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# **Professional Learning in Massive Open Online Courses**

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## **Abstract**

This study explores the role of Massive Open Online Courses (MOOCs) in supporting and enabling professional learning, or learning for work. The research examines how professionals self-regulate their learning in MOOCs. The study is informed by contemporary theories of professional learning, that argue that conventional forms of learning are no longer effective in knowledge intensive domains. As work roles evolve and learning for work becomes continual and personalised, self-regulation is becoming a critical element of professional learning. Yet, established forms of professional learning generally have not taken advantage of the affordances of social, semantic technologies to support self-regulated learning. MOOCs present a potentially useful approach to professional learning that may be designed to encourage self-regulated learning. The study is contextualised within 'Fundamentals of clinical trials', a MOOC for health professionals designed and run by the Harvard Medical School, Harvard School of Public Health, and Harvard Catalyst, the Harvard Clinical and Translational Science Center, and offered by edX. The research design builds on the authors' previous studies in the areas of Technology Enhanced Learning and Professional Learning and in particular, research which explored the learning behaviours of education professionals in the Change 11 MOOC. The previous studies demonstrated a link between individual learners SRL profile and their goal setting behaviour in the Change 11 MOOC as well as uncovering other factors which influenced their engagement with the MOOC environment. The present study extends the original study by further focusing on specific aspects of self-regulation identified by the Change11 studies and our parallel studies of self-regulated learning in knowledge workers. The analysis of learner behaviour in the Fundamentals of Clinical Trials is complemented by additional exploration of the design considerations of the MOOC, to determine the extent to which course design can support or inhibit self-regulation of learning. The study poses three research questions: How are Massive Open Online Courses currently designed to support self-regulated learning? What self-regulated learning strategies and behaviours do professionals adopt? and How can MOOCs be designed to encourage professionals to self-regulate their learning? Validated methods and instruments from the original study will be adapted and employed. The research is unique in providing evidence around two critical aspects of MOOCs that are not well understood: the skills and dispositions necessary for self-regulated learning in MOOC environments, and how MOOCs can be designed to encourage the development and emergence of SRL behaviours.

## **Keywords**

MOOC, massive open online course, self-regulated learning, professional learning

## **Introduction**

The Massive Open Online Course format pioneered by George Siemens and Stephen Downes in *Connectivism and Connected Knowledge* (2008) has evolved and been reimagined in a number of ways, as educators and entrepreneurs explore new pedagogical and business models. MOOCs initially emerged as an instantiation of the pedagogic principles of 'connectivism' (Siemens, 2005; Downes, 2009). Rather than viewing learning as the transmission of expert knowledge from an instructor to learners, connectivist principles emphasise that learning occurs through network connections, as learners connect with their peers and with knowledge resources (Siemens, 2005). MOOC learning is ideally suited to the networked society (Castells, 1996) and the near

ubiquity of network connections in our daily lives. The ‘open’ and ‘massive’ aspects of MOOCs – not only connectivist, but also other forms of MOOCs - change the roles of learners and instructors such that learners have more autonomy than in conventional courses. An underlying assumption is that learners have the skills and dispositions necessary to learn autonomously. However, by definition, MOOCs attract a broad range of learners with diverse dispositions (Milligan, Littlejohn & Margaryan, 2013) and the strategies and behaviours needed for autonomous learning in MOOCs are not well understood. This gap in knowledge is of concern, given the recent rapid growth of MOOC initiatives (Daniel, 2012).

The body of research on learning behaviours in MOOCs is sparse. A recent meta-study of MOOC research studies identified no more than 30 peer-reviewed journal and conference publications across the whole domain (Liyanagunawardena, Adams & Williams, 2013). Most studies focused on content, analytics and environments, overlooking the skills and dispositions required of the learner to learn autonomously. Of the few studies that examine learners’ behaviours in MOOCs, some of the most significant are by Kop (2011), and Kop and Fournier (2011). These studies identified literacies critical for effective learning in ‘connectivist environments’ as an open mind-set, the ability to learn cooperatively with others and heightened critical analysis skills. The learning behaviours observed in a cMOOC included aggregation, relation, creation and sharing (Kop, 2011). These findings mirror a previous study of the learning behaviours of hundreds of knowledge workers in a large multinational organisation (Littlejohn, Milligan & Margaryan, 2011). There, the authors identified a set of behaviours knowledge workers utilise as they autonomously self-regulate their learning: connecting, consuming, creating and contributing knowledge to company knowledge networks. The authors found evidence that these behaviours are influenced by the goals people set as they ‘chart’ or regulate their learning and development.

In professional learning – or learning for work – each learner brings a body of existing knowledge, as well as their professional and personal networks, to their learning setting (Littlejohn, Milligan & Margaryan, 2011). Although digital networks provide dynamic environments that connect work and learning, established forms of professional learning have (largely) not taken advantage of the opportunities around how people collaborate to learn, how feedback can be exploited and the multiple ways in which people and resources can be brought together to enhance learning (Littlejohn & Margaryan, 2013). MOOCs present a potentially useful mechanism for supporting and enabling professional learning, serving as a catalyst for the formation of heterogeneous learning communities that facilitate knowledge exchange.

Self-regulation is a critical aspect of professional learning, as learning for work becomes continual and individualised (Eraut, 2000; Tynjälä, 2008). In contexts where people’s work roles are fluid and constantly changing, individuals continually have to draw upon existing knowledge across disciplinary or sectoral frontiers, connecting in ways that allow them to build new knowledge (Engeström, 2009). As these roles oscillate over time, the individual has to take greater responsibility for self-regulating his or her own professional learning (ibid). SRL is critical to working effectively within the complex networks found in knowledge intensive workplaces (Veen, van Staaldouin & Hennis, 2011). SRL allows people to ‘future-proof’ their skills, making them more flexible as workers (Lefrere, 2007), allowing them to plan, share and co-develop their learning goals (Siadat Jovanović & Gašević, 2013).

Self-regulated learning (SRL) is also important in circumstances where the learner - rather than a teacher or instructor - determines the learning goals (Schunk, 2001); as occurs in MOOC environments, where learners take a more active role in managing and guiding their learning than in conventional courses. Self-regulation is the ‘self-generated thoughts, feelings and actions that are planned and cyclically adapted to the attainment of personal goals’ through three phases: forethought, performance and self-reflection (Zimmerman, 2000). Within these three phases, Zimmerman identified 16 sub-processes that self-regulating learners use, with more effective learners using a broader range of sub-processes. Using Zimmerman’s SRL framework as a theoretical lens, our own research on professional learning in the Change 11 MOOC identified differences in the learning behaviours of learners with different SRL profiles; particularly with respect to the types of goals set and the learning networks they developed (Milligan, Margaryan & Littlejohn, 2013). This proposed study extends previous research by examining in greater depth the self-regulated learning strategies and behaviours professionals adopt in MOOCs (RQ2), focusing on Zimmerman’s identified SRL sub-processes.

An individual’s ability to self-regulate their learning is context dependent - influenced not just by their personal dispositions, but also by factors associated with the environment in which they are learning. There is evidence that learning strategies in MOOCs are influenced not only by learners’ motivation and confidence, but also by the structure of course, the delivery environment and the perceived value of learning (Kop, 2011). In formal

learning contexts, Cho and Kim (2013), Barnard, Paton and Lan (2008) and others have explored the role of SRL skills in learner behaviour online. In these studies, a clear link between SRL skills and behaviours, and learning success in online environments is established focusing on self-efficacy, interactions with others, and strategies for regulation. In this study, we explore how MOOCs designs can best support professional learning and encourage learners to develop and exhibit SRL behaviours by exploring how Massive Open Online Courses are currently designed to support self-regulated learning (RQ1) and how MOOC designs can encourage professionals to self-regulate their learning (RQ3).

## Research Context

The research study focuses on a MOOC for health professionals entitled 'Fundamentals of clinical trials' (<https://www.edX.org/course/harvard-university/hsph-hms214x/fundamentals-clinical-trials/941>). The MOOC is designed and run by Harvard Medical School, Harvard School of Public Health, and Harvard Catalyst, The Harvard Clinical and Translational Science Center and offered through the edX initiative founded jointly between Harvard University and MIT. The MOOC provides an introduction to the scientific, statistical, and ethical aspects of clinical trials research. The course is intended for individuals interested in conducting clinical trials who have foundations in epidemiology and biostatistics and is likely to draw a combination of medical students and medical professionals. The course ran from October 2013 until February 2014, utilised the edX MOOC platform and drew more than 22,000 participants. The survey instrument was completed by 413 participants, of whom 85 were invited for interview. Study participants were drawn from 81 countries across all continents.

## Research Design

This study explores the role of MOOCs in supporting and enabling professional learning as people learn for work. The first phase explores the design strategies used by instructional designers at Harvard University as they organise a Massive Open Online Course for Health professionals. Key components of the MOOC design will be mapped against the sub-processes of self-regulated learning, to identify how the course has been designed to support and encourage self-regulated learning behaviours. This phase addresses RQ1: How are Massive Open Online Courses currently designed to support self-regulated learning? The second phase examines the self-regulated learning behaviours of health professionals as they participate within the edX MOOC. We will measure the SRL profiles of health professionals participating in the MOOC and will select those with high and low SRL scores to analyse their learning behaviours in more detail through semi-structured interviews. From this phase, we will produce a set of learner use cases describing different patterns of self-regulated learning behaviours, addressing RQ2 What self-regulated learning strategies and behaviours do professionals adopt? In the final phase we will integrate the findings of phases 1 and 2 to extend our understanding of the relationship between course/environment design and learners' self-regulated learning behaviours. We will specifically examine how learner behaviour varies with each learner's capacity to self-regulate their learning in the MOOC context, as measured through their SRL profile. Understanding this relationship will allow us to identify a set of recommendations for the design of MOOC learning platforms and courses for professional learning, addressing RQ3 How can MOOCs be designed to encourage professionals to self-regulate their learning? The recommendations will be piloted with a second health-focused professional learning MOOC delivered through a different MOOC platform.

## Implications

The study will contribute research evidence around two key aspects of MOOCs that are not well understood: the skills and dispositions necessary for self-regulated learning to occur in MOOC environments, and the potential ways in which MOOCs may be designed to encourage autonomous, self-regulated learning behaviours. The focus on professional learning allows us to explore the potential of MOOCs to provide access to high quality learning experiences in developing countries where these opportunities may previously have been limited. The application of the MOOC format to the area of professional learning and development will provide new opportunities for sharing practice. Innovative practice can be shared within different communities across the world. Although data is collected from a single MOOC (in a specific domain), the tools and instruments are designed to be generic and will be released openly, allowing similar studies to be undertaken in different domains, with the current study as a reference point.

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