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How health professionals regulate their learning in massive open online courses☆

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ABSTRACT

Massive Open Online Courses (MOOCs) are typically designed around a self-guided format that assumes learners can regulate their own learning, rather than relying on tutor guidance. However, MOOCs attract a diverse spectrum of learners, who differ in their ability and motivation to manage their own learning. This study addresses the research question '*How do professionals self-regulate their learning in a MOOC?*' The study examined the 'Fundamentals of Clinical Trials' MOOC offered by edX, and presents narrative descriptions of learning drawn from interviews with 35 course participants. The descriptions provide an insight into the goal-setting, self-efficacy, learning and task strategies, and help-seeking of professionals choosing to study this MOOC. Gaining an insight into how these self-regulatory processes are or are not enacted highlights potential opportunities for pedagogic and technical design of MOOCs.

1. Introduction

The invention of the Internet provided opportunity for radically new models of online learning (Anderson & Dron, 2010; Garrison, 1997). However, online learning provision has tended to mimic conventional teaching in an online setting and models of online learning have largely been adaptations of conventional approaches to teaching, rather than new innovations. For example in Higher Education, campus-based universities tend to use online learning as a complement to face to face instruction, while open universities have largely applied models of distance education that move from the delivery of paper-based materials to online distribution of digital content (Anderson & Dron, 2010). Over the last few years, Massive Open Online Courses (MOOCs) have emerged as a way for millions of learners worldwide to access learning opportunities more flexibly with the advent of thousands of courses, attracting millions of learners (Shah, 2015). While the original proponents of MOOCs envisaged them as a radical departure from conventional, online learning (McAuley, Stewart, Siemens, & Cormier, 2010), the enormous growth of MOOC offerings has been through the emergence of courses that adopt more traditional pedagogical approaches, prioritising scale over pedagogical innovation (Haggard et al., 2013). There are two distinctive features of MOOCs that differentiate them from other forms of online learning: that they offer open access to Higher Education for learners irrespective of their previous qualifications or experience; and that they facilitate learning on a massive scale with thousands, or even tens of thousands, of learners signing up for each course. To enable learning at such scale, and reduce the cost of learning support, MOOCs tend to be designed around a self-guided format that assumes learners are able to regulate their own learning, rather than relying on instructor guidance (Margaryan, Bianco, & Littlejohn, 2015). However, MOOCs attract a diverse spectrum of learners, who vary in their ability to regulate their learning (Halawa, Greene, & Mitchell, 2014; Milligan, Littlejohn, & Margaryan, 2013). The capacity to self-regulate learning is influenced by personal psychological (cognitive and affective) and environmental factors (Zimmerman, 2000a). There is evidence that self-regulated learners adopt effective learning strategies in conventional, online contexts, planning, monitoring, and coordinating their sources of learning (Bernacki, Aguilar, & Byrnes, 2011). MOOCs, however, are qualitatively different from conventional, online courses, particularly in terms of their scale and openness. Gaining insight into self-regulated learning of individual participants in MOOCs is critical in understanding whether and how open, online courses are effective in supporting learning.

This qualitative study examines how learners regulate their learning in a MOOC. The context of study is the Fundamentals of Clinical Trials MOOC offered by edX, a leading provider of open, online courses based in the United States. The study explores the research question: *How do professionals self-regulate their learning in a MOOC?* by collecting and analysing narrative accounts of learning provided by health professionals participating in the MOOC. The paper begins with a review of current research in MOOCs, focusing on studies that address aspects of SRL and further our understanding of MOOC learning. This review is followed by a description of the design and context of this study, and

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of the instrument used. The results are then presented and discussed. The paper concludes with a discussion of the main findings and their implications, alongside a reflection on the limitations of the study and prospects for future research.

1.1. Literature review

The past decades have been marked by changing societal expectations around access to Higher Education. The internet and digital technologies have been viewed as a potential means of opening access to Higher Education to people irrespective of their previous educational experience (Daniel, 2012). However, there is a tension between cost and scale, and universities have sought ways to provide cost-effective access. MOOCs have been promoted as a potential solution to the cost-scale conundrum (Daniel, 2012). MOOC providers, such as edX, Coursera, and FutureLearn, have worked in partnership with universities to provide scalable solutions by designing courses that foreground content presentation, typically lecture video and automated assessment, over opportunities for interaction (Anderson, 2013; Margaryan et al., 2015). This design has led some authors to question the utility of MOOCs as an effective environment for online learning (Rhoads, Berdan, & Toven-Lindsey, 2013). Nevertheless, MOOCs have become a popular choice for individuals seeking learning opportunities, and this has stimulated research effort focused on understanding learning within MOOCs.

While initial MOOC research was often qualitative, quantitative studies have become dominant with the emergence of large scale MOOC platforms that permit the generation and analysis of 'clickstream' data (Veletsianos, Collier, & Schneider, 2015). Attempts to interpret clickstream data include mining the data tracking learners' access to MOOC resources and classifying learners according to their patterns of interaction with content (Kizilcec, Piech, & Schneider, 2013) or with other learners in online discussion forums (Gillani & Eynon, 2014). Other studies have focused on MOOC participants' prior education, gender and geographic location (Breslow et al., 2013; Guo & Reinecke, 2014; Kizilcec et al., 2013) to explore the factors underlying poor rates of completion that are typical of MOOCs (Jordan, 2014). But while these quantitative studies of learner activity within MOOC platforms provide us with greater understanding of *what* populations of learners do within MOOCs, our understanding of *why* individual MOOC participants learn as they do, and *how* they actually learn is less developed (Veletsianos et al., 2015, p571). Unlike in traditional HE courses where learner expectations are largely standardised (for example successful completion of a course or degree programme as a marker of success), the diversity of learners in a MOOC results in a range of motivations for participation (Kizilcec et al., 2013) and potentially leads to different levels of engagement (Breslow et al., 2013) which may not be focused on completion. In a MOOC, where certification may be absent, or of little value (Kizilcec et al., 2013), learners are required to be more intrinsically motivated, recognising their own goals and indicators of success. Breslow et al. (2013) argue that it is important to understand the influence of learner motivation on learning in MOOCs. Similarly, Gašević, Kovanović, Joksimović and Siemens (2014, p168) call for studies that improve our understanding of 'motivation, metacognitive skills, learning strategies and attitudes' in MOOCs arguing that because levels of tutor support are lower than in traditional (formal) online courses, there is a need for greater emphasis on the individual learner's capacity to self-regulate their learning. Self-regulation is the 'self-generated thoughts, feelings and actions that are planned and cyclically adapted to the attainment of personal goals' (Zimmerman, 2000a, p14). Zimmerman identified a number of components (sub-processes) of self-regulation including goal-setting, self-efficacy, learning and task strategies, and help-seeking. Although originally conceptualised in formal (classroom) settings, SRL and its sub-processes have subsequently been studied extensively in online contexts (see Bernacki et al., 2011 for a comprehensive review) and SRL is increasingly being used to investigate learning in MOOCs. Research that explores these aspects of SRL in MOOCs is described below.

Zimmerman (2000a) highlights goal-setting as a central component of SRL. By setting goals, the learner is able to monitor progress towards those goals, adjusting their learning as necessary. Different types of goals are recognised, ranging from specific, learning focused goals driven by intrinsic motives to extrinsically motivated performance goals (Pintrich & de Groot, 1990). Setting goals and monitoring them is motivational as it provides evidence of progress to the learner. Haug, Wodzicki, Cress, and Moskaliuk (2014) explored the utility of badges in a MOOC focused on emerging educational technologies. The authors used self-report questionnaires and log files to explore patterns of participation, and found that learners who had set a goal to complete the course were more likely to sustain their participation (determined by measuring access to course content and active engagement with others about the course) than those who did not set a goal. Completion of the course provided an extrinsic motivation for these learners (Ryan & Deci, 2000). However, as highlighted above, MOOC learners may not be motivated by completion, so it is important to understand different types of motivation for MOOC study. Zheng, Rosson, Shih, and Carroll (2015) conducted interviews with learners who had undertaken a variety of MOOCs and identified four categories of MOOC learner motivation: fulfilling current needs, preparing for the future, satisfying curiosity, and connecting with people. Their findings suggest that completion is just one outcome of MOOC participation, with key motivations to study being intrinsic in nature, related primarily to personal improvement. In a larger, survey based study, exploring motivations of MOOC learners based in the United Kingdom, Spain and Syria, seven different types of motivation were identified (White, Davis, Dickens, Leon, & Sanchez Vera, 2015), mirroring the categories identified by the Zheng et al. (2015) study, and in addition identifying categories of motivation reflecting other extrinsic factors: the free and open nature of MOOCs, their convenience, and the prestige of courses run by high quality institutions. These studies identify the types of goals learners may be setting, but do not tell us about how different types of goals influence learning in MOOCs.

Self-efficacy, the personal belief about having the means to perform effectively in a given situation (Bandura, 1986), represents another component of self-regulation. An individual's self-efficacy influences how they respond to setbacks in their learning, with highly self-efficacious individuals redoubling their efforts in an attempt to meet their goals when faced with a challenge, while those lacking self-efficacy may give up or become negative (Zimmerman, 2000a). In a study of learners registered for a MOOC on economics, Poellhuber, Roy, Bouchoucha, and Anderson (2014) explored the relation between self-efficacy and persistence using clickstream data and scales for self-efficacy and self-regulation. Their study found a positive link between self-efficacy and persistence, though the main predictor they identified was initial engagement. Wang and Baker (2015) studied participants on a Coursera MOOC on big data in education to explore the link between motivation, self-efficacy, and completion. The study found that participants who self-reported higher levels of self-efficacy at the outset of the course were more likely to persist to the end, echoing findings from online learning research (Wang & Newlin, 2002). Our own parallel study of participants in a MOOC on Data Science (Littlejohn, Hood, Milligan & Mustain, 2016a; Hood, Littlejohn & Milligan, 2015) linked a range of factors: previous experience of MOOC learning, familiarity with content, and current role to learner self-efficacy.

Learners draw on a range of cognitive and metacognitive strategies (learning and task strategies) to support their learning, including taking notes, revising, supplementing core learning materials, exercising time management and undertaking on-going planning and monitoring. Highly self-regulated learners draw on a wider range of strategies and recognise the applicability of different strategies to different situations (Zimmerman, 2000a). They are also able to effectively monitor their learning, changing strategies when they become ineffective.