Learning to learn in MOOCS

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Extended abstract

MOOCs are a creature of the digital age, born of cloud computing, web-2 capability, and ubiquitous digital devices. Millions of individuals have participated in thousands of these higher learning courses, many run by the world's most prominent universities. While they have much in common with their on-campus and online antecedents – objectives, content, instruction, assessment, and interaction organised as 'a course' – they are also fundamentally different, in the nature of the experience offered, and in the relationship between 'teacher' and 'taught'. There is much yet to be learned about what MOOCs can and cannot deliver for higher order learning, and how they might best do it. It seems certain that much of the potential for MOOCs is yet to be tapped (Kennedy, 2013).

This paper outlines one way of understanding what it is about learning in MOOCs that is so distinctive, and explores the implications for the design of MOOCs. It draws on an ongoing research study into the nature of learning in MOOCs at the University of Melbourne (Milligan 2014, 2015), and on insights gained from designing and running one of the University of Melbourne's fourteen MOOCs (Milligan & Griffin, 2015; Ringtvet & Milligan, in press, Milligan & Ringtved, in press).

The research study is focussed on one of the essential characteristics of MOOCs, seen by some as a deficit, and by others as a liberating asset. MOOCs lack the familiar core of higher education: a relatively homogenous class of motivated, like-minded students whose individual efforts are orchestrated, monitored, guided and assessed by an expert in the field who interacts with each student. In MOOCs, a learner can be alone, unseen and unheard by anyone. The orchestration of effort and activity is the responsibility of the individual learner. Attention is provided not by an expert teacher, but by cloud-based teaching or assessment machines of greater or lesser intelligence, by the activities of other participants, and by peers who assess and evaluate work submitted (Gillani, 2013; Kop, 2011; Milligan et al., 2013; Stewart, 2010). In terms used by Hattie & Timperley (2007), it is the crowd, machines, and peers, not teachers, which are the principal 'agents' of the feedback on individual performance that fuels learning.

The study hypothesised that one way of understanding patterns of learner participation, enjoyment and success in MOOCs is to see learners as bringing to the experience different capacities to learn in that milieu. In this view, learning capacity in a MOOC derives from a complex set of knowledge, understandings, attitudes and skills required to generate learning, which different learners possess to differing degrees. It was further hypothesised that this learning capacity, like other complex human capabilities in education, can be represented as a developmental progression. The research sought to identify the component skills, knowledge, values, attitudes required to define and validate the construct for 'knowing how to learning in a MOOC', referred to here as the 'learning-at-scale capability' or L@SC. This construct was found to have three elements: *crowd-sourced learning*, *self-calibrating mastery* and *peer evaluation*. Each element has been detailed in a hierarchical developmental progression of a kind suggested by Dreyfus & Dreyfus (1980). This progression provides a rich description of what learners need to know and be able to do to manage the learning environment of the MOOC. It identifies and describes the behaviours associated with each of five levels, from the novice MOOC learner to the expert.

The project is, as far as it is possible to tell in such as fast-growing field, unique in applying to the question of learning in MOOCs the educational measurement methodologies commonly used in large-scale assessment of complex learning outcomes in convention educational settings (Wilson, 2003; Masters & Forster, 1996, Griffin & Care 2015), in conjunction with big-data analytics (Milligan, 2015). These rigorous, quantitative methods, informed by an extensive literature review and participant observation were used to define and validate the construct and the developmental progression.

The findings suggest that the L@SC is complex, and must be understood in a nuanced way. The expert learner (for example) uses forums in a particular way. They come trusting that they can learn from the experience and expertise of others, not just from experts. They are open to interaction, and prepared to assist others with their learning. They are skilled at creating and identifying those rare moments of contingency that make up a 'learning moment'. Indictors of such expertise are not always self-evident. For instance log-stream data shows that experts might not be the most prolific posters or commenters. Rather, they are selective, posting or commenting in dialogic streams, focussed on building insight and engagement for themselves and their peers on topics of mutual interest. When it comes to using machine feedback, the novice is more likely to use gaming and guessing to improve performance whereas the expert learner is more focussed on using the feedback to generate mastery of learning goals. These skills appear not to be strongly correlated with prior higher education success.

A key implication of this research is that designers should not try to reproduce what 'good teaching' looks like on campus and in traditional online courses. MOOC design should support the learner to become skilled at using machine feedback to develop mastery, to be capable in peer evaluation, and skilled in crowd-sourcing learning. This finding has particular implications for assessment and feedback in MOOCs. The ATC21S MOOC teaching team is exploring how best to support learners to be self-calibrating and self-monitoring, and skilled at peer evaluation. The team is also working on the nature of skills required by staff

moderating forums, to ensure that they support rather than de-power the self-regulated learner, and support rather than subvert the capacity of the crowd to support learning.

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