

Divergent Perceptions from MOOC Designers and Learners on Interaction and Learning Experience: Findings from the Global MOOQ Survey

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DIVERGENT PERCEPTIONS FROM MOOC DESIGNERS AND LEARNERS ON INTERACTION AND LEARNING EXPERIENCE: FINDINGS FROM THE GLOBAL MOOQ SURVEY

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Abstract

As the provision of MOOCs continues to grow exponentially across the globe, much of the criticism on the quality of the learning experiences provided is based on its typically low drop-out rates. There is strong evidence that completion is not a goal for the majority of MOOC participants neither does it affect their satisfaction and perception of the quality of their learning experiences. Based on a literature review and analysis of existing quality approaches and indicators for MOOCs, the Global MOOC Quality Survey was designed and conducted in order to access quality perceptions of actors in the MOOC design and implementation process (n=267). In this paper, we present its first results relating to the designers and learners experiences with MOOCs and their offered four interaction types: learner-facilitator (LF), learner-resource (LR), learner-learner (LL) and group-group (GG). Comparing the different perspectives of learners and designers, our analysis presents significant differences in MOOC learners' and designers' intentions and experiences. The correlation differences of the MOOC learners and designers on the interaction in MOOCs are significantly very high. These results are also compared with the opinions from MOOC designers collected in a number of semi-structured interviews. Based on the analysis, we conclude this divergence is based on a misunderstanding between the two target groups on interaction. MOOC designers recognise its importance, but do not seem to understand and meet fully the expectations of MOOC learners, as their perception maybe influenced by institutional context.

1. Introduction

Globalisation and the impact of the internet have contributed significantly to transform living and working conditions in the last two decades [3]. The emergence of the global economy and the network society has brought new complex societal challenges which have a great impact on how education is perceived, organised and conducted. There is a strong pressure from stakeholders to innovate educational practices, making them more flexible and adjustable to context [16] [21]. This results from the need for citizens to adapt more easily to changing social and work contexts [6]. But, public education systems are also expected to educate citizens to become agents of change themselves. In order to meet this challenge, major changes are being introduced in education systems worldwide [14]. From a prevailing teacher-centred perspective, education is evolving to a dominant learner-centred approach as the circumstances and modes of learning are becoming more diverse as well.

As the complexity and scale of these challenges increases, public opinion and Governments are also pressuring education systems to respond ever more rapidly and effectively, using less resources. In face of this, educational institutions and all stakeholders at the different education levels have been feeling the need for education provision to become more scalable, interoperable and flexible. In this framework, openness has become a key value in education and learning, similarly to what also happened although independently in science and innovation. Thus, inspired by the UNESCO declarations on Open Education (2002 and 2012), in particular the policy on Open Educational Resources (OER) [25], and fostered by the European Commission's communication on "Opening Up Education" [5], educational institutions across Europe are transforming, especially in the higher education sector.

One of the drivers for this transition has been the phenomenon of Massive Open Online Courses (MOOCs). The first MOOC bearing that designation was the "Connectivism and Connective Knowledge" course (CCK08) offered by Siemens, Downes and Cormier at the University of Manitoba, Canada, in 2008 [1] [24]. It drew on the experiences by Alec Couros¹ and David Wiley² who, in 2007, decided to open the formal, for-credit courses they

¹ EC&I 831: Social Media & Open Education - <http://eci831.wikispaces.com>.

² INST 7150 Introduction to Open Education - http://opencontent.org/wiki/index.php?title=Intro_Open_Ed_Syllabus

were teaching at their institutions to anyone who wanted to take part in them in a not-for-credit, informal way. The term MOOC was coined by Cormier, after registrations for the course went past 2000 participants [4]. Although this first MOOC set itself in the larger context of Open Education and OER, it really became a huge success when Thrun and Norvig opened their “An Introduction to AI” course at Stanford, in the Fall of 2011, to anyone who wanted to take it for free, an impressive 160000 plus people registered for the course [24].

This unexpected event, coupled with the reputation of the professors and the institution involved, set in motion what would become the educational phenomenon of 2012 [1]. Soon after Thrun created Udacity, and Koller and Ng created a similar company, Coursera. Also in 2012, MIT announced the partnership with Harvard which established the EDx consortium. In the following years, MOOC provision grew constantly. MOOC providers and learners are now spread across all regions of the globe. According to Class Central [18], the number of MOOCs in 2017 is higher than ever (9,400) and the same applies to MOOC learners (81 Mio.) and providers (800+).

The unprecedented and rapid popularity of MOOCs in the last years has led to an increasing global debate about their quality, involving researchers, practitioners, institutional leaders and learners. To address the quality issues involved in the discussion, the Massive Online Open Education Quality (MOOQ) project was initiated as the European Alliance for the Quality of MOOCs. It is a 3-year project funded by the European Union under the ERASMUS+ call. MOOQ is directly relevant to several key aspects of the 2011 EU Modernization Agenda.

2. Designing for quality MOOCs

The quality of the learning design and the experiences it provides for participants has been subject to much debate in recent years. Typically, the drop-out rates has been used as an indicator for measuring the quality of the learning experience. In MOOC settings, evidence indicates they are consistently very low and often below 10% [9] [11]. This has fuelled much of the criticism on the quality of current MOOC design. A new research agenda have been claimed in literature to reboot MOOCs [9] [17]. However, this discussion of low quality MOOCs is based on an improper use of drop-out rates as a quality indicator given these courses are mostly non-formal learning experiences [15]. Moreover, most of the criticism in academia derives from the fact MOOCs are seen as a synonym for “teaching classes online to a high number of students”, without a sound understanding of how the notions of “open” and “massive” were the real change operators in the initial concept, or of the history and practice of distance and online education [24]. In fact, most universities have adopted a traditional teacher-centred model of MOOC design. Although it allowed them to claim to be innovative, it actually didn't change much of their old culture and pedagogical practices.

As a consequence, alternative evaluation measures for MOOCs have been proposed and discussed in order to better address learners and their personal intentions and goals in learning with MOOCs [10] [22] [24]. As MOOCs become an important part of higher education institutions' provision and are increasingly used in formal learning contexts, the debate on how they meet quality standards gains relevance. To contribute to informed decision-making by providers and designers, the MOOQ project aims at developing in a an open dialogue with the experts community a Quality Reference Framework (QRF) for MOOCs. An international alliance was established to connect and bring together key experts and organizations to collaboratively address the quality of open online learning and education and, in particular, MOOCs.

One key element to assure the success and the quality of learning processes is social interaction. This is particularly the case in online learning and especially in open learning contexts as it happens with MOOC settings [23]. Research has provided much evidence that interactions with content, teacher/facilitators and peers lead to better results [26], a perceived higher quality of courses [17], satisfaction with the learning experience [19] and perceived effectiveness [13]. Early literature on MOOCs has investigated the nature of learner interactions with their course environments. However, to date we know very little about the nature of interactions between learners and facilitators or how these actors perceive the value of exchanging information with one another [7].

In fact, individual support or tutoring is impossible in a scalable or massive course environment. While there should be suggested activities and guidance from the course organizers, these can be carried out only at a more general level. Learning support in a MOOC environment has to rest mainly in the learning community, through collaboration, dialogue, peer feedback and active engagement from participants in the learning process. Participants in MOOCs are therefore expected to take an active role and be responsible for their own learning, but also seldom to actively engage in helping build a supporting learning community [24].

As Moore points out, interaction is a term which carries many meanings as to be almost useless unless specific sub-meanings can be defined and generally agreed upon [12]. In our research we have applied the three interaction types defined by Moore for distance education: learner-instructor (LI), learner-content (LC), learner-learner (LL). But, we've also included an additional fourth kind of interaction, as MOOCs by definition imply targeting and involving a high number of learners, potentially an unlimited amount. As such, learning activities are often conducted not individually but by random teams or groups of learners who join for a specific interest. The revised typology for learning interaction is the following: learner-facilitator (LF), learner-resource (LR), learner-learner (LL) and group-group (GG). In this paper we present a comparative analysis of the learners and designers perception of their experiences and interaction in MOOCs, focusing on interaction. The results will lead to the development of a future QRF to support quality MOOC design.

3. The Global MOOC Quality Survey

The first output of the MOOQ project was a survey on existing practices and design patterns for integrating quality approaches on emerging open online courses, including active discourse on open issues and concerns arising from the massive, large-scale implementations, showcasing paradigms of key players in the field. The goal was to reveal design patterns, both current and evolving beyond the classic theories of distance education. The analysis of the collected data will allow to derive best practises that are appropriate input for the design of the QRF.

Based on an in-depth review of literature and the analysis of existing quality approaches, evaluation instruments and quality indicators for MOOCs, we have prepared the Global MOOC Quality Survey, which was designed in two steps: First, a small pre-survey with a set of potential questions was developed and administered. We could already see from the pre-survey respondents (n=45) that the pattern of MOOC learners intentions when engaging in a MOOC experience was not similar to the one shown by the designers.

The following step was the development and launch of the Global MOOC Quality Survey which targeted three different groups of actors in a MOOC environment: learners, designers and facilitators. The survey was conducted in an open format over a period of four months in the first half of 2017. For its dissemination, the MOOQ team had the support of the leading international associations and institutions in the field.

On Table 1 below an overview of the number of participants from the three target groups is presented.

Table 1: Participants of Global MOOC Survey

	MOOC learners	MOOC designers	MOOC facilitators	TOTAL
Participants	166	68	33	267

As shown on Table 1, the number of respondents was significantly high for this kind of survey. As expected, the number of learners who responded is higher than the number of designers and of facilitators. Comparatively, the number of facilitators is quite relevant as not many MOOCs provide facilitation.

According to the gender profile, the female MOOC learners who participated in the survey are younger and reporting a lower level of highest education. This feature is in line with their lower age. The distribution is also not surprising in what refers to the age range when compared with MOOC and average populations, whereas the educational level is very high in relation to the average population but very similar to the reported MOOC populations [2] [8]. Both male and female groups of learners are coming from all five continents even if the majority originated from Europe.

4. Results on learners' and designers' perceptions on MOOC experiences

The findings from the Global MOOC Survey on the designers' and learners' perspectives on experiences and interaction in MOOCs are described in this section (for more details see [20]). On Table 2 we present the responses of the learners on their learning experience (question item LLE4).

Table 2: Answers on Learning Experience LLE4 by Learners

	n	VB	B	N	G	VG
Learning experience	166	4	4	13	75	70

VB: Very Bad, B: Bad, N: Neutral, G: Good, VG: Very Good

On Table 3 we show the responses of the designers on their design experience (question item DDE4).

Table 3: Answers on Design Experience DDE4 by Designers

	n	VB	B	N	G	VG
Design experience	68	1	2	13	33	19

VB: Very Bad, B: Bad, N: Neutral, G: Good, VG: Very Good

As shown in Tables 2 and 3, most of the 234 learners and designers who participated in the survey reported positive experiences with MOOCs. Over one third of them (38%) rate their experiences as very good (VG) and close to half (46%) declare them as good (G). This perception, however, is not similar in the two groups. Almost all of the learners (87%) report a very good (VG) or good (G) experiences with MOOCs while slightly less designers share a positive perception (77%). The result is much more significant though when we look only at the highest rating. In fact, close to half of the learners (42%) report their experiences as very good when compared to only 28% of the designers. The high degree of satisfaction shown by the learners with their MOOC learning experiences is consistent with the results from most MOOC surveys. This is not surprising and it demonstrates how completion rates fail to capture the essence of a non formal learning experience.

On the other hand, a possible explanation for the divergence between the perceptions on experiences by learners and designers may be linked with the great challenges faced by designers in their work. It seems designers might underestimate the complex multiple factors involved in course design for open and scalable learning environments. As such, they might feel unease when interpreting their design experiences.

5. Results on learners' and designers' perceptions of interaction in MOOCs

Next, we present specific findings from the Global MOOC Quality Survey on the MOOC interactions as perceived by the designers and the MOOC interactions as reported by the learners. On Table 4 we show the learners' responses on the experienced interactions in MOOCs (LF, LL, LR and GG = question items LLR4-1 to LLR4-4).

Table 4: Answers on Interaction Items LLR4 by Learners

	n	N/A	SD	D	N	A	SA
LF by learners	146	20	5	13	48	37	23
LL by learners	146	15	3	17	34	51	26
LR by learners	146	9	2	8	25	61	41
GG by learners	146	37	4	15	50	24	16

N/A: Not available, SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree

From the answers, it is clear learners perceive as more relevant the interaction with resources. Most of them (70%) strongly agree (SA) or agree (A) with this statement. A not so strong agreement (53%) is reported by learners regarding interaction with peers. Even so, this two types stand out as the perceived as more significant. Looking at the interaction with facilitators, only 41% strongly agree (SA) or agree (A). This is an interesting finding although not surprising given the special characteristics of a typical MOOC learning environment.

As presented in detail in another paper [20], the bivariate correlations between the learners' interactions (LLR4 items as predictors) and learners' experiences (LLE4 as outcome) show very high significant relations between three types of interaction and the learning experience (LLE4), namely LF (LLR4-1: "Interaction between learners and facilitators"), LL (LLR4-2: "Interaction among learners") and LR (LLR4-3: "Interaction between learners and

learning resources"), whereas there is no significant relation between GG (LLR4-4: "Interaction among teams and groups") and the learning experiences (LLE4). In addition the coefficient of determination (R^2) measuring the substantive importance of an effect is very high for the three interaction types LF, LL and LR.

On Table 5 we present the designers' responses on the designed interactions in MOOCs (LF, LL, LR and GG = question items DLR4-1 to DLR4-4).

Table 5: Answers on Interaction Items DLR4 by Designers

	n	N/A	SD	D	N	A	SA
LF by designers	52	2	1	5	11	24	9
LL by designers	52	1	1	3	11	19	17
LR by designers	52	3	1	0	4	22	22
GG by designers	52	8	2	10	14	13	5

N/A: Not available, SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree

The results shown are consistent with the learner's although with a higher expression. An even larger level of agreement is reported by designers in what concerns the interaction with resources. The very large majority (85%) strongly agree or agree with the statement referring to the interaction with resources. The same phenomena occurs in relation to interaction with peers (69%). However, the difference between the previous type and the learner's interaction with facilitators is not as clear as in the case of learners. As much as 64 % strongly agree or agree with the statement opposed to only 41% of the learners.

As explained in detail in the above mentioned paper [20], the bivariate correlations between the designers' interactions (DLR4 items as predictors) and designers' experiences (DDE4 as outcome) do not present any significant relation between the four interaction types (LF, LL, LR and GG) and the design experience (DDE4). But, the results are quite different for the two interaction types LL and LR and for the two interaction types LF and GG. The coefficient of determination (R^2) measuring the substantive importance of an effect is quite high for the two interaction types LL and LR: They are sharing around 4.5 %.

6. Comparison of learners' and designers' perceptions on interaction

Comparing the correlations from the learners' and designers' answers it seems that their perspectives on the importance of the three traditional interaction types are very contradictory [12]. There is consensus on the fourth interaction type (GG) as the p value is the lowest for both, learners and designers, i.e. no direct relation can be demonstrated. Among the three interaction types with very high significant relations for the learners, two interaction types (LL and LR) have a much lower p value, i.e. a small relationship could exist for the designers whereas it is excluded for the other interaction type (LF) with $p=.703$. In general it is surprising that designers do not value interaction as much as the learners what could lead to MOOC designs not fitting the interests and demands of the learners (as referred previously for a more detailed analysis see [20]).

7. Input from semi-structured interviews with designers

In the framework of the research, a number of additional semi-structured interviews was conducted with providers, designers and facilitators. Regarding interaction in MOOCs, it is particular significant to review the perspective shared by the designers. For this purpose, we've selected a set of three interviews (2 male and 1 female). All the designers interviewed are much experienced.

The importance of interaction is recognised by all three designers and they agree this depends on the design options. As one designer states, a MOOC in which interaction and collaboration do not happen is very likely to be unsuccessful and therefore will have no relevance to the institution that provides it. In addition, it is also stressed by the designers the connection between interaction and the pedagogical approach and design model selected. However, it can also be concluded from the interviews that the different approaches to the design process across

institutions can influence substantially the options taken by the designers. In the case of one of the institutions represented there is a reference pedagogical model for MOOCs in place, which has been subject to continuous improvement. This model promotes a learner-centred design and awards much importance to interaction. Another institution provides a set of broad design principles (interactivity, flexibility, innovation, contextualization, among others), but confers teachers the responsibility to individually choose the principles to include in the MOOC design.

Based on this input from the interviews, we can conclude that although designers acknowledge the importance of interaction, institutional context might play an important role in how this importance is perceived by designers in their actual practice.

8. Conclusion

In this paper we present the first findings from the Global MOOC Quality Survey with a focus on the comparison between designers' and learners' different perceptions of their experiences and perspectives on interactions in MOOCs. Regarding their perceptions on the MOOC experiences, we've found the designers report a less positive perception of the quality and impact of their design work than the learners as they rate consistently higher their learning experiences. In what relates to interaction, major differences were found between learners and designers perception of the importance of three traditional interaction types identified by Moore. There was a very high significant relationship ($p < .001$) between the learners' MOOC experience and the three interaction types LF, LR and LL and a significant relationship ($p = .026$) for the fourth interaction type GG, which was added by us. On the contrary, we didn't found a significant relationship between the designers' MOOC experience and all four interaction types (for the full analysis see [20]).

Comparing the different perspectives of learners and designers, our analysis presents significant differences in MOOC learners' and designers' intentions and experiences. The correlation differences of the MOOC learners and designers on the interaction in MOOCs are significantly very high. We suggest as an explanation for this divergence the different perspectives hold by designers' and learners' on interaction in MOOCs. MOOC designers do not seem to understand very well the needs and demands of MOOC learners or may be too much conditioned by their institutional environments in their design options, as the results from the additional interviews suggest. This leads us to conclude that it can be questioned whether designers and institutions/providers are currently understanding and thus fully meeting the expectations of MOOC learners. Given the importance and impact of this innovative type of educational provision, we believe there is the need to foster the dissemination of quality learning design models and practices specific for MOOCs which are clearly learner-centred and based on successful distance and online learning experience.

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References

1. Daniel, J (2012). Making Sense of MOOCs: Musings in a Maze of Myth, Paradox and Possibility. [see: <http://sirjohn.ca/wordpress/wpcontent/uploads/2012/08/120925MOOCspaper2.pdf>]
2. Dillahunt, T. R., Wang, B. Z., & Teasley, S. (2014). Democratizing higher education: Exploring MOOC use among those who cannot afford a formal education. *The International Review of Research in Open and Distributed Learning*, 15(5), pp. 1-20.
3. Castells, M. (1996-1998). *The Information Age. Economy, Society and Culture*. Oxford; Malden, MA: Blackwell.
4. Cormier, Dave (2008). The CCK08 MOOC – Connectivism course, 1/4 way. [Blog post]. *Dave's Educational Blog*. October 2, 2008. <http://davecormier.com/edblog/2008/10/02/the-cck08-mooc-connectivism-course-14-way/>.
5. European Commission (2013). *Opening up Education: Innovative teaching and learning for all through new Technologies and Open Educational Resources*. [COM(2013) 654 final] [see: <http://eurlex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:52013DC0654&from=EN>]

6. European Commission (2011). *Supporting growth and jobs – an agenda for the modernisation of Europe's higher education systems*. [COM/2011/0567 final] [see: <http://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=celex:52011DC0567>]
7. Gillani, N. and Eynon, R. (2014) Communication Patterns in Massively Open Online Courses. *The Internet and Higher Education* 23: 18-26.
8. Glass, C. R, Shiokawa-Baklan, M. S, Saltarelli, A. J. (2016). Who Takes MOOCs? *New Directions for Institutional Research*, 2015(167), pp. 41-55.
9. Hansen, J. D., & Reich, J. (2015). Democratizing education? Examining access and usage patterns in massive open online courses. *Science*, 350(6265), pp. 1245-1248.
10. Henderikx, M. A., Kreijns, K., & Kalz, M. (2017). Refining success and dropout in massive open online courses based on the intention–behaviour gap. *Distance Education*, 38, pp. 353-368.
11. Margaryan, A., Bianco, M., & Littlejohn, A. (2015). Instructional quality of massive open online courses (MOOCs). *Computers & Education*, 80, pp. 77-83.
12. Moore, M. G. (1989). Three types of interaction. *The American Journal of Distance Education*, 3(2), pp. 1-7.
13. Nandi, D., Hamilton, M., & Harland, J. (2012). Evaluating the quality of interaction in asynchronous discussion forums in fully online courses. *Distance Education*, 33(1), pp. 5-30.
14. OECD (2016). *Education at a Glance 2016: OECD Indicators*. Paris: OECD Publishing.
15. Onah, D. F., Sinclair, J., & Boyatt, R. (2014). Dropout rates of massive open online courses: behavioural patterns. *EDULEARN14 Proceedings*. pp. 5825-5834.
16. Peter, S., & Deimann, M. (2013). On the role of openness in education: A historical reconstruction. *Open Praxis*, Vol. 5(1), pp. 714. [18] Reich, J. (2015). Rebooting MOOC research. *Science*, 347(6217), pp. 34-35.
17. Reich, J. (2015). Rebooting MOOC Research. *Science*, 347 (6217), 34-35.
18. Shah, D. (2018, January 22). A Product at Every Price: A Review of MOOC Stats and Trends in 2017. Class Central. Retrieved from <https://www.class-central.com/report/moocs-stats-and-trends-2017/> [on 25 April 2018].
19. Sher, A. (2009). Assessing the relationship of student–instructor and student–student interaction to student learning and satisfaction in web-based online learning environment. *Journal of Interactive Online Learning*, 8(2), pp. 102-120.
20. Stracke, C. M., Tan, E., Teixeira, A. M., Pinto, M., Kameas, A., Vassiliadis, B., & Sgouropoulou, C. (2018). Gap between MOOC designers' and MOOC learners' perspectives on interaction and experiences in MOOCs: Findings from the Global MOOC Quality Survey. *Proceedings 18th IEEE International Conference on Advanced Learning Technologies (ICALT 2018)*. (accepted, in print).
21. Stracke, C. M. (2017a). The Quality of MOOCs: How to improve the design of open education and online courses for learners? *Proceedings 4th International Conference, Learning and Collaboration Technologies (HCLT 2017)*, Part I, LNCS 10295, pp. 285–293.
22. Stracke, C. M. (2017b). Why we need High Drop-out Rates in MOOCs: New Evaluation and Personalization Strategies for the Quality of Open Education. *Proceedings 17th IEEE International Conference on Advanced Learning Technologies (ICALT 2017)*, pp. 13-15.
23. Tawfik, A. A., et al. (2017). The nature and level of learner–learner interaction in a chemistry massive open online course (MOOC). *Computers in Higher Education*, 29. p. 411-431.
24. Teixeira, A. & Mota, J. (2014). A Proposal for the Methodological Design of Collaborative Language MOOCs. In E. Martín-Monje & E. Bárcena (Eds), *Language MOOCs: Providing learning, transcending boundaries* (pp. 33-47). Berlin: De Gruyter Open. ISBN: 978-3-11-042250-4.
25. UNESCO (2012). *2012 Paris OER Declaration*. 2012 World Open Educational Resources (OER) Congress. Paris: UNESCO.
26. Zimmerman, T. D. (2012). Exploring learner to content interaction as a success factor in online courses. *The International Review of Research in Open and Distributed Learning*, 13(4), pp. 152-165.