

‘Vote me up if you like my ideas!’ Experiences of Learning in a MOOC

Working Paper for the ICA Pre-Conference: Innovation in Higher Education: building a better future?

Rebecca Eynon¹, Isis Hjorth, Nabeel Gillani and Taha Yasseri, University of Oxford

Massive Open Online Courses (MOOCs) are the latest in a long line of technical initiatives in higher education that have received a great deal of media hype – with *The New York Times* naming 2012 “The Year of the MOOC”².

Much of the early debate was based on relatively simplistic utopian or dystopian debates about how MOOCs would transform Higher Education that neglected previous research in the field (Flew, 2002; Selwyn, 2011). For those who have worked in the field of education and technology for some time, this was all a little predictable, but did have a useful purpose in drawing attention to wider discussions about the purpose and future of higher education. Furthermore, these debates are increasingly informed by a growing body of empirical evidence as MOOCs themselves have become a topic of academic research.

In our own work, we view MOOCs as just one part of the complex ecology of higher education, which need to be explored together with the existing and historical characteristics and functions of the sector. As Robins and Webster (2002) suggest, researchers need “to develop a more sociologically grounded narrative of change in higher education – one that is aware of continuities, as well as transformations” (pp.6-7). In research on MOOCs then it is important as a starting point to consider what is potentially new about these courses and what is similar to past offerings.

1. Locating MOOCs within the higher education landscape

When one considers what MOOCs can potentially offer learners that previous incarnations of open education initiatives have not; we would argue that MOOCs are potentially unique in the way that they offer an opportunity for thousands of learners from diverse geographical locations with varied experience to participate and collaborate with *each other*.

Despite this, often the current focus of research on MOOCs is around interaction with content. From a pedagogical perspective, activities such as watching video lectures and taking multiple choice quizzes are valuable and play an important role in learning. However, it is also important to consider the nature of learners’ interactions with each other. As Sfard reminds us, it is valuable to acknowledge the varied ways that learning can occur, both through activities that support the acquisition of information and knowledge as well as more collaborative and participative approaches to learning (Sfard, 1998).

From the significant amount of research in online learning, there are already a range of social constructivist and social-cultural perspectives that can be utilised (e.g. Goodman and Dabbish, 2011; Lave & Wenger, 1991; Siemens & Conole, 2011; Stahl et al., 2006). Furthermore, recent studies have suggested that some students in MOOCs spend as much or more time using the discussion forums as they do viewing lectures or doing homework (Seaton, et al., 2013), highlighting the need to explore these kinds of activities.

¹ Contact author: rebecca.eynon@oii.ox.ac.uk

² http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html?_r=0

Thus, our work has focused on how people interact with each other within MOOC forums. Our ultimate aim is to contribute to this field through the development of a series of learner profiles that reflect the different ways in which people communicate and interact with one another in MOOCs, and how these interactions are related to learner characteristics, experiences and outcomes. Such an approach is useful for educators to better understand and support learners in MOOCs – a challenging task in these massive and open “crowd like” settings where there is a significant distance between teachers and learners.

In this paper we present some of our research that aims to achieve this goal. Using data from one case study MOOC on business strategy that had an emphasis on encouraging interactions we ask:

1. Can we distinguish coherent profiles of learners’ interactions within a MOOC?
2. How do these interaction profiles relate to learner characteristics?
3. What is the relationship between these interaction profiles and learners’ performance and experiences of learning within a MOOC?

2. Methodology

One reason there has been a significant interest in researching MOOCs from a range of different disciplines is the availability and abundance of digital trace data that is produced by learners in these online environments. However, while such data is incredibly valuable we argue that it is not sufficient to fully understand the learning process.

Learning cannot be understood through behaviour alone. Individual cognition and the social context matter – as clearly indicated by the title of this paper ‘Vote me up if you like my ideas!’ – a phrase sometimes used by forum participants in an attempt to be acknowledged by others. As Illeris (2003) notes, the process of learning can be viewed as

an entity which unites a cognitive, an emotional and a social dimension into one whole. It combines a direct or mediated interaction between the individual and its material and social environment with an internal psychological process of acquisition. Thus, learning always includes both an individual and a social element, the latter always reflecting current societal conditions, so that the learning result has the character of an individual phenomenon which is always socially and societally marked. (p. 227)

We suggest that a mixed method approach to the research is essential; in order to connect large scale patterns of interactions in the forums, with the content of the posts, to the ways that people experience these interactions. While it is possible to connect individual experiences within the forums with the interaction trends taken at the more macro level, it requires careful consideration to draw meaningful conclusions from these connections. In our study we therefore used a range of methods that could be linked back to individuals: analysis of digital trace data, a pre and post survey, 28 in-depth interviews and qualitative content analysis of 6500 posts in two sub-forums. We draw on all of these methods below – but first we introduce the course that is the focus of this research.

2.1 Overview of the case

The focus of the analysis is on a purposively selected Coursera-based MOOC that aimed to promote interaction and learning around real world business problems; using both weekly discussions of business cases in course forums and a peer-assessed final project that enabled students to conduct a strategic analysis of any existing company.

The course lasted for six weeks and assessed students through a combination of weekly quizzes and a final project: to perform a strategic analysis of any existing organization. Students were encouraged to use the forums to discuss weekly business cases on existing companies such as Google, Apple, Disney, etc. Students were not evaluated on their performance in the forums.

90,000+ students registered for the course, and approximately 143 countries were represented from six different continents. Over 47,000 students were considered “active” (i.e. logged into the course’s website at least once) and more than 39,000 of them viewed or downloaded at least one of the lecture segments. Over 20,000 students completed at least one quiz. 4,337 participants created at least one post or comment in the online discussion forums. Over 2,500 students received a nonzero score in the course, implying that they submitted at least one quiz or the final project. These patterns reflect the different interpretations of what it means to “participate” in these settings (see also Kizilcec et al., 2013).

Participants tend to be highly educated people primarily from the Western world (see also Breslow et al., 2013; Kizilcec et al., 2013). Based on responses to the pre and post course surveys³, nearly 40% of respondents were between the ages of 25 and 34, over 80% had at least a Bachelor’s degree, and approximately 40% had a Master’s or professional degree (e.g. MBA, J.D., etc.). Moreover, approximately 54% of pre-course survey respondents identified themselves as “industry professionals”. The most popular motivation for taking the course was “professional development”. Characteristics of forum participants (e.g. motivation, educational background) were virtually identical to the broader set of survey respondents.

Each aspect of the course had an associated sub-forum (for example, the Final Project sub-forum facilitated questions, debates, and team formation for the final assignment; the Cases sub-forum was divided into additional sub-forums for each week’s selected company). There were also forums for Questions for Professor, Technical Feedback, Course Material Feedback, Readings, and Lectures.

There were over 15,000 posts and comments in the forums, generated by nearly 4,500 learners. Lurking was prominent. Over 15,000 people viewed at least one discussion thread, contributing to a total of 181,911 discussion thread views.

2.2 *Research design*

For this paper, there were three phases of analysis:

Qualitative content analysis of 6500 posts:

We conducted content analysis on all posts in the case studies and final projects sub-forum. These two forums were selected as we considered them most significant for interaction and learning (Gillani et al., submitted)⁴. The final project sub-forum facilitated questions, debates, and team formation for the final strategic analysis assignment; and the cases sub-forum was a place for students to engage in discussions about particular questions about specific business cases.

Content analyses have sometimes been used in online learning research, (e.g. De Weaver et al. 2006). The content analysis scheme for the present study was developed based on both existing

³ Response rates to the pre and post survey data were N=7000, 1000 respectively - thus it is important that the results be caveated with the likely existence of response bias (Armstrong & Overton, 1977; Couper, 2000).

⁴ They were the forums that had the highest proportion of meaningful interactions between learners and the lowest proportion of chance encounters as identified using a significant network extraction model used to infer social networks in ecological settings (Psorakis et al., 2011); and were the most integrated and inclusive of all the sub-forums based on a vulnerability analysis.

academic literature and preliminary observations of online course discussions. For the purposes of this paper each post was coded on three dimensions: learning; dialogue acts; and topic.

The learning dimension was used to collect data about the extent to which knowledge construction occurred through discussions, categorising each post using one of nine categories, ranging from no learning, through to four types of sharing and comparing of information, to more advanced stages of knowledge construction such as negotiation of meaning (Gunawardena et al., 1997). The second dimension identified communicative intent in the forums, selecting from five categories: argumentative, responsive, informative, elicitative and imperative (Clark et al., 2007; Erkens et al., 2008). Given the slightly, chaotic nature of the forums, we also wanted to code for the content of the discussions. For this purpose we used 11 categories that reflected all course related topics (e.g. cases, quizzes, readings, arrange online meet-ups, introductions)

For simplicity (given the size of the dataset), the unit of analysis selected was the post. The qualitative analysis software NVivo was used for labelling content. Coding was conducted by four individuals who trained together over the course of two sessions and pilot tested the instrument together to enhance reliability.

Identification of interaction profiles:

We used Bayesian Non-negative Matrix Factorization (BNMF) to extract communities of learners based on the nature of their online forum posts. While previous studies in education have opted for clustering approaches such as K-means or agglomerative methods (e.g., Ayers (2009)), we chose BNMF because it afforded a modelling flexibility and robustness that was better-suited for this particular dataset and application domain (see Gillani et al (2013) for full details). Since participation in multiple sub-forums was minimal (in most cases, no more than 10% of participants in one sub-forum participated in another), we explored the latent features of communication and the characteristics of these underlying communities in both sub-forums independently of one another.

In-depth interviews with 28 MOOC participants:

At the same time we contacted all MOOC participants who had indicated their willingness to be interviewed in the post-course survey. All of the participants who responded to our follow up request were interviewed, primarily by Skype with three being conducted via email (at the request of the participants). The interviews were semi-structured and focused on their motivations for taking the course, their learning experiences and practices, the significance of the forums and other people for their learning and the course outcomes. These topics were discussed in relation to their current life circumstances and other MOOCs they may have taken. Interviews were transcribed prior to the analysis and were conducted to provide data primarily about the motivations and experiences of learning that was not possible to obtain from the other methods in this project.

3. Findings

3.1 Quantitative profiles of learner interactions⁵

Cases sub-forum

The Cases sub-forum had 1387 unique participants that created nearly 4,100 posts or comments. We used BNMF to detect latent communities based on the learning and dialogue acts reflected in these

⁵ Please note this section is taken directly from an earlier paper: [Communication Communities in MOOCs](#)

posts, as this particular sub-forum was set up for participants to practice the tools and frameworks they learned in the course, and so, the learning and dialogue dimensions were selected to reveal the ways in which people used the forums to engage with one another and construct knowledge.

Four learner communities emerged, containing 238, 118, 500, and 531 people, respectively. We describe these communities as committed crowd engagers, discussion initiators, strategists, and individuals, respectively.

Community 1 (committed crowd engagers). Participants in this group tended to engage with others in the forum. Of all the groups they contributed the most responsive dialogue acts at 43% of total posts, and the second highest number of informative (8%) and elicitative (5%) statements. In terms of learning, they tended to achieve quite similar levels of higher-order knowledge construction to groups 2 and 3. These participants read and posted the most of all four groups. 45% of the group's participants passed the course – significantly more than any other group ($p < 0.05$). Interestingly, members of this group were likely to be from Western continents, with a larger proportion of Europeans (26.1%), albeit only significantly greater than the other groups at the $p < 0.1$ level. Nearly 31% had at least a Master's degree – similar to group 3. It is reasonable to suggest that this group found the forums an important part of their learning and used it as they sought to formally pass the course.

Community 2 (discussion initiators). Most notable for this group was its level of elicitative dialogue acts – which characterized over 48% of its participants' posts. Moreover, 24% of their posts did not involve learning, a significantly greater proportion than the other groups ($p < 0.07$ compared to group 1; $p \approx 0$ compared to groups 3 and 4). Still, members of this group had a larger proportion of posts reflecting higher-order learning than the other groups (8.0%). Interestingly, this group had a significantly lower pass rate than groups 1 and 3 (25%, $p < 0.05$), but this could be explained to a large extent by the high number of people who did not submit a final project (67%, similar to group 4). Members of this group viewed fewer discussion threads and contributed fewer posts than groups 1 and 3. Geographically speaking, a significantly higher proportion of this group's members were located in Asia in comparison to the other three (31%, $p < 0.01$). This could suggest that geography played an important role in motivating discussion. Indeed, the more elicitative nature of dialogue in this group may suggest cultural differences in interpretations of, or responses to, various conversation topics.

Community 3 (strategists). In many ways, people in this group were similar to group 1. They had similar levels of higher-order learning and tended to be responsive to others' comments. However, they had a greater proportion of argumentative statements (55%) and rarely had posts that reflected no learning (1.6%). People in this group were second most likely to pass the exam (36.2%) and second most likely to try to pass, but ultimately fail (6.4%). They tended to be similarly educated to those in group 1 – with nearly 30% receiving at least a Master's degree. They viewed and contributed to the forums the second most number of times, but this was still significantly less than group 1 ($p \approx 0$). Combined, these characteristics suggest that students in group 3 were more strategic in their approaches, using the Cases sub-forum only as needed to achieve their learning goals.

Community 4 (individualists). People in group 4 were highly distinctive in their large proportion of argumentative statements (85%). They had a smaller proportion of posts featuring higher-order learning (3.7%) compared to groups 1 - 3. They read and posted in the forums less than any other group (significant at $p \approx 0$ compared to groups 1 and 3). They were the most likely to not submit a final project (68%) a similar number to group 2. Of all the groups, participants in this group had the smallest proportion of people attain at least a Master's degree (23.2%, $p < 0.05$ compared to groups 1 and 3). These indicators may suggest a number of possibilities: that members of this group were the

most likely to drop out of the course of all four groups, may have had limited experience of using forums to construct their knowledge, or simply preferred to learn individually.

Final Project sub-forum

The Final Projects sub-forum had 1256 unique participants creating nearly 2,400 posts or comments. We selected the communication and topic labels as inputs into BNMF because of the nature of the sub-forum: it was a place for participants to find others to discuss their individual final projects with prior to the submission. Therefore, how people engaged with each other and the topics of their engagements were central to this setting. We detected 5 communities with 296, 50, 611, 45, and 237 individuals, which we characterised as: instrumental help seekers, careful assessors, community builders, focused achievers, and project support seekers, respectively.⁶ 3

Community 1 (instrumental help seekers). Participants in this group had a high proportion of elicitive dialogue acts (64%) and primarily discussed the final project (83%). On average, they posted more than groups 2 and 4 and their amount of views of the forum were relatively low (similar to groups 4 and 5). The proportion of people who passed was significantly lower than in groups 2, 3 and 4 (41%, $p < 0.01$). People in this group were also more likely to submit and fail the final project than clusters 3 and 5 (14%, $p < 0.05$). There were fewer people with postgraduate qualifications compared to groups 3 and 5 (20%, $p < 0.01$). These trends suggest that members of this community sought help by asking questions and discussing the final project with their peers, but still did not pass the course.

Community 2 (careful assessors). Participants in this group had the highest proportion of elicitive dialogue acts out of all of the groups (71%), but in contrast to group 1, the focus of their posts was about the peer review process (87%). They viewed more posts on average than groups 1, 4, and 5, but only groups 4 posted fewer comments on average. Thus, it seems that participants in this group used the forums to look for answers to questions they had about peer review, and only posted again if necessary. Like group 4, a high proportion of learners passed the course, compared to groups 1, 3, and 5 ($p < 0.05$). These patterns suggest that this group needed to know more about the peer assessment process, but that its members were very strategic in their use of this sub-forum to obtain necessary information.

Community 3 (community builders). Participants in this group were distinctive in the proportion of posts that were responsive to others (55%). In contrast to the other groups, the focus of their discussions were spread across final projects and peer review. Interestingly this group seemed the most engaged of groups in the forum, being the most likely to view and post in this sub-forum of all participants in other groups ($p < 0.05$, $p < 0.001$, respectively). Likewise, the average length of posts submitted by supporters (712 words) was markedly higher than in any other group (Group 1 had the 2nd highest average of 382 words – $p < 0.001$). Their pass rate (51%) was higher than clusters 1 and 5 ($p < 0.01$), but lower than 2 and 4 ($p < 0.05$), partly due to the high proportion of learners (41%) that did not submit a final project. This suggests that participants in group 3 were more interested in exchanging ideas with others as opposed to receiving formal acknowledgement or recognition for passing the course.

Community 4 (focused achievers). Participants in this group were distinctive as they had a higher proportion of argumentative dialogue acts (68%). While most focus was on peer review (70%), many posts also discussed course outcomes and certificates (20%). They had the highest proportion of posts that evidenced some form of learning (32%). They posted the least (on average, 2.5 times), and had the smallest average post size (146 words) and number of thread views views (38), both

⁶ 17 individuals were assigned to their own groups; for the purposes of analysis, we only investigated clusters with at least two members

statistically significant only when compared to group 3 ($p < 0.05$). Interestingly, they had the highest proportion of participants submit a final project and pass the course (76%, $p < 0.01$ compared to groups 1, 3, and 5), yet a similar proportion to group 1 who submitted but still failed (13%). Furthermore, they comprised a group that showed the most emotion in their posts (20%) of all the groups. These patterns suggest a very focused group of participants who only used the forums when necessary to achieve their goals – and to express both joy and unhappiness with their own course outcomes.

Community 5 (project support seekers). Participants in this group were similar to those in group 1, although they were distinguished by a high proportion of imperative dialogue acts (50%) and organizing virtual meet-ups (45%). The average number of discussion thread views was relatively low (40 - similar to groups 1 and 4); moreover, participants made posts more often than groups 2 and 4, albeit not with statistical significance. This pattern suggests that participants in this group were seeking support and opportunities for collaboration on the final project. Interestingly, this was the only group where significant differences were found in geographic region: there were more people from South America in this group compared to 3 ($p < 0.01$), which may indicate a wish for people from the same part of the world to collaborate. While this group had a higher number of participants with postgraduate degrees than group 1 (29%, $p < 0.05$), they had the lowest pass rate out of all other groups (32%, $p < 0.05$), partly explained by having the highest proportion of participants who did not submit a final project (57%, $p < 0.05$).

3.2 Qualitative stories of community membership

23 of our 28 interviews had been classified into at least one of the communities discussed in section 3.1. It is worth noting that a high proportion of our interviewees (14) were identified in the quantitative profile analysis as relatively community orientated – perhaps reflecting the reasons they agreed to be interviewed and help us with the project. Also of note is the high proportion (7) who are found in both sub-forums. As indicated above there were few learners who engaged in more than one forum – thus our sample is clearly biased towards more active forum users – the implications of which are considered in the discussion. The names of the participants and where they fit in the quantitative typology is illustrated in Figure 1 below.

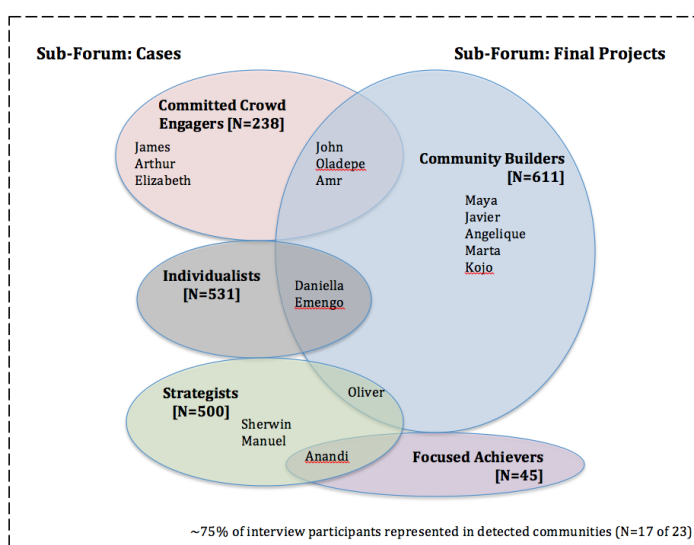


Figure 1

Due to space constraints, in this section we focus on the four interaction types that had the greatest number of interviewees: committed crowd engagers, community builders, strategists and individualists. Each is considered in turn below.

Committed Crowd Engagers (Cases sub forum)

The interviews with James, Arthur and Elizabeth do reflect to quite a large extent the recognition of the relevance of the forums to support their learning as would be expected from committed crowd engagers. For Arthur from Germany the forums were a way to read about the ideas of others and identify further sources to reflect and extend his own learning. He told us:

I mostly just read in the forum and only made a few postings myself. Because of the forum setup with weekly cases/themes and questions it was quite interesting to think about it and then just read other people's opinions and compare them with your own views. The general quality in the forum was quite high. [...]One thing I'm looking for are links to other sources or interesting related materials and sometimes people bring up questions that start interesting discussions.

Arthur did not however use the forums to ask questions about the course material, “because it's easier to find that information on the internet” nor was he “looking to connect to other people in the sense of getting to know them personally”. Yet he still found the forums to be an important part of his learning experience.

For Elizabeth from Canada interacting with others in the forums was very important to her “to engage with the material.” At times she found the “noise” in the forums quite frustrating. However, despite this, she found that the forum allowed for deep engagement, more so than traditional classroom learning affords; and the large number of participants meant that she could always find likeminded. She told us:

You can have more specialised conversations and so you can discuss a very specific point and a fairly large number of people will be informed and motivated, whereas it might not be... you know, you might not be able to cover such a specific point in a classroom or in a smaller setting.

James from the US felt he was an “independent learner” but did spend an hour or so each week after watching the lecturers participating in the forums. He tended not to post to get feedback on his own ideas, but more because he felt he could help others get on the right track. He told us “sometimes people were missing significant points and that's when I would tend to post more, is when I thought the conversation hadn't gotten to where I thought it [should be].” Thus for him, he was contributing to the community but did not seem to want or expect anything back. Supporting others was a significant factor in his learning experience.

However, in other ways, some of the interpretations from the quantitative data are not really reflected in their reported experiences. The issue of assessment remains a little unclear. For example, James was doing the course to inform his business not in order to learn from assignments, or to formally complete the course, seeing that has having “no value” for him and would mean “quite a bit” of work. He got what he wanted from the course, specifically “ways to organise and present my thinking” and materials to help him in the future. Likewise, Elizabeth never engaged with quizzes, the final assignment or the peer-review process.

Arthur did submit the final assessment, and while the certificate was not acknowledged as something important, learning by producing something was important to him. He told us,

What concerns me in general, is that watching lectures and doing simple quizzes doesn't really teach you that much. Real learning requires putting in some effort, be it additional reading or exercises and applying what you have learnt to real situations.

And that was his motivation for assessment.

Committed Crowd Engagers (Cases sub-forum) /Community Builders (Final projects sub-forum)

Three of our interviewees Oladepe, Amr and John were classified in our analysis as both committed crowd engagers in the cases forum and community builders in the final projects forum. Oladepe and Amr fit the profiles relatively well in terms of their community orientation and their emphasis on the roles the forums played in their learning. As will be demonstrated below, John behaved in the forums in ways that suggest community engagement – but he experienced this activity in a very different way.

Oladepe from Nigeria was very engaged with the forum; for him the forums were a rich learning source, he told us the forums, *“created my curiosity to know more”*. It was important for him to meet people outside Nigeria to broaden his perspective and *“get more enlightened.”* Indeed, he was keen on meeting people specifically from outside of Nigeria because, *“around here we might be thinking in the same way or similar way (...) but when you consider perspective from especially developed countries you learn more.”*

He felt he learned a lot from feedback received in the forums:

You drop your comments and you see people thinking in the same direction or you see people thinking in the other direction and giving you solid reasons, you know, to back it up - and you see reasons to like change your view and stick to a better one.

He explicitly used the MOOC to network and establish contacts. The networking aspect of participation was very central to him, and he hoped to do business with other participants subsequently. He also joined a Facebook group, mostly for local MOOC participants.

Amr from Egypt enjoyed reading and posting in the forums and found the forums the most useful part of the course. Amr shared a document with examples of his posts, and underlined that this critical and culturally diverse discussion couldn't happen in other, more traditional, educational settings as he tended to have different views to the professors and felt the forums were a place where he could discuss his views in ways not possible in the traditional classroom. He told us *“I don't think that this sort of strong criticism could be applied in a formal traditional for credit courses, even in the most liberal educational institutions.”*

As noted above, John's experiences of the forum do not fit as well under the Committed Crowd Engagers/Community Builders categories. He had quite ambivalent attitudes toward the forums. He explained:

You know, some questions and complaints and everything were really sophomore or pedestrian, like you graduated in university presumably and you're asking a question on how do you find information? [...] And other times there were some people that really provided some unbelievable insights and I felt like, 'Oh my god, I'm a mental midget compared to some of these people.' So I did enjoy the forums but I didn't spend much time on them. I basically, just because with work and everything like that it was too time consuming to have to go and read all through those threads to respond and think.

However, he would post in the forums if he had an opinion he wanted to share, and did engage in dialogues with other participants – seemingly engaging in quite deep discussions (relative to others) but seemingly didn't make much of this himself:

But there were topics that I had an opinion on so I posted. A couple of exchanges back and forth but I didn't get into very long thread discussions. At the most maybe two, three levels of discussion I would go myself.

In terms of learning, he perceived of himself as an individualist, not particularly interested in forming or being part of a group/learning community:. He told us, *"I kind of like to do things on my own more or less (...) I'll delve into group things but it's more I kind of like to venture out on my own."*

Yet, John did participate in a Google hangout for participants – and would have joined a second one. John's interview is an excellent example of the difference between the experience of learning and the activity of learning and how research in this area needs to somehow reflect these differences.

In terms of completing the course, both John and Oladepe fitted more closely with the committed crowd engager typology as completion was important for them in different ways. For Oladepe, the certificate served to document achievement, and equally increased ethos/status:

Well with the situation here in my country you must have something to show for whatever courses or whatever workshop you attend, so completing it, having the certificate is also important (...) I think the certificate is paramount here [in Nigeria].

For John, completion was more about satisfaction for himself, and far less important for his CV. He told us:

There are a couple of courses I thought I'd go in as kind of an audit basis, but it was just not satisfying enough. I had to have some measures of success or understanding. You know, if a grade imparts that then fine, at least I know, okay I did something relevant to having gained some level of knowledge.

Community builders (Final projects sub-forum)

In this section we present some of the experiences of those participants who only fell into this group: Angelique, Maya, Javier, Marta and Kojo.

Angelique particularly enjoyed the forum discussions, because they allowed her to gain multiple perspectives. As she explained, *"It's an opportunity to go away from your... boundaries."* The case study course was her first MOOC, and sometimes she felt a bit intimidated by the level of professional experiences of other participants in the forums. Nonetheless, Angelique made friends through these MOOC online interactions. She told us:

I think that's the best part of participate in that kind of courses because you get to know people that maybe have a shared point of view about their workplace or their life than you, I have made friends through MOOC.

Since taking her first MOOC, Angelique overcame her initial feelings of shyness and subsequently even met other MOOC participants in face to face settings, just as she took an active role in other off-platform online interactions.

Maya, from Syria dedicated quite a lot of time to studying the course (2-3 hours daily). In terms of forum participation, Maya primarily used it to get information or answers to specific questions. Often she found that others had already posted the question, so she would just read these rather than post herself. However, when she did post something in the forums, she tended to check back to see what responses she received. Other indications that the community is important to her was her frustration that MOOCs sometimes attracts people that do not take it seriously enough (as evidence by them posting silly comments).

Javier from Spain participated in the peer-review process, and saw this as important part of helping the community. He told us, *"I participated in evaluating, I can't remember the number, but I thought that if you wanted to help out the community you should evaluate maybe four different works for other people by using their rubrics you should evaluate them, and I think it was really interesting."* Javier didn't participate much in the forums, and didn't prioritize this, primarily because of other life and time commitments. That being said, Javier expressed that he found it interesting to read content posted in the forums.

Marta has completed several courses on Coursera and was very focused on the community aspect of MOOCs. She had arranged a small study group with other students from Europe and was planning a meet up in person with people from this group. She felt part of something. She told us:

Well I certainly do feel part of the community (....) If you take part in the forums, if you interact with all the people, then you are part of the community. If you just watch lectures and do assignments, then you're learning on your own, and what's great is that Coursera supports both communities.

Kojo was probably the least community orientated of this group. Kojo is a professional working in business, lives in a rural town in Ghana, and in his late 30s. He has a background in finance, and wanted to do the MOOC course to get closer to his career goal. He felt he had not engaged in any detail with other course participants, and did not recall much from forming part of study groups for the MOOC course as such. In general, time was a big issue for him. He told us, *"I guess that for time constraints I was unable to actively participate as much as I wanted, but I think it was generally very good."* He did join the African study group and was aware of a face to face meet up – but he told us *"I couldn't really be part of that due to my work schedule and my work load and location, with is a great constraint in this sense."* In the interview, Kojo mentioned his rural location many times, this barrier was significant for him.

The significance of passing the course and obtaining the certificate varied for interviewees.

The certificate meant a great deal to Kojo, and he had also subsequently included it on his LinkedIn profile:

The statement of accomplishment, which for me, I feel very satisfied. Very satisfied. [...] It was a rewarding moment for me. [...] Yes, I printed it out and I think there was also a LinkedIn connection [...], and I also went through that.

Kojo told us about the signature track option, and was of the perception that paying for this track would afford an actual certificate with university credentials. To him, however, that wasn't an

option, as he did not have a credit card which was needed in order to pursue this option on Coursera.

The certificate was also important to Maya, which is why she included it on her CV. Although, she doubted it would count for much with future employers. Interestingly, based on the MOOC experience she subsequently signed up for a paid online MBA, as the MOOC gave her confidence that she could successfully complete an online course.

For Javier, Angelique and Marta completion was important but the certificate far less so. Javier had not embedded the certificates in his LinkedIn profile or CV. Marta explained taking MOOCs was *"more for my internal development than for the outside world."* The experiences of these interviewees tend not to fit the completion profile of community builders as a whole.

Strategists (case sub-forum)

We now turn to those who seem from the quantitative analysis to have a more individual and less community orientated approach to learning: Sherwin, Manuel, Oliver and Anandi.

Sherwin is a Philippine Management consultant and policy advisor to the Philippine government. He is in his mid 50s, and considers himself having gone into semi-retirement; he does more work for non-profits and spends time with his five grand children. A friend who followed the initial Machine Learning Coursera course introduced him to MOOCs. Since he signed up, he has completed 27 courses, and admits to being a *"moocaholic"*. He is enrolled at 3-4 courses at any time, and describes himself as *"promiscuously electric"* when it comes to course titles.

In-line with a more individual approach Sherwin was particularly excited about the video lectures. The lectures are *"Superstar lecturers"* – otherwise they would not start a MOOC, was Sherwin's reasoning, they are top at their department.

Sherwin did not consider himself to be overly interactive in the forums and did not participate in the course to seek for personal interaction although he sometimes found he benefited from the discussions. He tried to keep his forum engagement low, simply because it was time demanding, and because of the volume of forum content of which a lot was not relevant to him. Instead he, *"usually looks for very specific issues which are of interest."* He felt that the forum's up-voting system worked well as a quality assurance, and was a way to showcase the, *"half a dozen people who are superstar students who are probably already familiar with the material or have absorbed it very well."* He found these students to be *"very helpful (...) sometimes their explanations are better than the teachers."*

Manuel took this MOOC course to update his knowledge for his work – and MOOCs to him were a good option as he was not able to afford to pay for courses (he would ideally like to do a full time MA). He told us:

If I don't get any training, it looks also like I'm not up to date, you know. So at least (...) I'm doing something, I'm learning something else, [and] getting involved with other stuff.

Like Sherwin, the lectures were an important part of his learning. For him the forums were useful to help him find answers to his questions, but he tended not to participate and use them instead in a relatively strategic way:

When I had any questions about it, usually I'm not the only one to have the question. So I just make a little research and I find that there's, I don't know, how many thousand people more that have the same question and get some answers, just figure it out and I get my answer.

Again similar to Sherwin, meeting people in the forums and talking to others was not a strong reason for Manuel to participate in MOOCs.

Oliver's experience seemed to fit best with the strategist profile as opposed to the community builder profile that he was also assigned. Like the other strategists his forum engagement was driven by his motivation to do really well in the course, and to get the certificate. In the interview, he explicitly said that he posted because it was mandatory (a misconception on his part). He told us:

If I'm taking a course, I intend to get an A. This aspect is very important, and it's what's actually driving me to finish all the material. So in those courses [where forum participation is mandatory], I've used the forum, but otherwise, [it is] very limited.

Still, like Sherwin and Manuel he has found some value in reading other participants' posted content, particularly when related to the weekly discussion of business cases to get a different perspective.

Anandi, classified both as a strategist and as a focused achiever in the final projects sub-forum, was an Indian female professional in her early 20s, who recently finished her BA in Commerce. Anandi's key motivation for taking the MOOC was to develop professional skills, and to get a more practically grounded understanding of the subject matter. In India, her experience of formal education has been primarily focused on theory and she really liked the "realistic examples" used in the MOOC.

The primary challenge for Anandi was finding the time to engage with the courses. She explained that she works all day, leaving limited time and energy for studying once she gets home, but she was determined to "do something" other than work. Anandi considered herself to have very limited interaction with other participants; she was aware, that other local course participants have had offline meet-ups, but she had not had "the opportunity to do that, because of lack of time."

For Manuel, the certificate was important to show employers but also provided a sense of achievement for him. Similarly, for Oliver the certificate was important. He told us:

I do value my certificates, I keep them on my computer, I post my achievements on my LinkedIn profile, and on my resume. I don't include my marks, but I do that I've completed the courses, and obviously if anyone asks, I'll talk about it.

Individualists

Daniella, from Italy is very enthusiastic about MOOCs, and has completed around 11 courses over the last couple of years. Daniella was particularly keen on the lecture videos and quizzes:

The videos are for me very fantastic because I can see the professor even the way he, you know, he express the information, it's different from reading them. So the videos are the first one. Secondly I like the quizzes, I really like the quizzes because it helps me to check if I have acquired the knowledge that allow me to reply to some questions.

Interestingly, Daniella was also classified as a community builder – and she displays some characteristics of this group as well. Other people are important to her learning – to help her achieve her goals but her learning motivations are still relatively individualistic.

Daniella has engaged in off-platform interaction, and initiated offline meet-ups, even hosting people, after seeing an Italian group advertised in the forums, but does not actually engage with the forums herself because while interesting “*it’s time-consuming, we have a lot of material to, you know, to read and I have no time.*” Daniella preferred to team up with participants on Facebook, and they then discussed course materials:

The way it happens is when there is the study group I go to Facebook and I start to be active, so I introduce myself and then I say, “Oh, well I have to do kind of sort of Quiz Number 1,” for example, and then I see the reply of other people and then you can see automatically there are people who are more... more active than others, and then I don’t know, natural sometimes they say, “Oh, should we meet next Wednesday to check if the progress and to see if I have questions?” So we check outside in Skype.

Like Daniella, Emengo was classified as both an individualist and as a community builder in the forums. However, his experience fits better the community building profile. Emengo is a Nigerian freelance civil engineer in his early 40s, interested in Coursera because it offers an opportunity for him to learn about subjects related to his work. So far, he has been enrolled in 16 courses and has completed three. The low number of completed courses should not be interpreted as a lack of engagement, but as an outcome of his internet connectivity challenges, and his overall goal of learning, as opposed to getting high grades on course work or a statement of accomplishment.

Emengo expressed annoyance that so many MOOC participants were overly focused on grades and on receiving the course certificates/statements of accomplishment. In the interview, he mentioned several times how forum posters had complained about marks given in peer assessment, or that they did not pass the course:

I went in to learn. Because this statement of accomplishment, I don’t think, in my country, Nigeria, anyone pays attention to it. So I went into it to learn, but [everyone else on the forum were saying] you need it, you need it, you need it to get a job.

Interaction with other course participants was a key driver for Emengo’s engagement. Interacting with, and having access to dialogue between, international participants was key. It allowed him to learn about other perspectives, which to Emengo is crucial in an increasingly global world. Equally, it allowed him to benchmark his knowledge and skills against that of foreigners:

Eventually, the world is getting smaller, so being a king in a small pond is no longer enough [...] because very soon, the world will be coming into the pond. So to interact gives an opportunity for cross-border assessment of your capacity. If I am going to advice people [...] and if I interact with these people across-boarder, then my knowledge also somehow has to be across-boarder.

Because of connectivity constraints, Emengo participated in the forums before he watched the lectures, rather than after because it could take him “*four days to download just something for one week*”. In this way, he could access discussions about the topics, and also, find information relating to quiz questions if he was in doubt.

As noted above, for Emengo the certificate had limited value. For Daniella she found the certificates an important incentive (she hds also embedded them in her LinkedIn profile):

It helps me to, it's a kind of reward that I give to myself because I dedicated time to this activity and I know that it helps, for me personally, my self-esteem. Say, "Okay, I have a certificate from Stanford University now" (...) if I don't have certificate, I tend not to do the course.

4. Discussion and conclusion

Research on MOOCs can make use of a great deal of previous work on online learning but some of the methodological and practical challenges are not the same. To fully understand and support learners in these spaces we need a way of detecting and differentiating distinct learner profiles (reflecting motivations, goals, preferences for course elements and online behaviours) which are particularly important in massive and open "crowd like" settings.

Some researchers have already made steps towards this goal using clickstream data and engagement patterns (Breslow et al., 2013; Kizilcec et al., 2013; Yang et al., 2013). We aim to contribute to this body of work by using a wider range of both qualitative and quantitative data sources in our final typology. The mixed method approach has been key to interpreting the data and to refine the core elements of our model.

While triangulation of these approaches is not an achievable or appropriate goal, through using these different methods we gain a great deal of insight into the learner experience and ways that MOOCs could be better designed and developed in order to support future learners.

The results presented above are just one stage in a developing research process where the different methods inform one another. The relatively strong relationships between individual experiences (reflected in the interviews) and the interaction types identified in the profile analysis is encouraging, but the additional information provided by the individuals and the differences between their own perception and actual behaviour at times suggest the analysis could be more nuanced, both in the ways we describe the different categories and the additional input data (e.g. motivations, Internet connectivity, and prior experience) and output data (end achievements) it would be valuable to have.

Inevitably there are challenges to this research – in terms of whose experiences are visible. Our interviewees are clearly come of the most committed, motivated and successful participants are unlikely to be "typical" MOOC learners.

Ultimately, we aim to translate the current findings into a set of quantitative metrics that could be used by researchers and educators in a number of ways. Of course, the focus of the current study is of one particular MOOC, and is subject to the nuances of a particular pedagogical approach and set of learning objectives. Yet while the typologies may vary from course to course, the underlying metrics to calculate these may be relatively consistent.

In creating this typology we hope to enable educators and researchers to think in a more informed way about how forums in MOOCs could be used to enhance learning, and to develop initiatives that more specifically target and support different segments of the population. We also hope that the mixed method approach used in this study will be of value to future research in this field.

5. References

- Belanger, Y. & Thornton, J., (2013). *Bioelectricity: A Quantitative Approach*, Durham, NC: Duke Center for Instructional Technology.
- Breslow, L. B., 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 & Practice in Assessment*, 8, 13-25.
- Goodman, P. S. & Dabbish, L. A. (2011). Methodological Issues in Measuring Group Learning. *Small Group Research*, 42(4), 379 – 404.
- Granovetter, M. S. (1973). The strength of weak ties. *American journal of sociology*, 1360-1380.
- Kizilcec, R., Piech, C. & Schneider, E. (2013). Deconstructing Disengagement: Analyzing Learner Subpopulations in Massive Open Online Courses. New York, NY, LAK '13 Proceedings of the Third International Conference on Learning Analytics and Knowledge
- Lave, J. (1988). *Cognition in practice: Mind, mathematics, and culture in everyday life*. Cambridge, UK: Cambridge University Press.
- Lave, J. & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. New York: Cambridge University Press.
- Orton-Johnson, K. (2007). The online student: lurking, chatting, flaming and joking. *Sociological Research Online*, 12(6), 3.
- Psorakis, I., Roberts, S., Ebden, M. & Sheldon, B. (2011). Overlapping community detection using Bayesian non-negative matrix factorization. *Phys. Rev. E.*, 83(6).
- Seaton, D. T., Bergner, Y., Chuang, I., Mitros, P., & Pritchard, D. E. (2013). Who does what in a massive open online course? *Communications of the ACM*
- Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher*, 27(2), 4–13
- Siemens, G., (2005). Connectivism: A Learning for a Digital Age. *International Journal of Instructional Technology and Distance Learning*, 2(1), 3-10
- Siemens, G. & Conole, G. (2011). Connectivism: Design and Delivery of Social Networked Learning. *International Review of Research in Open and Distance Learning*, 12(3).
- Stahl, G., Koschmann, T. & Suthers, D. (2006). Computer-supported collaborative learning: An historical perspective.. In: R. K. Sawyer, ed. *Cambridge handbook of the learning sciences*. Cambridge, UK: Cambridge University Press, 409-426.
- Vaquero, L. & Cebrian, M. (2013). The rich club phenomenon in the classroom. *Nature: Scientific Reports*, 1-8.