs, and being creative*.

## BACKGROUND

Garrison et al.'s [31] Community of Inquiry research establishes a conceptual framework that informs the design of the online learning tool and also represents a process of creating a deep and meaningful learning experience through the development of three interdependent, mutually reinforcing elements: *social* [30], *cognitive* [31] and *teaching presence* [31]. Meanwhile, the research in social learning and online communities demonstrates important roles of online communities and helps us understand why these online communities have early gains in learners' engagement and retention.

Lucas and Moreira have noted that utilizing informal social media in a formal learning setting promotes informal interactions that students describe as having a significant impact on their formal learning outcomes [17]. A recent study has documented the broad research on the positive impacts of applying informal online learning strategies (i.e., using social media on learning) [7]. This study delivers a framework from a pedagogical perspective for using informal learning approaches to create Personal Learning Environments that combine formal and informal learning format by using social media.

Recent research on the effectiveness of learning communities found that learning communities play very important roles during learning process. For example, they could affect the flow of thoughts across group members and help to form highly creative groups and deliver collaborative work [2, 21, 23]. The term Community of Practice (CoP) coined by two cognitive anthropologists describes the fact that a group of "people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" [15]. Thus, learning could be the main motive that the community forms together, or it could be an incidental product resulting from diverse interactions among members of the community. The emergent practices of a community could be one indicator of its effectiveness as a community.

In the research of Massive Open Online Courses (MOOCs), some literature found social media is important to enhance sense of community in MOOCs [11, 24] and instructors use social media as a second channel to communicate with MOOC students [3, 11, 26]. Also, an appropriate selection of social tools could be helpful to engage students and improve their retention during the course [3, 11]. However, these studies are lack of in-depth analysis of social media usage, the relationship of usage between a MOOC platform and social media and the rationales of the usages from both instructors' and students' perspectives. Thus, little insight that we could achieve exists to provide design principles for future MOOC platforms and help instructors and students to better utilize social media to enhance user engagement and retention.

In our study, we investigate the role of social media in the context of online education through the collection of usage logs from three MOOCs and the associated social media groups and through the comparative analyses on the level of usage and engagement between two platforms. We also conduct interviews with instructors and students to investigate their perspectives on using social media for MOOCs.

## RESEARCH METHOD

We applied a mixed method to understand the role of social media. We first employ a quantitative method to look at student engagement both on Coursera and Facebook. Then we conducted interviews to find out the motivations for instructors to use social media and for students to join the official Facebook groups of the MOOCs and whether their experiences met their expectations.

### The Study Settings

MOOC platforms normally include built-in social tools such as forums to centralize learners' contributions, and discussions; but also, instructors may suggest alternative tools to effectively build connections and collaboration among learners.

**Coursera Forum** (used as Coursera in this paper) is a tool for learners to participate in discussions on selected course topics. The forum needs to be maintained by both students and instructors who can define new threads and make comments. This forum is also for learners to raise questions about the enactment of the course, the contents of the modules or platform. The instructors and other participants may answer the questions or vote them as relevant to gain visibility.

**Official Facebook Group (also used as Facebook)** is Facebook group constructed by MOOC instructors or/and teaching assistants. Instructors may post announcements, foster course discussions, or share additional multimedia resources with learners who can contribute to the discussion and share new resources too. Note that using Facebook group is optional for MOOC instructors. Also, students can construct Facebook groups based on their interests but are

not accounted in *official* Facebook groups. In our paper, we only focus on official ones.

**Three MOOCs** were offered by a large public university in the Northeastern United States. We chose three types of MOOCs to avoid any possible result biases on a particular type of MOOC. The first MOOC was an arts course (Arts, May – July, 2013). Students learned different skills to make art crafts and learned how to appreciate arts. The second MOOC was a qualitative course (CIC, July – September, 2014), which guided students to use different tools and mental models to become more creative. The third MOOC was a quantitative course (Geo, April – June, 2014), which taught students how to build a map using programming languages.

#### Data and Data Collection

Our data include three types. The first type is student usage data on Coursera of three different MOOCs. The usage data consists of click stream data, which documented students' all posting activities (e.g., posts, comments, and votes) on Coursera and the time of each activity occurs.

The second type is student usage data from three official Facebook groups of the three MOOCs we mentioned above. We collected Facebook usage data by two ways. We used Facebook API to crawl activities in the groups. We also collected summary data directly from the group page because the first author is the admin of all these three courses on Facebook. As we obtained the unique ID for each user (any user identifiable information was not used for preserving privacy), we processed different types of activities (e.g., the number of posts, comments, likes, etc.) for each user. As each post contains the timestamp, we measured a level of activities over time for both Coursera and Facebook.

The third type is the interview data from instructors and students of the three MOOCs. We recruited 4 instructors (one is from Arts MOOC, one is from Geo MOOC and the other two are from CIC MOOC) and 12 MOOC students. We send messages to students through Facebook to invite them join our study and we randomly chose 12 students from responders. Our data was collected by semi-structured interviews. At the beginning of each interview, we gathered social-demographic information about the participant (e.g., gender, age, general teaching duration, Facebook using frequency and routine). We then asked the participants about their general MOOC experiences (e.g., how many MOOC sessions they have taught/learned, how long they have been using MOOCs and social media, etc.). For instructors, our questions focus on the motivations of using Facebook, the teaching activities on Facebook, and their perceptions of using both Coursera and Facebook. For students, our questions focus on their motivations, expectations, and perceptions of joining and being engaged in Facebook.

We summarized the general profile of 12 participants (students): our interviewees included 5 undergraduate students, 4 graduate students, 1 housewife and 2 employees; 5 females and 7 males; 4 participants use Facebook daily, 5 participants login Facebook occasionally but check it frequently during the MOOC they took, 3 participants registered Facebook because the MOOC put the Facebook group link.

The interviews ranged from approximately 40 minutes to 2.5 hours. All interviews were audio-recorded, annotated, and transcribed for further data analysis.

#### Data Analysis

This paper proposes a deep analysis on how social tools are perceived and utilized by MOOC learners in order to shed some light on their selection process. Particularly, this analysis involves two different tools on three MOOCs. One tool is a built-in forum on Coursera, and the other one is an external social media group — Facebook. The analysis on these tools includes a level of usage and engagement from the actual usage logs and comparison between the two platforms.

For qualitative data (i.e., interviews), we use thematic analysis and grounded theory, which underlines the concurrent processes of data collection and analysis [10]. After conducting a small number of interviews with students, we took an initial data analysis session to identify core themes. Once these themes were identified, we employed axial coding to further generate categories and sub-categories. Themes and categories were refined by an iterative coding process that involved the first author and another coder. The preliminary results offered a coding guideline for the next round of coding for each new set of interviews. When following rounds of analysis were not able to discover new themes or categories any more, this demonstrated saturation of theory [10]. This happened after we conducted our 11<sup>th</sup> student interview. Our 12<sup>th</sup> interview further confirmed that the saturation of the theory had been reached. Thus, we stopped conducting more interviews with students.

#### RESULTS

We first present descriptive statistics of course enrollment, and use and engagement from posting activities in Coursera and Facebook. We then present how a level of engagement changes over time and compare the results between the two platforms. We next move to our qualitative analysis reports from a total of sixteen participants, presenting instructors' and students' perspectives of social media for MOOCs.

#### Engagement in posting activities

For each MOOC, we first measured the number of people who joined Coursera and those who joined Facebook. As summarized in Table 1, we can see that different numbers of people joined Coursera and/or Facebook and much fewer people joined Facebook than Coursera. Several reasons might lead to this result. First, Coursera is the official

platform to carry the course and every student has to register for the course, watch lectures and submit homework on Coursera; Facebook is more like a second channel for student to connect with classmates and instructors. Also, students should find or become aware of the Facebook page after they joined Coursera. Second, not all of the students who registered for the course have Facebook account or are active users in Facebook, though Facebook has most large user population. Third, students have diverse motivations to join a MOOC [24]. For example, students who just want to audit a course may not participate social activities.

		Art (%)	CIC (%)	Geo (%)
Total users	C	69,867	155,237	25,837
	F	20,344	8,800	4,758
Engaged users	C	7,416 (10.6)	2,189 (1.4)	2,898 (11.2)
	F	3,524 (17.3)	2,841 (34.7)	1,547 (32.5)

Table 1. Summary of total users and engaged users (C: Coursera, F: Facebook).

		Art (%)	CIC (%)	Geo (%)
Total posts	C	29,876	7,945	16,710
	F	1,345	117	50
Comments added to posts	C	22,292 (0.74)	5,580 (0.70)	5,842 (0.34)
	F	2,538 (1.88)	123 (1.05)	64 (1.28)
Votes or Likes added to posts	C	40,304 (1.34)	6,306 (0.79)	5,121 (0.30)
	F	8,296 (6.16)	1,387 (7.83)	509 (10.1)

Table 2. Summary of post-related activities.

We considered a level of engagement and investigated how people exhibited different engagement levels in Coursera and Facebook. Here we defined *engaged users* who shared posts, comments, or votes in Coursera or Likes in Facebook at least once (if not more than once) during the course. With this rational, we measured how many users engaged in posting activities everyday. We were aware of a possibility of having more enrolled users after the class starts, which leads to having the different number of enrolled people on a daily basis. Again, from instructors, we were told that there was some increase in enrollment for the first two weeks, but the increase became negligible after then. In this sense, our analysis on engagement may not perfectly depict a trend but provides a general insight. Overall, as shown in Table 1, the result indicates that only around or less than 10% of users on Coursera posted content while there were more engaged users on Facebook. Especially, people in the CIC course

were much more engaged in Facebook than Coursera compared to other two courses.

Along with total and engaged users, we also calculated the number of comments and votes/likes added to the posts and compared the results between Coursera and Facebook. Here we considered votes in Coursera equivalent to Likes in Facebook. Even if there are down-votes, we found only few cases in our samples where people added down votes to the postings. As shown in Table 2 and Figure 1, from all three courses, people tended to add more comments for each post in Facebook than Coursera as well as much more Likes for each post in Facebook than Votes in Coursera, showing higher engagement in social media. Students in Facebook seem to be more active and engaged than Coursera users.

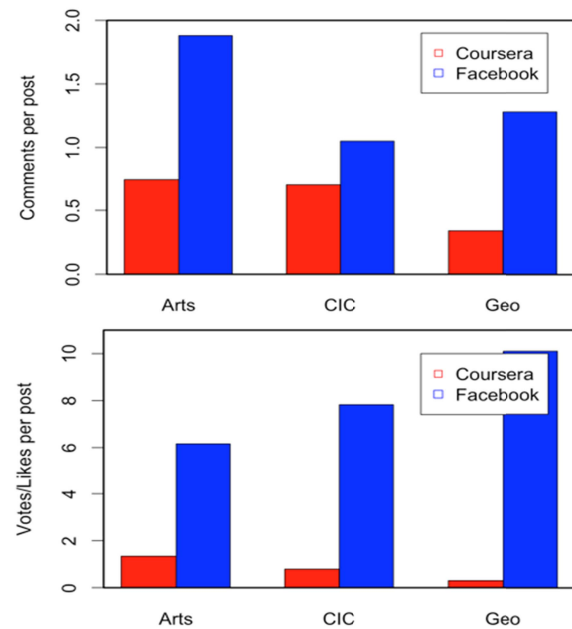


Figure 1. Summary of commenting (top) and Voting/Liking (bottom) activities.

### Engagement over time

For the last measurement on engagement, we took the timestamps in the posts, calculated the number of posts for each day, and plotted a ratio of engagement by day. We also computed a linear trend model for the percentage of the total number of posts given day to compare the variance of engagement overtime more directly. As illustrated in Figure 2, we can see that the engagement in Coursera significantly dropped (especially well exhibited in Arts and CIC) after two or three weeks. According to linear trend model results, engagement decreased more rapidly in Coursera ( $p < 0.001$ ) than in Facebook. It also appeared that there were active posting activities in Facebook before the class started for all MOOCs. The main reason is, in Coursera, students can register a MOOC several weeks before the course officially starts but they cannot access to the course until that day. Instead, during this period of waiting time, they could visit official Facebook group associated with the MOOC, which is built by instructors (we will have detailed rational in

interview and discussion part). Additionally, we found that there were still activities in Facebook even after the MOOC finished, shown more obviously in CIC and Geo.

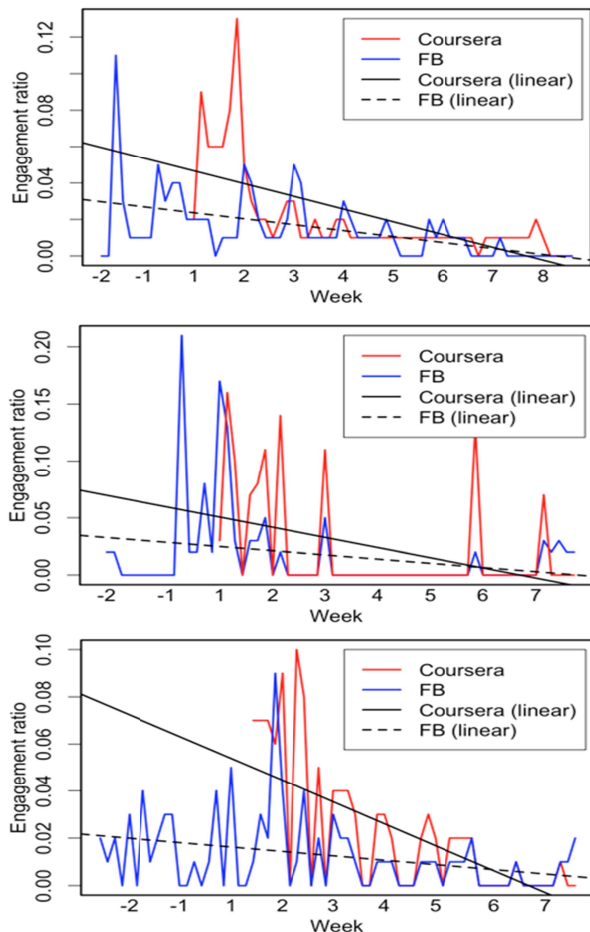


Figure 2. The level of engagement over time on Coursera and Facebook (FB) from three courses ((top): Arts, (mid): CIC, and (bottom): Geo).

Overall, our comparative analyses from the real usage data in the two different platforms clearly showed that, even if there were more people enrolled and more posts shared in Coursera and much fewer people joined in Facebook, when it comes to a level of engagement, Facebook seems a more attractive place to stay longer and engage more.

From these empirical results, we were motivated to study the following questions: *Does social media play different or unique roles in making people more engaged in an online course compared to official forums? Can we identify some of those elements from social media and think about a better approach to enhance students' retention, which will be both beneficial for instructors and students?* However, these are the questions that we could not answer just from a quantitative approach. To have better understandings of these questions we designed and conducted interview studies by recruiting four instructors and twelve students and asked their own perceptions and behaviors on Facebook and Coursera.

### Students' Perspective: Learning Experiences between Facebook and Coursera

We interviewed 12 students of the three MOOCs with respect to their motivations and experiences in using Facebook and Coursera during learning. Our intention was to uncover how their reflections would match our quantitative findings and the discrepancy of using Facebook and Coursera between instructors and students.

From interviews, 11 students like Facebook more than Coursera. They admitted the role of Facebook and Coursera should be different, for example, Facebook should be more social orientated but Coursera should be more problem solving orientated. But in fact, the role is not clearly divided. They would rather stay in Facebook to follow the announcements and have discussions with students and the instructor. We have generated 4 themes that students made the comparisons between Facebook and Coursera forum based on their experiences.

#### A Real Community in Facebook

All 12 participants believe Facebook give them a sense of community. In Facebook, they know some “real” amazing people, have follow up conversations and discussions, gain more quick feedback and attentions, and also have fun moments, all of which are hard to find in Coursera forum.

*“I lost my interests in the Coursera forum after one week because it was very chaos. I didn't know people there because I guess most of them were not willing to make friends. They used fake name, which made me feel untrusted. So later, I used a fake name too. Also, I rarely received replies from them on Coursera and when I answered some questions, no thanks received. It's not like a human being interaction place. So I went to Facebook group, where I saw a totally different atmosphere...”* [P3]

*“Although I also introduced myself in Coursera but no people would carefully read it, which makes the introduction useless.”* [P7]

Indeed, in Coursera, students are allowed to use any names that are not real to represent themselves and it is optional to fill out their profile information. Trust would be hard to build in this case. Moreover, Coursera did not provide a course roster; thus, it is hard to maintain a conversation or a friendship there.

Also, our participants believe Coursera is just a short-term place to stay depending on the length of the course (usually 4 to 8 weeks). Thus, they do not treat Coursera as their “home” or “territory” and are not willing to put more efforts into the discussion forum. In contrast, even after the MOOC finished, they could still maintain friendship with students and track the materials or discussion in Facebook.

*“People will leave Coursera right after the course finish. Everything would be gone. So I didn't want to contribute much in the forum... At the beginning the course, I frequently asked questions on Coursera but no answers.*



*After a while, I chose to ask questions on Facebook and it worked. Actually, I like answering question on Facebook, as least I received some thanks and we can have real interactions.” [P11]*

These factors make the Coursera not well suited for social connections and thus hard to build a sense of community. In addition, our participants felt hard to keep passion on the Coursera when their questions or actions constantly cannot receive feedbacks or attentions. This affects both social and learning aspects. Discussion forum is a crucial place for students to digest challenging knowledge and keep learning motivation. The current obstacles have made the expected functionality of the forum tarnished.

### ***More Convenient to Communicate with Others in Facebook***

All of participants consider convenient access is a big factor they visit Facebook group more than Coursera. Since our participants have much longer usage experiences on Facebook, and they are very comfortable to communicate with others and also potentially have more trust on other Facebook users. They have Facebook mobile app on their phone and keep Facebook website open on their PC, which make them receive any notifications or messages from the Facebook MOOC group anywhere and anytime. They could utilize a small chunk of time to join discussions. In doing so, they check the Facebook group much more often than Coursera. Although some participants said they also have and use a Coursera app on their phone, they mostly use the app to watch lectures and not necessarily to read posts, add comments, and so on.

*“I wish I could use my Facebook account to login Coursera. I think I will have more visits on Coursera when they save the extra step for me to login.” [P5]*

*“I frequently forget my password or account name. I know this is stupid, but it happens frequently not just on me but on many of my friends!” [P4]*

*“Sometimes, I actually want to reply or make some updates on Coursera, but when I think I need to login on my computer, I postponed doing it and then I forgot to do it later.” [P12]*

All of our participants believe Facebook plays an important role to remind them to visit Coursera. Since MOOCs are optional, most of students who registered MOOCs drop off in the middle [24] and lots of students cannot follow the course schedule. But when our participants received notifications from Facebook, they began to think of going to Coursera to catch up the course schedule. In other words, because of the reminders and course related posts on Facebook, our participants visited Coursera group more often than they would have.

*“I usually forgot to check the Coursera and follow the MOOC schedule, especially when I was busy. But Facebook group posts and notifications would encourage me to*

*squeeze sometime to watch more course lecture on Coursera and catch up the course schedules.” [P2]*

### ***Better Place for Collaboration in Facebook***

All our participants believe Facebook is a better place to collaborate with group members comparing with Coursera because there is no build-in tool in Coursera to collaborate. Instructors usually encourage student to construct groups based on the project or their mutual interests. Students usually construct groups actively on Facebook because they feel this is the most “natural” tool they could think of. Usually, they recruited group members from the official Facebook groups first. After identifying the group members, they build their own private groups on Facebook. For example, in Art MOOC, they construct different Facebook groups based on their preferred materials to make crafts, different ages groups and with or without disabilities. Our interviews show that they had very satisfied and successful experiences to collaborate with team mate and finish their group projects in this way.

Although three of our participants tried to use Coursera to recruit group members and have group activity on Coursera by constructing a new thread, they ended up with using Facebook. The reason is, not like Facebook having privacy groups setting, people who do not belong to their group still could visit and comments on their thread on Coursera, which makes them hard to maintain their group activities.

*“What we need is a place to collaborate on our group project but Coursera is really not an ideal one. Since there is no collaboration feature on Coursera, we appropriated the forum and added a new thread on the forum to divide some place for our project discussion. But we cannot control the access to the thread. We experienced lots of interruptions. So we gave up and adopted Facebook.” [P8]*

### ***Instructors/TAs Initialed Discussion in Facebook***

Our participants believe it is beneficial to build professional relationship with the instructor. But it is very difficult to have conversations with the instructor on Coursera. One reason is that there is no specific communication channel to the instructor. There are also massive amount of messages on Coursera, making instructor hard to check/read them all. On the other hand, in Facebook, instructors or TAs usually initiate posts first and students could have comments under the post. This gives students the feeling that they have the direct interactions with the instructors. More importantly, our participants believe the posts proposed by instructors or TAs read important or interesting, which are more attractive and valuable for students to look at and discuss.

*“I like reviewing Facebook posts and joining discussions with classmates, instructors and TAs there. The posts are usually interesting, for example, the instructor would share some useful materials or learning topic related knowledge. It is beneficial. Even just reviewing the discussions, I could learn more. I also received more replies from instructors and TAs than that on Coursera.” [P1]*

### Instructors' Perspective: Motivation and Perception of Using Facebook and Coursera

We interviewed 4 instructors of the three MOOCs with respect to their motivations of and perceptions in using social media and Coursera during teaching.

#### Motivations

##### *Improving Retention and Engagement*

All of our instructors said their primary goal of using social media was to enhance student retention and engagement. They believe the ideal online learning requires active engagement on the part of the student. Although each MOOC serves a large scale of students, they still hope their students to be active learners in the learning process not passive recipients of transmitted knowledge. Also, from the course data, they found only the small number of students could finish the course and receive a certificate. They hope more students could keep passion on the course. Together with students they hope to cultivate an active and friendly learning environment.

*"Ideally, I hope students can be engaged in MOOCs just like face-to-face class. Social media, such as Facebook may help to improve the engagement."* [Instructor 2]

##### *Cultivating a Sense of Community*

In general, all our interviewed instructors believe cultivating a sense of community is imperative for a successful learning process. However, our instructors believe it is very challenging because MOOCs students are massive and from all over the world. Building groups and a community is the most effect way to make student have a sense of belongings. Facebook is suitable, because it not only allows in-depth and formal discussion over the learning topics but also supports creating an environment for informal conversations more smoothly and naturally. In other words, the affordances of Facebook are appropriate for building a sense of community among students and instructors. In contrast, Coursera does not seem to be well designed to support these needs.

*"Cultivating a sense of community is definitely important for students, especially for MOOC student! I was forced to open a Facebook account to remind and encourage more students to participate our course activities. I don't know how effective it is but worth to try."* [Instructor 1]

*"Facebook is a very useful tool to enhance student communication quality and quantitate. Although Coursera has provided a discussion forum for students and instructors to communicate, I still feel hard to take effective and efficient communications."* [Instructor 2]

##### *Advertising the Course*

According to our instructors, another important role of Facebook is to advertise their MOOCs before MOOCs officially started. In Coursera, students cannot access the course until the start date. Thus, our instructors usually construct the official Facebook group several weeks before the course was launched. During this time, instructors

virtually introduce themselves (i.e., text post and making a video) and also encourage students to do self-introduction. They would also make a more detailed introduction of the course and give students some suggestions to learn this course well. They will also post something interesting to remind student that the course will be available very soon.

*"Facebook is a great place for students and instructors to build some connections before the course. Since the MOOC usually only span 4 to 8 weeks, which is relatively short comparing with traditional course. Thus, it will be challenging to create a good learning environment. Building a Facebook group several weeks before the course start potentially gives students more time to cultivate a community"* [Instructor 4]

##### *Being Creative*

The enemy of creativity, according to Robinson, is standardization [20]. MOOCs today rely heavily on standardized tests because the massive scale makes personalized learning impossible. Our instructors believe this is not an ideal way to teach students. They hope students can understand divergent thinking and seek multiple answers to a problem. They believe utilizing social media could drive students to be self-starters and have the potential to encourage them to be creative.

*"In Facebook, they have the opportunity to connect to fellow students to work on collaborative projects just as they will in the career world. This could help student have critical thinking and broaden their scope of current understanding. I am not saying the Coursera forum cannot do this, but I think social media can do a better job."* [Instructor 3]

#### Perceptions

##### *More Positive Feelings in Facebook*

The instructors perceived a more friendly environment in Facebook. They found there are full of the warm words in Facebook, such as "thank you" "this is helpful", but in Coursera, complains and rude words frequent appear. One instructor even kicked out some students on Coursera because of their bad behaviors.

*"I don't know whether this is because of the anonymous feature that allow students make a comment anonymously, I found students have very mean comments on both instructor and other students on Coursera. But in facebook, every one is very nice. I can always see very effective and meaningful discussions. I really hope the community is healthy and positive. I was actually disappointed when I go through the comments on Coursera."* [Instructor 2]

##### *More like a community in Facebook*

All our instructors believe Facebook did a better job in terms of cultivating a sense of community. Instructors said there are still many activities going on in Facebook even after the courses were finished. For example, in the Art MOOC, students would continue share their art crafts on Facebook group and many prior students would comment

under the picture. When instructors have some learning information or materials, they would still post in the Facebook group.

*“I think a good community could arouse students interests and make students feel happy and comfortable to share their learning experiences. Students should have a kind of attachment to the community and would like to contribute their efforts and benefit others. I think the Facebook group of my course is a very successful community in this case. I was always inspired by their words.”* [Instructor 1]

#### **Chaos Discussion Forum in Coursera**

Our instructors believe the structure of Coursera forum is chaos, though they have tried to divide various discussion areas for different topics; for example, each week’s topic has a separate space to discuss. However, the structure is hard to maintain. Students do not follow the rules but post on the area they believe most people could see it. Besides, the design of forum is unaesthetic, even instructors consider the design is boring, which become more salient when there are a massive number of comments.

*“You cannot imagine how painful I was when I tried to look through the comments. The design of the forum is very boring, especially when I need to go through so many comments... Also, the structure of the forum is chaos. I need to answer the same question repeatedly in different threads. Why don’t pull them together?”* [Instructor 4]

*“I doubt Facebook can do a better job if all the MOOC students joined in and had discussions in Facebook. But Facebook definitely looks better in terms of design, at least you won’t feel bored.”* [Instructor 3]

#### **DISCUSSION AND DESIGN IMPLICATIONS**

Facebook cannot take over the role of Coursera, because the forum is still the main interaction hub for MOOC students. The number of participants and posts shows the importance of this functionality that is built into Coursera. However, students did not very engaged in their Coursera discussions, because of a lack of efficient communication, no features supporting collaboration, convenient access to the platform, aesthetic and structured design, and other issues. In contrast, although Facebook groups tended to be smaller in number, students using them felt more engaged. Thus, we should consider how to gain inspiration from Facebook for the better design of Coursera forums.

#### ***Social Presence in MOOCs***

Both students and instructors believed their Facebook group was formed as a real community, since students used their real identities, communication was more efficient, and learners received more attention from peers and instructors, etc. From our quantitative analysis, we also found that activity patterns on Facebook were more stable and students were active even before the MOOC started and near to the time when it finished. In contrast, in the Coursera forums, students do not trust others, which inhibits effective communication; the activities also showed a steep decline

after the first week and had almost no activity close to the MOOC’s ending date. All these findings reflect the significant role of social presence in MOOCs. Social presence is defined as the ability of participants to identify with the community, communicate purposefully and meaningfully in a trusting environment, and develop interpersonal relationships by way of projecting their individual personalities [32]. Affordances of Facebook provide students a relatively trusting environment and foster more interactions between students, thus helping them to form a healthy community – all of which are lacking in Coursera.

We suggest MOOC carriers and designers should seriously consider the importance of social presence and use this concept to guide future design efforts. For example, it is beneficial to ask students to register using their real name to avoid issues of interpersonal trust. MOOC platforms could also consider a formal connection with Facebook as most people use their real identity in Facebook. This would also offer students a more convenient way to access MOOC platforms without constructing a new account and building a new profile. Besides, we also found instructors construct a Facebook group site and pages several weeks before the course begins since that period of time provides a good opportunity for students to “meet” each other earlier and begin to cultivate a sense of community. From our quantitative analysis (see figure 3, 4, & 5), we can also see students were very active even two weeks before the course started. Both quantitative and qualitative analyses show the importance of pre-course activity. We suggest Coursera allows instructors to open a forum and build a new social place before the course officially begins. Although Facebook works well, not all students have a Facebook account and are likely to join a Facebook group.

#### ***Teaching Presence in MOOCs***

Our analysis also revealed an important distinction between Facebook groups and Coursera forums. In Facebook, all posts were initiated by the instructors and the students made comments to the posts. In contrast, the posts in Coursera were primarily student-initiated. This distinction results in different perceptions from students’ perspectives. For example, the student participants felt that the content in Facebook groups was of higher quality and more attractive. On the other hand, this also demonstrates the involvement of instructors and TAs is important to make the forum popular and reliable. Although instructors are considered as a facilitator of their MOOC [18], we found students still have high expectations to be more connected with instructors. These findings further confirm the importance of the *teaching presence* in MOOCs [31]. This also implies that MOOC instructors’ role is critical to enhance student retention and engagement. Prior studies have found similar results in the context of traditional online courses; teaching presence is critical for development of social presence [31] and also highly correlated with students’ retention and learning outcomes [19]. Thus, we suggest rethinking the position of instructors and TAs [26]. From design



perspective, it would be beneficial to open a sub-forum on Coursera to pull out all the instructors threads, which may makes the forum more effective and popular.

### *Pedagogy Matters*

Both students and instructors we interviewed complained about the design of the discussion forum in Coursera including comments that it is boring, difficult to navigate with respect to content of interest, too many posts about the same content, unaesthetic forum design, no support for collaborations, and so on. These issues have been mentioned by prior literature [24, 25], and researchers also have begun to provide design suggestions for the forum. From our analysis, it seems the immature design of the forums has somewhat reduced students' motivations for using and being active in Coursera.

In contrast, discussions in Facebook were perceived as organized, meaningful and attractive. One of the big differences between the two communication spaces is that in Facebook, instructors design/select the outline of the discussion topics and lead the discussion but in Coursera, the forum is student initiated and develops on its own. The results demonstrated that discussions need to be pedagogically designed. While some literature does show that social media may foster and amplify social interactions over conventional discussion boards when equivalent pedagogical approaches are used (e.g., [28]), how to design and lead discussions matters more. As our results indicated, the students believed the content posed by instructors in Facebook groups had higher quality and were more interesting. Thus, we should also see the important role of pedagogy played during teaching and learning instead of merely relying on the technology and trying to find every answer from it.

### **LIMITATIONS AND FUTURE WORK**

Although we have presented a comprehensive set of analyses based on three MOOC courses in different types and interviews, and have discussed several interesting and meaningful insights, we acknowledge our study has some limitations. First, our results may not apply to the entire genre of MOOCs, because there are many other courses with different goals and scopes that may attract many engaged students. Second, we only studied Facebook and did not include other communication options (e.g., Twitter or Google plus) because Facebook is the only one used by all the three MOOCs and is also most popular. But it is possible that other MOOCs are more successful on using Twitter and Google plus, etc. We plan to expand our work to other MOOCs to look for similar patterns, and to include other social media platforms in the analysis to study various roles of social media for the success of MOOCs.

Additionally, our findings may suffer from self-selection bias. Since we were not able to link the same users from Coursera and Facebook because of a lack of user information (e.g., same ID or username used in Coursera and Facebook), we cannot identify the different behaviors between Facebook

user and non-Facebook user. We could only see the overall usage and engagement differences. Bias may exist; for example, people who join Facebook may be more active in communication than who do not. Future work could explore learning and social behaviors of different groups of students (Facebook user VS. non-Facebook user; heavy Facebook user VS. light Facebook user, etc).

Third, we found the motivation of some students joining Facebook is to have more interactions with instructors instead of purely being attracted by the affordances of Facebook (e.g., better communities, convenience of communication and better place for collaborations). Our usage data are limited to show the weights of these different reasons to result in different usage patterns. A large-scale survey could be used in the future to explore student motivations for joining a Facebook group when taking a MOOC.

### **CONCLUSION**

In this paper, we employed mixed methods to understand social media use and engagement compared to official MOOC forums and also demonstrated the rationales of social media use from instructors' and students' perspectives. We first present the comparative analysis of usage log data of three MOOCs regarding usage and engagement between Coursera and the associated Facebook groups. We also interviewed four instructors and twelve students of three MOOCs to understand their motivations and experiences in both platforms. We found that students showed higher engagement and retention in social media than the forums, and identified *four reasons* that lead to the results including a real community in Facebook, instructor initiated discussion forum, a better place for collaboration and more convenient to communicate with others. Our interviews with instructors unveil *four motivations* of using Facebook including enhancing student retention and engagement, cultivating a sense of community, advertising their MOOCs and being creativity. Through the comparison between Facebook and Coursera, our research attempts to provide several design guidelines for the next generation of MOOCs.

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