Peer assessment in the first French MOOC : Analyzing assessors' behavior

Matthieu Cisel
ENS Cachan
61 av. du Pdt Wilson
94230 Cachan
+33 1 43 37 08 52
mcisel@ens-cachan.fr

Rémi Bachelet
Ecole Centrale de Lille
Cité Scientifique,
59651 Villeneuve d'Ascq
+33 3 20 33 53 53
remi.bachelet@ec-lille.fr

Eric Bruillard
ENS Cachan
61 av. du Pdt Wilson
94230 Cachan
+33 1 47 40 24 57
bruillard@ens-cachan.fr

ABSTRACT
Given the increasing number of students registering to MOOCs for free, course instructors who want to go beyond automated evaluation have no choice but to use peer assessment. Despite the increasing use of peer evaluation, very little is known regarding the factors that influence assessors' engagement in the process. Based on two editions of *Introduction to Project Management*, the first French xMOOC, we explored the impact of learners' background on their engagement in peer assessment. We observed that registrants that took part in peer evaluation differed significantly from other participants in regards to time constraints and demographic variables such as geographical origin.

Keywords
Peer assessment, xMOOC, engagement, demography

1. INTRODUCTION
The impact of Massive Open Online Courses (MOOCs) has considerably deepened since the foundation of edX and Coursera in 2012 [3]. Nevertheless, initial enthusiasm has been tempered by recurrent criticism over different aspects of MOOCs such as their low completion rates [1] or the unreliability of the grading process. Many courses rely on peer assessment [5] to evaluate at no cost large amounts of assignments. This grading process is easily scalable, but has faced high level of skepticism given the fact that MOOC participants are not trained examiners.

A deeper understanding of the factors influencing the peer grading process is needed in order to increase its efficiency. *Introduction to Project Management* is the first French xMOOC; it relies extensively on peer assessment and therefore represents an interesting case study in regards to those issues. How does participants' background influence their engagement in the peer assessment?

2. MATERIAL AND METHODS
2.1 Course description
ABC de la Gestion de Projet (*Introduction to Project Management*) is a MOOC organized by Centrale Lille, it was run twice in 2013, in the spring and in the fall. 1332 participants completed and obtained a certificate during the spring edition, and 3301 during the fall edition. In the second edition of the course exclusively, 579 students from Centrale Lille and several other French institutions of higher education registered. They were not taken into account in this analysis. When we speak about students, we refer to registrants still studying at university but not taking the course for credentials.

The course provided videos, quizzes, weekly assignments and a final examination. Two certificates corresponding to two different workloads were offered - a basic one and an advanced one. To obtain the basic certificate, it was required to complete successfully the quizzes and to pass the final exam. In order to obtain the advanced certificate, participants were required, in addition to the quizzes and the final exam, to submit weekly assignments that were peer assessed. In the spring edition and the fall edition, respectively 438 and 809 obtained the advanced certificate. Assignments were evaluated four times each in the first edition, and five times each in the second. Consequently, over the duration of the MOOC registrants could assess up to 16 and 25 assignments in the first and the second edition, respectively. Many registrants skipped some peer assessments in the spring edition. In the fall edition, course instructors threatened to lower the grades of the participants who had not taken part in the peer assessment process.

2.2 Available data and methods
In both editions, participants were asked to fill in a survey at the beginning of the course. It was responded to by 69% of the 3495 registrants of the spring edition and by 54% of the 10847 registrants of the fall edition. Response rate was higher among completers, with 99% and 93% in the first edition and the second one, respectively. Those surveys provided data on participants' origin, gender, employment status, and the amount of time they intended to work weekly for the MOOC. Countries were classified into three categories based on their human development index (HDI), obtained from UN data [7]. Countries with Medium and High HDI were grouped into a "Intermediate HDI" category. In order to obtain odd-ratios, we computed logistic regressions (glm procedure, family="binomial") with R. *Ref.* is the reference for such odd-ratios.

3. RESULTS
In both editions, only a fraction of registrants submitted assignments and were therefore allowed to take part in the peer assessment process. Among them, a significant proportion skipped peer assessment. The proportion of participants who skipped peer assessment at least once for the assignments they had submitted was higher for the spring edition (32.7%), than for the fall edition (8.3%).

Table 1. Identifying factors affecting engagement in the peer assessment process in the spring and the fall edition of the MOOC. Numbers represent odd-ratios of a logistic regression. For "Assignment submission", higher O.R means that more participants submitted at least an assignment for a given category, compared to the reference (Ref). For skipping P.A (Peer Assessment), higher O.R means that more participants skipped peer assessment at least once. *p-value <0.05, ** p-value <0.01, ***p-value <0.001

	Assignment submission		**Skipping P.A.**	
	Spring	Fall	Spring	Fall
Gender				
Male	*Ref*	*Ref*	*Ref*	*Ref*
Female	0.97	0.88	0.74	0.90
Employment status				
Higher management positions	1.27	**1.46***	0.81	1.11
Lower management positions	0.79	0.99	0.96	1.95
Unemployed	1.23	1.06	1.30	1.26
Students	0.73	1.01	1.36	1.15
Others	*Ref*	*Ref*	*Ref*	*Ref*
HDI				
Low	*Ref*	*Ref*	*Ref*	*Ref*
Intermediate	**1.43***	1.29	1.01	1.31
Very High	**1.98 *** **	**1.50*** **	**0.30 *** **	**0.48*** **
Weekly workload				
Below 2 h	**0.31 *** **	**0.43 *** **	1.44	1.62
Between 2 to 4 h	*Ref*	Ref	Ref	*Ref*
Between 4 to 6 h	**3.22 *** **	**2.77*** **	1.03	0.91
Bbove 6 h	**4.39 *** **	**3.86*** **	1.17	1.21

Through logistic regressions, we aimed at identifying the factors associated with engagement in the advanced certificate (Table 1). Only registrants who had responded to the initial survey were taken into account. We first tried to understand the background of participants who had submitted at least an assignment.

Geographical origin and time constraints were the main drivers of selection. As shown in Table 1, registrants from More Developed Countries (Very High HDI) were more likely to submit assignments and less likely to skip peer assessment than those from Least Developed Countries (Low HDI). Time constraints were also a very important driver of selection. Participants who were not able to spend more than two hours per week on the MOOC were unlikely to submit an assignment, and consequently to take part in the peer assessment process.

Given that taking part in peer assessment was encouraged but not compulsory to get the certificate, some participants skipped it. To analyze this phenomenon, we followed the same approach that we had used previously, but only registrants who had at least an assignment were taken into account in the logistic regression. Time constraints had no longer any statistically significant impact. Only geographical origin had a statistically significant impact in the spring edition. Participants from More Developed Countries were 70% less likely to skip peer assessment than participants from Least Developed Countries. This trend was also observed in the fall edition.

4. CONCLUSION

Among demographic factors, geographical origin, and to some extent employment status, were the most influencing factors regarding engagement in the peer assessment process. This trend had been detected in previous studies [2]. Time constraints were also one of the main drivers of selection, which is not surprising given that most registrants follow MOOCs during their free time. Given the amount of time required by assignments, selection based on motivation and availability occurred mostly before peer assessment itself. This may explain why no link was detected between skipping peer assessment and the number of hours participants had intended to spend on the course. Further investigations are needed to understand why participants from Least Developed Countries show lower levels of engagement than those from More Developed Countries, regarding both submission of assignments and participation in peer assessment.

Categorization of participants based on their behavior has been carried out mostly at the scale of the course [4]. Such approaches could be followed at the scale of the peer assessment process. Taking into account demographic parameters in the models might enhance the efficiency of strategies [6] aimed at increasing the precision and the efficiency of peer assessment.

5. ACKNOWLEDGMENTS

We acknowledge the work of Unow and of the team of volunteers who took part in the design of the course. We thank M. Epstein and M. Khaneboubi for their helpful remarks and feedbacks.

6. REFERENCES

[1] Breslow, L., Pritchard, D. E., Deboer, J., Stump, G. S., Ho, A. D., & Seaton, D. T. (2013). Studying Learning in the Worldwide Classroom: Research into edX's First MOOC. *Research and Practice in Assessment*, *8*, 13–25.

[2] Cisel, M. (2014). Analyzing completion rates in the First French xMOOC. *Proceedings of the European MOOC Stakeholder Summit 2014*

[3] Daniel, J. (2012). Making Sense of MOOCs: Musings in a Maze of Myth, Paradox and Possibility. *Journal of Interactive Media in Education*, *3*(0).

[4] Kizilcec, R. F., Piech C., Schneider E. (2013) Deconstructing Disengagement: Analyzing Learner Subpopulations in Massive Open Online Courses, LAK'13 *Proceedings of the Third International Conference on Learning Analytics and Knowledge*.

[5] Kulkarni et al. (2013) Peer and Self Assessment in Massive Online Classes. *ACM Transactions on Computer-Human Interaction*, *9*(39)

[6] Piech, C., Huang, J., Chen, Z., Do, C., Ng, A., & Koller, D. (2013). Tuned Models of Peer Assessment in MOOCs. *Proceedings of the 6th International Conference of E.D.M*

[7] United Nations Development Programme. (2011). Human development report. Retrieved from http://goo.gl/WfA3Um