

MOOCs' Structure and Knowledge Management

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Abstract: This is a reflection paper that discusses the notion of knowledge management in massive online open courses (MOOCs). We explain MOOCs' structure in terms of representations of participants' minds (both designers and learners), where knowing is understood as a process and a result of sociotechnical construction, rather than purely social construction mediated by users and learning tools. By applying Walsham's human-centered view of knowledge (2001) we problematise the nature of MOOCs in relation to individuals' knowledge management. Such a view emphasises issues of representations in relation to humans' knowledge construction. This paper is organised as follows: firstly, pedagogical assumptions of MOOCs are discussed; secondly, the notion of sense making in a MOOC context is focused; thirdly, social learning analytics (SLA) is suggested as a key institutional asset to approach individuals' knowledge management. Our analysis suggests that the distributed and fragmented nature of MOOCs sets the scene for a number of challenges in regard to assessment, knowledge management and pedagogy in MOOCs. Due to the diverse social contexts and learners' cultural backgrounds, we believe that it is a rather problematic enterprise for MOOCs' designers and learners to attempt to find a unified pedagogical model. Consequently MOOCs are understood as a part of embryonic and emerging open, social learning, which focuses learner activity in a social setting. Finally we conclude by arguing that the sense making in MOOCs is likely to take place in a liminal space, between individuals' sense giving and sense reading processes.

Keywords: Massive Online Open Courses (MOOCs), knowledge management, sense making, social learning, social learning analytics, liminal (online) space.

1. Introduction

An increasing rise of Massive Online Open Courses (MOOCs) during the last 5 years has attracted the attention of learners, policy makers, faculties and researchers. MOOCs as a new educational form questions the role of traditional higher educational institutions as gatekeepers of knowledge by offering open online courses to the masses, thus potentially "making educational offerings accessible at a global level" (Cooper & Sahami, 2013, p.28). The open, autonomous and connected nature of MOOCs is what makes them distinctive from other kinds of online educational formats (Downes, 2007). In addition, MOOCs are often designed and promoted by universities, such as Stanford University, UC Berkeley and Harvard University in collaboration with different kinds of online platforms, offered by i.e. Coursera, Udacity and edX.

The idea behind MOOCs' development was introduced by Downes and Siemens when they offered an online course about Connectivism and connective knowledge in 2008 (de Waard, 2012, p.35). Such course design combining both formal and informal learning suggests an open learning format for all interested participants regardless of their previous academic backgrounds. As previously mentioned, such courses are primarily offered by higher educational institutions around the world adopting various social media. Kaplan and Haenlein (2010) explain social media as a group of Internet-based applications that rely upon ideological and technological underpinnings of Web 2.0 and allow the construction and exchange of user-generated content. Thus the open learning format of MOOCs in their reciprocal relation to higher educational institutions can be seen as an attempt to

adapt to the growing network society⁷, when “higher educational institutions will need to respond by providing more online learning, online content and more effective tools to find and use this content” (Kukulska-Hulme, 2012, p.247). Likewise, other researchers highlight the shift from face-to-face contact to an educational system, especially a formal university system, where students are becoming more independent and mobile in their learning. Traxler (2010) emphasises the need for a change in order to “keep university aligned to a changed and mobile society” (p.153).

The design of and research about MOOCs present significant challenges in terms of understanding the technology-mediated epistemic practices of individuals. This study explores the issues of knowledge management and sense making in MOOCs’ structure supporting individuals’ learning activities as well as participants’ personalised lifelong learning in online virtual learning spaces. In the MOOCs’ context, such learning activities are understood as a part of individuals’ social learning, which in a broader sense is seen as “processes of interaction that lead to concerted action of change, as group learning, and as the learning of individuals within a social context” (Buckingham Shum & Ferguson, 2012, p.9). Such a take on social learning particularly focuses on the non-academic contexts in which computer-collaborative learning may take place (the home, social network, and a workplace) and the use of open educational online resources.

Walsham’s human-centered view of knowledge (2001) is employed in our discussion of the nature of MOOCs in relation to individuals’ knowledge management. Such a view emphasises “what is in people’s minds, how they represent this to others, and how others interpret these representations” (2001, p. 600). Consequently MOOCs’ structure can be seen as multiple representations of both designers and participants’ minds in their mutual technology-mediated interactions in the online and physical surrounding environments. All this makes the process of knowledge transfer, construction and retention problematic in the MOOCs’ context. Knowledge building becomes a process and a result of a sociotechnical construction mediated both by users and learning tools. Technology itself plays a role in reshaping individuals’ perceptions, and attitudes and the new teaching and learning methods that evolve are co-constructed in a sociotechnical system rather than engineered (Viberg & Grönlund, 2012), exemplifying the *ensemble* view of technology as outlined by Orlikowski & Iacono (2001). The paper’s aim is to problematize how such idea of *sociotechnical* construction of reality – as opposed to purely *social* construction – is reflected in knowledge management processes in the context of MOOCs.

Today’s e-learning and mobile learning practices leave a large amount of digital footprints from i.e. learners’ activities in learning management systems (number of posts and duration of time spent in interaction with a particular platform, among others). Such vast amounts of *big data* distributed in various online social contexts is understood as a valuable ‘tracking/measurement tool’ to access what participants do in the context of a MOOC. As social learning analytics (SLA) is rooted in the concept of online social learning and grounded in learning theory in a participatory online culture, it has a potential to make sense of such distributed teaching and learning networks incorporated in MOOCs. SLA focuses on individuals’ learning processes in online social contexts, when analysing larger amounts of user-generated technology-mediated data.

The paper discusses the issue of knowledge management in the context of MOOCs in the following order. *Firstly*, pedagogical underpinnings of MOOCs as a new learning form are brought up. *Secondly*, the notion of sense making in a MOOC context is focused. *Thirdly*, we suggest learning analytics (LA), and particularly SLA as a key institutional asset to access individuals’ knowledge management on the one hand, and as referring to a research area in a broader sense, on the other.

2. MOOCs as a Form of Social Learning

MOOCs are considered a form of online social learning⁸ that “takes into account the changing affordances of a world in which social activity increasingly takes place at a distance and in mediated forms” (Buckingham Shum & Ferguson, 2012, p. 8). Technology use shapes social interaction (Säljö,

⁷The term *network society* was developed by Castells: “A network society is a society whose social structure is made of networks powered by microelectronics-based information and communication technologies. [...] A network is a set of interconnected nodes [...] A network has no center.” (2004, p. 3).

2010) and MOOCs, as well as other forms of online education, are dismantling the appearance of solidity of the physical classroom and the instructional institution offering the course. Still there is the tendency to refer to higher educational institutions offering MOOCs as warrants of high quality courses.

According to Bauman the shift from “solid” to “liquid” modernity is a powerful metaphor for today’s society where “hardly any form keeps its shape long enough to warrant trust and gel into a long term reliability” (2010, p.160). In a similar vein, Leander et al. illustrate the transition from the concept of classroom-as-container, the space where all educational activities take place, for teachers, students, researchers and policy communities, to a nexus-like perspective conveying the idea that the flow of information, material, resources “permeate the classroom from every direction” (2010, p.332). Indeed the classroom-as-container is a conceived space that has shaped how learning and education should be planned, investigated and produced, whereas the nexus-like perspective allows an alternative approach to the space(s) that is created when people, both inside and outside school or other educational arenas, engage with such fluid or liquid (and therefore flexible) supply of large amounts of information and resources.

MOOCs are good examples of the flexibility of the virtual classroom as a learning space that is available to all users as long as they have an Internet connection. Taking into account the diverse social contexts and learners’ cultural, as well as educational backgrounds an attempt to find a unified pedagogical model becomes a rather problematic enterprise. Still MOOCs’ platforms like Coursera or Udacity rely upon rather similar pedagogical grounds and designs. Consequently the issue here is whether the focus should lie on the search for a homogenous pedagogical paradigm or if MOOCs, instead, should allow participants to take over the control on their learning.

MOOCs as a form of open educational resources (OER) have specific characteristics: they have given start and end dates (usually 1-2 months), with pre-recorded lectures provided by the course instructors. MOOCs aim to make the experience more interactive through the use of i.e. quizzes and other tasks that can be automatically marked (Glance, Forsey & Riley, 2013). When the tasks do not permit this kind of machine-generated feedback, the solution is usually a peer review process, where students mark and grade one another’s contributions. In a MOOC context the goal of such courses should be to support students’ lifelong knowledge development and practices, rather than to focus on their results in form of grades and gained credits. This supports what Knight, Buckingham Shum and Littleton (2013) assume: pedagogy should involve knowledge practices-not assessment practices, in other words, assessment is used in teaching, but does not drive it. In light of the above, the assessment issue in MOOCs should be reconsidered due to their distributed, fluid and open nature.

3. Sense Making and Knowledge Management in MOOCs

In terms of knowledge management within a MOOC context, the notions of explicit and implicit or tacit knowledge are significant. The explicit knowledge can be of different kinds i.e. “the content in books or even the meaning of a single word” (Walsham, 2001, p. 600). In terms of MOOCs this knowledge derives from online course content in forms of recorded video lectures, online forum contributions, e-mails communication, and course instructions of different kinds. Such explicit knowledge becomes a part of individuals’ tacit knowledge only when it is well connected to the learner’s previous tacit knowledge and offers something new to the users (Walsham, 2001), in our case the participants of MOOCs. This transition of learners’ explicit knowledge into their tacit knowing⁹ emerges as a significant challenge for MOOCs’ designers due to a variety of contexts where learning occurs, and a variety of learners with different cultural and educational backgrounds. As Diana Laurillard puts it:

⁸The concept of online social learning is developed, among others, by Blackmore (2010) and Buckingham Shum & Ferguson (2012).

⁹The use of the “knowing” as a verb rather than a noun emphasises the ongoing process of knowledge construction.

the intellectual characteristics students bring to learning are forged by their previous educational experiences. This is important, because their conception of knowledge influences how they use the teaching available (2012, p.36).

Michael Polanyi in his discussion about how humans perceive the world introduces the concept of tacit power, as the way to how humans construct knowledge (1966). In terms of MOOCs and online social learning, tacit power originates from the learners' conversations about the course content, and through their interactions with others (students, instructors, and other individuals they meet in their everyday life) about the learning content, mediated by a number of (online) tools. This tacit power develops tacit knowing (Polanyi, 1969), and such power is different to each learner, depending on individual's previous experiences. Thus we consider the MOOC learning form as a form of support for individuals' lifelong learning (rather than their institutionalised learning), where the development of skills and competences is prioritised. Consequently the issue of assessment and marking becomes problematic in a MOOC context: What aspects of learning should be assessed? What are the grading criteria? Do we need grades at all in MOOCs?

In the process of tacit knowledge construction, the concepts of sense giving and sense reading, originally introduced by Polanyi (1969), complement each other in a broader and deeper process of sense making. We consider sense giving in terms of what the designers of a particular MOOC originally meant to achieve offering such a course. Sense reading is what learners do understand in the learning practices they engage in. This 'looping-like' process continues in the sense giving, which develops in the learners' interactions and reflections on the course content. Consequently, the sense giving of MOOC designers will not be the same as the sense reading of their learners, nor the same as the further sense giving of the learners within the same MOOC.

By adapting the concept of liminality (van Gennep, 1960), the sense making in MOOCs is seen to occur in a liminal space, between individuals' processes of sense giving and sense reading. The concept of liminality derives from van Gennep's anthropological studies of rites of passage that "may be subdivided into rites of separation [preliminal rites], transition rites [liminal rites], and rites of incorporation [or postliminal rites]" (Gennep, 1960, p. 11). Being in a liminal space is a metaphor that suits well the state of transition of individuals and the connectedness at the bordelands of different communities that characterises the practices of online social learning. When it comes to MOOCs, participants that come across the open learning material start working with it in a process of sense making that is likely to occur at different levels and at different sites. It could be inside the learning platform of a MOOC, but it could also occur via e-mail interaction, in forum discussions, Facebook groups or in synchronous meetings that the participants arrange via for example Skype. All these activities are understood as 'transitions' that have the potential to facilitate the rise of epistemic practices among individuals and their lifelong learning. The challenge ahead of us is to follow, to track and to understand the social practices outside of the platforms and analytics provided by MOOCs. How are the epistemic practices of participant in MOOCs managed in online as well as offline activities? How should the issue of drop out be approached in a MOOC perspective?

We do not aim to abandon the idea of MOOCs due to their complexity and the variety of the contexts in terms of the number and diversity of participants and tools involved. We would rather support Walsham's view, where the main challenge:

is to design systems [a MOOC system] and approaches to their use which recognise the tacit basis of all sense-reading, and sense-giving activities [both designers' and learners' learning practices], and to try to make these activities more meaningful and valuable to all parties [learners, course designers, and educational institutions involved] (p.601).

It is argued that in order to be able to understand and trace the MOOCs participants' epistemic practices and knowledge construction processes it is important to investigate such activities of sense reading and sense giving by employing methodologies and techniques that take into account both the situated and distributed nature of learning, as well as participants' individual actions.

Learning analytics (LA) deriving from business intelligence research area and data mining, is defined as the "measurement, collection, analysis and reporting of data of learners and their contexts,

for purposes of understanding and optimizing learning and the environments in which it occurs” (Siemens, 2011, p.11). More specifically we draw on the Social Learning Analytics that highlights the:

processes in which learners are not solitary, and are not necessarily doing work to be marked, but are engaged in social activity [a MOOC learning form, where collaborative learning activities are explicitly emphasised], either interacting directly with others [...], or using platforms [i.e. MOOCs’ LMSs and CMSs] in which their activity traces will be experienced by others (Buckingham Shum & Ferguson, 2012, p.5).

In terms of MOOCs, SLA as a research method can assist to make visible individuals’ processes of sense making and learning practices in social settings across different scales: “from national and international networks to small groups and individual learners” (Buckingham Shum & Ferguson, 2012, p.5). Access to such (public) data contributes, among others, to identify humans’ learning patterns in various sociocultural contexts. SLA in regard to MOOCs is of special importance due to the rapidly emerging mobile technology spread and use, where constant access to social media’s virtual environments is one of the users’ prevailing everyday activities.

4. Conclusions

The paper’s aim was to develop on how the idea of *sociotechnical* construction of reality – as opposed to purely *social* construction – is reflected in knowledge management processes in the context of MOOCs. Individuals’ epistemic practices in MOOCs are influenced not only by the socio-cultural contexts they are a part of, but also by the engaged technologies. Similarly learners have an impact on the use of technology in their learning practices, both occurring in collaborative work as well as in individualised activities. Knowledge management in MOOCs becomes a process and a product of such sociotechnical construction, which reflects the distributed and situated nature of learning in MOOCs at different levels. It is in this polyfaceted character that MOOCs obtain a potential to benefit and facilitate communication and knowledge sharing across the boundaries of time and space. The co-presence of different kinds of social mediating technologies, both at institutional and at individual levels has a direct bearing on learners’ epistemic processes.

The complex nature of MOOCs’ design in terms of learners’ knowledge management brings up several interrelated challenges for MOOC organisers, instructors, users and researchers. From a pedagogical point of view, it is argued that the application of a unified pedagogical model is a utopian endeavour to conduct. This is due to the diverse nature of contexts, participants, and tools involved. Processes of knowledge management and sense making in MOOCs are likely to take place in a liminal space, between individuals’ sense giving and sense reading practices. Thus a number of challenges in relation to assessment, knowledge sharing, as well as evaluation and dissemination in MOOCs have to be further investigated.

By adopting a human-centered view of knowledge management and taking into account the challenging nature of learning contexts, we conclude that the issue of MOOC assessment should be reconsidered in terms of individuals’ lifelong learning goals. It means that MOOC designers need to create a learning space where participants are allowed to make their own links and connections in relation to their tacit power that relies on the individuals’ previous experiences. SLA as a valuable research tool and technique has the potential to approach learners’ activities in MOOCs, both at the systemic level and at a more context-focused individual level.

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