# Toward a typology of MOOC activity patterns - Learners who never rest?

Rémi Bachelet, Rawad Chaker

# Toward a typology of MOOC activity patterns.

## Learners who never rest?

Rémi BACHELET[1], Rawad CHAKER[2]

[1]Centrale Lille, F-59651 Villeneuve d'Ascq Cedex, France ; [2]Université Lumière Lyon 2, ISPEF, ECP, 69365 Lyon Cedex 07, France

remi.bachelet@ec-lille.fr, rawad.chaker@univ-lyon2.fr

**Abstract.** This paper aims at understanding MOOC learners' activity patterns, taking into account factors like personal schedule, traditional working hours, domestic time, nighttime and their relation with MOOC course opening hours, live sessions, essay submission deadlines... Are MOOC learners adopting non-standard learning schedules? Does the MOOC schedule determine the connection patterns of the learners? Four search topics and findings emerge from our research A/ Observations related to the density of learning activity B/ A weekly typology of learning days, C/ Attraction for a "live" contact point, D/ The "21:00 effect". Finally, we suggest a series of best practices for MOOC design.

**Keywords:** MOOC, platform connection patterns, live Q&A, learning schedule

## 1 MOOC, professional education and learners' schedule

MOOCs are increasingly used to improve existing occupational skills as well as to acquire new skills [1]. They are perceived by students as a way to improve their employability [2], and by potential recruiters as professional development means [3]. As a matter of fact, today, "self-development and employability (...) is the long-term project that underpins all others" [4]. Taking into consideration that professionals have standard working hours, how do MOOC learners manage their connection and training schedules? Does the MOOC determine the connection rhythm of the learners, or is it their personal and professional rhythm that determines when do they connect to the MOOC?

As time flexibility is one of the most appealing options offered by elearning [5], that of learners is determined by their capacity to allocate time to learning activities and the quantity and quality of time they can spend on these activities [5]. Apart from professional schedule, adult e-learners have personal and family constraints [6; 7]. The time they can allocate to their learning activities is often "the time left over once their professional, social, and family commitments have been fulfilled" [5]. According to Romero and Barbera [5], "for adult learners who work during the day, the time when most are available for learning activities is in the evening and on weekends" [8]. In other words, we would like to find new evidence related to learners' behaviors, in

order to improve the good practices thesaurus related to MOOC design, especially the scheduling and planning part.

## 2 Research methodology

Both the data analysis and the implementation attempts described in this paper use data collected on a French project management MOOC: MOOC GdP. The first session of MOOC (GdP1) was the first xMOOC to be opened in France [9] and experience of running a distance learning course [10]. Enrollment opened January 11, 2013. The course offers two individual tracks: Basic and Advanced. After the "common core course", 13 specializations are available. Thus MOOC duration is 4 + 2 weeks. A "Team project" track is also proposed, with around 100 projects realized since GdP1.

This paper puts in use data recently collected during 4 sessions: MOOC GdP5, 6, 7 and 8. These sessions took place between March 2015 and October 2016. Attendance/Attrition was as follows (table 1):

| Session | Enrolled | Active Basic track: | Graduating Basic track |
|---|---|---|---|
| GdP5 | 17,579 | 4,842 | 2,282 |
| GdP6 | 23,315 | 7,537 | 3,900 |
| GdP7 | 19,392 | 5,951 | 2,393 |
| GdP8 | 24,603 | 7,998 | 4,526 |

**Table 1.** Detailed session stats: https://goo.gl/MVVEpy

Our first data source is Google Analytics, filtering out server data activity for each session. We get server-side raw connection data, not individual sessions. Our second data source is YouTube Analytics. For each live "Q&A" video, we extract: live views, video views after live session (our data consists in 5*4 = 20 live sessions).

### 2.1 Weekly connection patterns are regular and stable

Our first finding is the regularity of connection patterns for weekdays. After normalizing sessions as a percentage of total attendance, and plotting average hourly activity for each weekday, we observe a very similar pattern for each session (Fig 1).

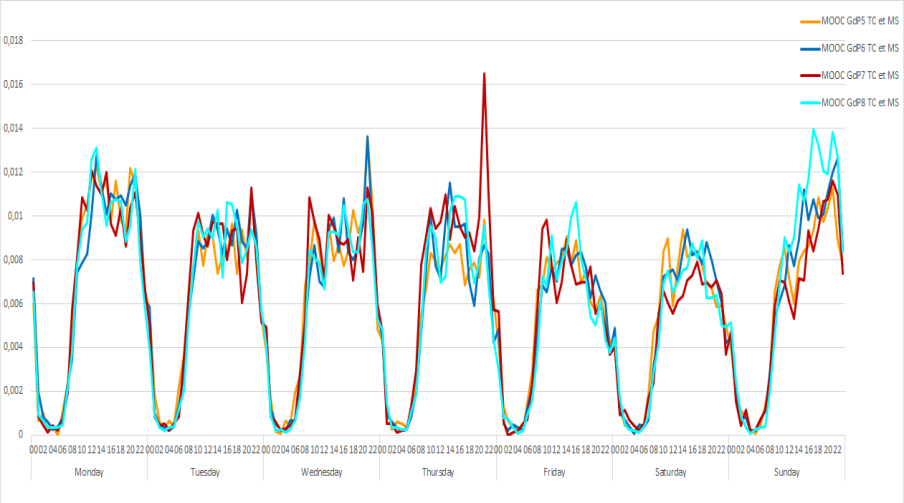


**Fig. 1.** Normalized hourly and weekly connection patterns

Peaks on Wednesday (sessions 5 and 6) and Thursday (sessions 7 and 8) match our live "Q&A" videos.

### 2.2 Q&A live sessions: convergence of deferred and live attendance

Each session features five live "Q&A" videos at 21:30: Wednesdays (GdP5 and 6) or Thursdays (GdP7 and 8). As seen in fig. 4, Youtube attendance analytics reveal a similar decreasing pattern along each session. Furthermore, these events are more affected by technical glitches and ad hoc communication. Attendance pattern is one of convergence: live attendance is quite stable along the MOOC (-50%), while deferred attendance shows a sharp -300% decrease.

As a result, the last live "Q&A" attendance converge to 50-50 live/deferred in attendance. The live connection rate is around 10% of active learners. We hypothesize there is a category of "hardcore learners" who attend the live "Q&A" not matter what. Thus, live "Q&A" would be a major attractiveness factor for hardcore learners. The 20 live "Q&A" took place on Youtube and not on the MOOC platform. However, they still coincide with a greater number of platform connections. Our multi-platform MOOC arrangement is not detrimental to the main MOOC platform.

### 2.3 Daytime, evening and night hours work: higher density for evening time

Although our analytics are limited to server-side data, we can plot the aggregated connections during 3 time slots.

- time slot 1 (8 a.m. – 6 p.m.): daytime
- time slot 2 (7 p.m. - 10 p.m.): evening
- time slot 3 (11 p.m. - 7 a.m.): night

If we only take into account the number of hours into each plot, daytime work would of course appear dominant. Hence, we re-ploted out data, taking into account hourly connections instead of total connections (Fig. 2):

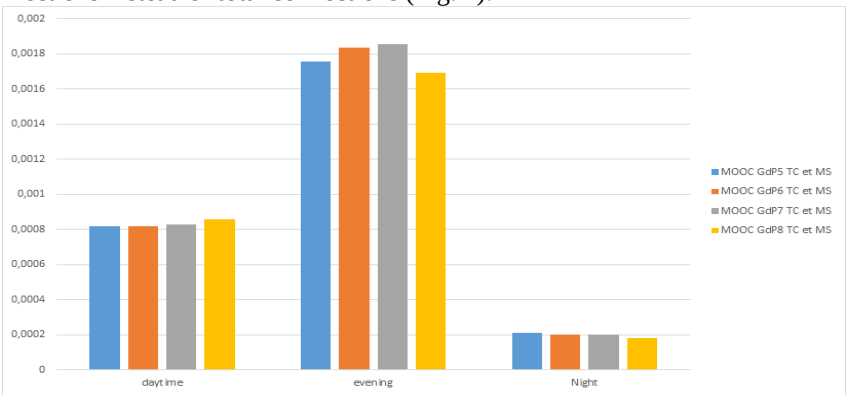


**Fig. 2.** Platform connections per hour on daytime, evening and night slots

It appears that evening hours represent a much higher density of work than traditional working hours.

### 2.4 Four types of daily patterns

Finally, we isolate five typical weekdays, in order to study their daily pattern (Fig. 3).

1. **Launch days**: each weekly module opens Monday at 12:00
2. **Live days**: live "Q&A" session is held on the evening of that day
3. **Weekdays+Saturdays**: "normal" week day with no live "Q&A".
4. **Sundays**: essay submission is due Sunday midnight week 1-3

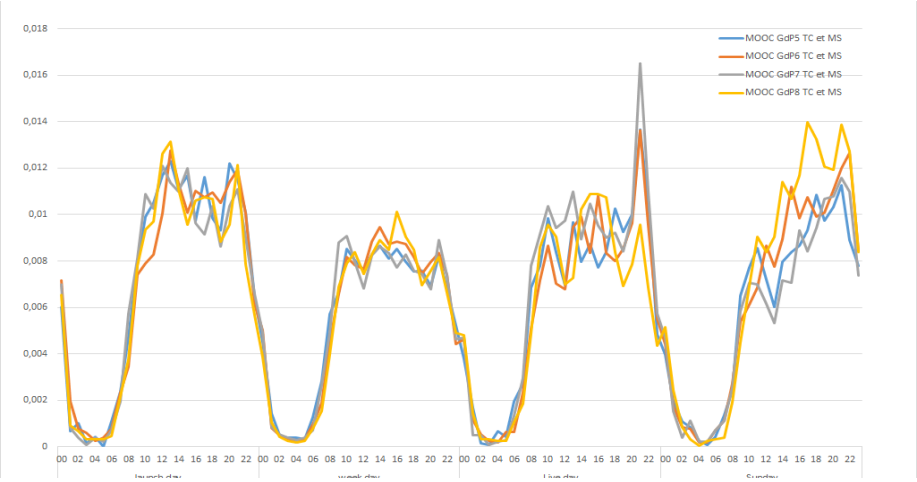


**Fig. 3.** Four types of daily patterns

We observe in fact not five, but four daily patterns: Saturday does not seem a special day as it lies in the continuity of the slow decrease of weekdays. Once more, a traditional working hours model does not seem to fit.

### 2.5 Longitudinal study of daily patterns: the "9 p.m. effect"

Compiling all our data from all sessions we observe a recurring pattern with three typical time slots (Fig 4):

- Nighttime (steady and very few connections),
- Day 9 a.m. – 5 p.m. (steady and around 1% connection density every hour)
- Evening 7 p.m. – 10 p.m. (variable connection density: 1.5-2%)

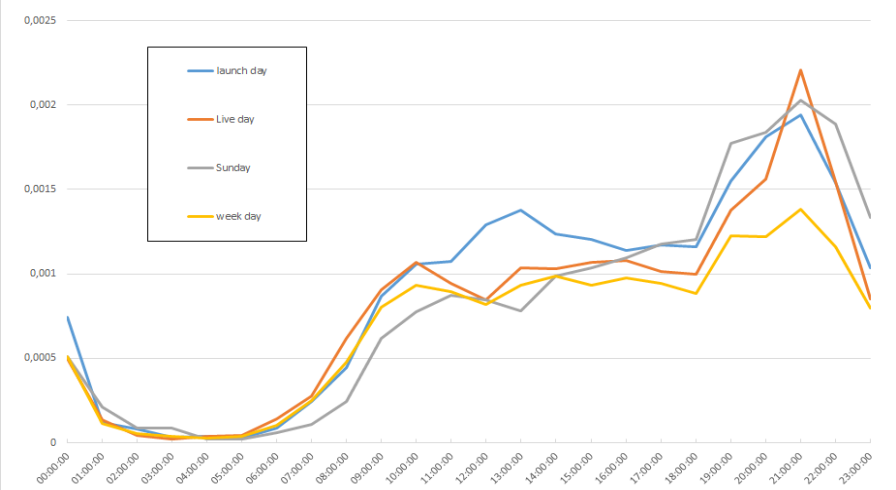


**Fig. 4.** Longitudinal connection density: the 9 p.m. peak

Most interestingly, a connection peak appears on the 9 p.m. - 10 p.m. slot every day. This peak is a recurring phenomenon: even though it's partly induced by MOOC organization (on the evening of live "Q&A" at 9:30 p.m. and to a lesser extent essay submission deadline at midnight) we still observe this peak when there is no specific trigger factor every day (except Saturday).

## 3 Conclusions and recommendations

A series of results and search topics emerge from our research:

1. Learning on a MOOC occurs with a double density on evenings compared to daytime and nighttime.

2. We propose a typology of 4 types of days, each displaying a specific hourly pattern: 1/ Launch days; 2/ Live days; 3/ Weekdays and Sundays; 4/ Essay submission days
3. A recurring “live” contact point has a lasting attraction on some hardcore learners, while other learners are less and less retentive. The two populations (“hardcore” and “standard”) exhibit a specific mode of attrition. Thus, the first live session of particular importance to final attrition.
4. The "9 p.m. effect": there is a recurring peak on activity between 9 p.m. and 10 p.m. This peak appears every day but Sundays.

Both instructional time flexibility and students’ perception of this flexibility are considered indicators of e-learning quality [5] and an expectation of e-learners [11].

From this, we draw two best practices for MOOC design:

- Understand the importance and role of weekly live sessions in creating and maintaining hardcore learners.
- Preferential timeslot for working learners: 9 p.m. - 10 p.m. is the best timeslot to set up events and work.

## References


1. Milligan, C., & Littlejohn, A. (2014). Supporting professional learning in a massive open online course. The International Review of Research in Open and Distributed Learning, 15(5).
2. Santandreu Calonge, D., & Shah, M. (2016). MOOCs, graduate skills gaps, and employability: a qualitative systematic review of the literature. International Review of Research in Open and Distance Learning, 17(5), 67-90.
3. Radford, A. W., Robles, J., Cataylo, S., Horn, L., Thornton, J., & Whitfield, K. E. (2014). The employer potential of MOOCs: A mixed-methods study of human resource professionals’ thinking on MOOCs. The International Review of Research in Open and Distributed Learning, 15(5).
4. Boltanski, L. & Chiapello, E. (1999). Le nouvel esprit du capitalisme. Paris: Gallimard.
5. Romero, M., & Barberà, E. (2011). Quality of e-learners’ time and learning performance beyond quantitative time-on-task. The International Review of Research in Open and Distributed Learning, 12(5), 125-137.
6. Diaz, D. P. (2002, May/June). Online drop rates revisited. The Technology Source, 93–106.
7. Palloff, R., & Pratt, K. (2003). The virtual student: A profile and guide to working with online learners. San Francisco, CA: Jossey-Bass.
8. Kasprzak, J., & Nixon, M. (2004). Cheating in cyberspace: Maintaining quality in online education. American Association of Computing in Education Journal, 12(1).
9. Bachelet, R., Cisel, M. (2013). Evaluation par les pairs au sein du MOOC ABC de la Gestion des projets: une étude préliminaire. Atelier MOOC, EIAH, Toulouse http://goo.gl/6JHYOv
10. Bachelet, R., Zongo D., Bourelle A. (2015) "Does peer grading work? How to implement and improve it? Comparing instructor and peer assessment in MOOC GdP", Third Europe-

an MOOCs Stakeholders Summit, 18-20 May 2015, Université catholique de Louvain https://halshs.archives-ouvertes.fr/halshs-01146710

11. Lorenzetti, J. P. (2005, August 1). How e-learning is changing higher education: A new look. Distance Education Report, 4–7.