Enhancing the Student Experience: integrating MOOCs into Campus-Based modules.

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Abstract

Massive Open Online Courses (MOOCs) are continuing to expand in Higher Education Institutions (HEIs). According to Class Central, over 1500 courses started in May 2017 alone. In some cases, these courses are becoming integrated into institutions, to such an extent that they are being incorporated in the on-campus curriculum. Externally-facing MOOCs are being used as part of face-to-face modules, often with the aim of leveraging the networked learning opportunities that these kind of open courses offer.

There are a range of benefits which learners can enjoy when undertaking a university module in which participating in a MOOC is part of the syllabus. Firstly, there is the opportunity to learn from the latest research in the subject, often before it is published more formally. Secondly, they can collaborate not only with their peers, but with a global learning community, exposing learners to a significant diversity of ideas, approaches, experience and knowledge. Thirdly, there are all the well reported benefits to being able to study where, when and with whom you chose.

There are also benefits to the creator university beyond that of developing teaching resources. Learners' engagement with the content may help to co-create research in real time, both for academic research and for research into MOOCs themselves. In addition, complex materials such as network maps or interactive games that have been developed for a MOOC at considerable care and expense, and been subjected to thorough quality assurance processes, can also be reused in other contexts within the university, for example for student recruitment or staff development purposes. In summary, there are a wide range of opportunities emerging from the integration of MOOCs into the classroom.

However, at the moment it is not easy to evaluate the outcome of integrating MOOCs into traditional university modules, as there is not yet a great deal of research reporting on the area. Moreover, there are a wide range of methods that have been and can be used to this end: the participation in the MOOC may or may not be assessed; the role of the MOOC within the module can vary (teaching, revision, primer...etc); the role of on-campus learners can vary from mere participants to teaching assistants or content producers; the proportion of the MOOC learning materials used as module materials can also vary; and the timelines of the module in relation to the MOOC can also be very diverse. It is therefore important to assess the effectiveness of various initiatives in order to find the optimal internal uses of MOOCs.

This paper reports on a socio-technical intervention in which 46 undergraduates on the Online Social Networks module at the University of Southampton also had the Learning in the Network Age and Power of Social Media FutureLearn MOOCs, and an offline support programme, integrated into the syllabus for revision purposes. Learners were surveyed before the module started to establish their prior experience of and attitudes to MOOCs. In order to reach an assessment of the effectiveness of the intervention, the module final grades and result profile, the learners assessed reflections and the anonymised end-of-module feedback forms were analysed. The module grade average increased by three percent, moving up a band, and the number of top grades awarded doubled. However, learner reflections and feedback were rather more mixed, with equal numbers of learners finding MOOCs of great value for deepening understanding as those who gained little benefit from the experience. Such diversity of outcomes led the researchers to a discussion of the barriers affecting a socio-technical approach to HE teaching and learning.

Keywords: MOOCs, Networked Learning, Blended Learning

Introduction

The web has already had a transformative effect on most aspects of modern life, work and education, and Higher Education Institutions (HEIs) have not been exempt

from this process. According to Sir Tim Berners-Lee (2000), the web was originally created as a system for CERN researchers to share their findings and thereby learn from one another - a global learning tool. Equally, the Innovating Pedagogy Report (Sharples et al, 2014) recently identified "massive open social learning" as the innovation most likely to have a significant impact upon education. It is unsurprising therefore that a plethora of formal and informal, profit and not-for-profit online services targeted at teaching and/or learning have continued to spring up in the years since the creation of the web. Massive Open Online Courses (MOOCs) form one type of online teaching and learning approach and have now begun to move from an emerging technology to a maturing feature of the educational sector. A 2013 review of MOOCs by the UK's (then) Department for Business, Innovation and Skills (BIS) suggested that,

> "There is consensus that MOOCs, correctly deployed, do offer education institutions a useful lever for restructuring and transition. On balance, the literature expresses the view that MOOCs will probably not threaten traditional forms of University teaching in the short term, but a significant sub-group of credible writers forsees wide and sudden changes and disruptions to HEIs from MOOCs." (p.6)

In the four years since the review, forward thinking HEIs have begun to move beyond a focus on online file storage towards harnessing the potential of digital technologies to support social, collaborative learning on a global basis. A growing number are putting MOOCs at the heart of their online education strategy as the building blocks of flexible, networked curricula and collaborative partnerships (e.g. the Universities of New South Wales and Deakin in Australia, and most recently Leeds and Coventry Universities in the UK). Every programme in UNSW is developing an integrated curriculum framework that combines free MOOCs, traditional modules and professional development elements according to its specific requirements. However, this forward

thinking is not yet typical across the HE sector generally.

MOOCs were primarily conceived as externally facing educational initiatives in HEIs (Davis et.al. 2014) (although they have subsequently also been used internally as testing grounds for educational innovation (Leon, et.al. 2015). The most common model for the development of MOOCs is a partnership between HEIs and bespoke platforms, such as FutureLearn, Coursera, or EdX, who host the educational content produced by the HEI's academics, and provide them with a specific interface. There is another model by which a university produces a course and the materials and activities of which are distributed across different applications, usually through social media. These two formats have been categorised as xMOOCs and cMOOCs respectively (Rodriguez, 2012). Both formats have the university as the content provider, and as a key stakeholder, and have the potential to "drive innovation and experimentation, leading to improved learning and lower costs and a managed restructuring" (BIS, 2013, p.6) for the HE sector.

Mainly due to the fact that these courses are massive and open, many opportunities have been identified as a result of the integration of these courses within on-campus modules. However, as the BIS Review (2013, p.6) suggests, "There is as yet no agreed satisfactory system of measurement for assessing the quality of MOOCs from the learners' point of view". This paper aims to build on a small but growing body of research evaluating the effectiveness of integrating MOOCs into traditional university modules. The objective is to investigate whether blending MOOCs into a traditional module as a revision tool positively impacts learning. It will begin with a brief history of MOOC developments and a socio-technical approach to HE teaching and learning, before reviewing the results of earlier work in this area. It will then report on a MOOC

intervention in which 46 undergraduates on the 'Online Social Networks' module had the Learning in the Network Age and Power of Social Media FutureLearn MOOCs integrated within the syllabus and module activities. Finally it will evaluate the lessons learned and discuss some of the barriers to wider adoption.

A brief history

Although the first courses categorised as MOOCs did not include campus-based students, they did integrate enrolled paying students with open online learners (Downes, 2008). Downes reported on the experience of a course entitled Connectivism and Connective Learning, in which one version of the course featured a paid enrolment, capped at 25 online students, and another version was free and had an enrolment of nearly 3000 learners. As a manifestation of Connectivism (Siemens 2005a), learners in both versions interacted with each other through a set of distributed open online tools, mainly chats, blogs, and even in virtual worlds such as Second Life.

A different approach to the open online course flourished a few years later. In 2011, leading universities such as MIT and Stanford started to liaise with MOOC platform providers such as EDx and Coursera to offer platform-centered courses to tens and even hundreds of thousands of students (Davis et.al. 2014). These courses were categorised as xMOOCs, as opposed to the above described connectivist MOOCs (cMOOCs) (Rodríguez, 2012), and many universities adopted them as part of their strategy. Both cMOOCs and xMOOCs are open, online and externally facing. This feature motivated many universities to adopt them for achieving outreach and visibility, (León et.al. 2015), but there were other drivers. For example, MOOCs provide opportunities to interact with high numbers of learners other than those on-campus (ibid), as well as opportunities to for educators to wrap their materials in flipped and blended learning

experiences on-campus (Koller, 2012).

At first glance, it may seem that early connectivist MOOCs were conceived as interactive experiences between university learners and a wider, diverse learning community, whereas later platform-centered MOOCs ran the risk of being perceived as a means of expansion and colonialism (Daniel, 2012). However, this distinction does not align with the numerous mission statements of xMOOC stakeholders and there is also variation between the connectivity offered by courses and platforms within the xMOOC model itself. It may also be the case that sometimes MOOC participants themselves voluntarily choose to connect with coursemates through alternative platforms. For example, a learner on the Learning in the Network Age MOOC (FutureLearn / University of Southampton) chose to start a Facebook page for the MOOC with the express intention of providing a means for interested learners and the educators to stay in contact once the MOOC was ended. Many MOOCs also feature a course Twitter hashtag to provide non-platform-based communication avenues, or include links out to quizzes, surveys or others hosted on third party platforms. There is also an increasing blurring of in-platform communication and activity and out-platform interactions, which may be voluntary or formal.

In summary, MOOCs in 2017 can mainly be considered as platform-centred services developed in partnership between a MOOC provider and a university, each located at different points along the spectrum of strict xMOOC to strict cMOOC according to appropriacy, capability and intent. They are primarily externally facing resources, but are starting to become used for internal purposes. As such, they provide fertile ground for providing a gateway through which universities can transition towards a socio-technical approach the HE teaching and learning.

A Socio-technical approach to HE teaching and learning

Developing from the fields of Science and Technology Studies (e.g. Bijker et al, 1987; Hughes, 1987) and Actor Network Theory (e.g. Callon, 1986, Latour 1987, 1990; Law, 1992), a socio-technical system may be best defined as one which "focuses on the interdependencies between and among people, technology and the environment" (Cummings, 1978). Socio-technical theory tells us that the development of society and the development of technology is interdependent, with each impacting the other in complex and inseparable ways at Niche, Regime and Landscape levels (Geels, 2002). At the level of the individual, personal development can not be separated from the technologies which are available to that individual and the societies in which the individual exists. When applied to education, this approach recognises that learning becomes something an individual accomplishes inseparably from their technology and their social context.

Evolving from the learning theory of Social Constructivism as expressed in Communities of Practice (Vygotsky, 1978; Lave, 1991; Lave & Wenger, 1991), Connectivism (Siemens, 2005a, 2005b; Downes, 2006) underpins the socio-technical approach to HE teaching and learning. Connectivism suggests that "knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks" (Downes, 2007) and that "knowledge and skills emerge from making connections between different domains of activity such as experience, learning and knowledge, as well as between individuals in a social network. It foregrounds learners' exposure to social and cultural experiences, rather than their exposure to didactic transmission or self-directed enquiry" (BIS, 2013, p.13). Connectivism recognises the role of forming networks of connections as the process of learning and places equal emphasis on those connections being face-to-face or through

technologies. As such, it is the learning theory perhaps best placed to reflect a modern society often described as consisting of networked individuals (Wellman & Rainie, 2012) learning, living and working in a network society (Castells 1996).

The socio-technical umbrella broadly encompasses many well-established and researched efforts to maximise the potential of technology for teaching and learning, including movements around Technology-enhanced Learning (TEL) (e.g. Goodyear & Retalis, 2010), blended learning (e.g. Garrison & Vaughan, 2008), online educational tools (e.g. MOOCs, Khan Academy, etc), networked learning (e.g. Richardson & Mancabelli, 2011) and Connectivism (Siemens, 2005a, 2005b). Beyond their commitment to the centrality of technology, these movements are also linked by a view that learning is not about passively consuming content provided by tutors.

Rather, learning is social, networked and technological where individuals collaboratively discover, share, discuss, reflect and learn in harmony with their technologies. Socio-technical approaches move beyond the received wisdom of "the sage on the stage" - instead it is about actively participating in learning at times, places and contexts of the learner's choosing. As Mazur (2012) notes, "Active learners take new information and apply it, rather than merely taking note of it. Firsthand use of new material develops personal ownership". Indeed, the author of the first MOOC (#CCK08) in 2008 emphasised the importance of these elements of MOOCs, explaining that "To date, higher education has largely failed to learn the lessons of participatory culture, distributed and fragmented value systems and networked learning." (Siemens, 2014).

MOOCs in the classroom

There have been a large number of initiatives to experiment with the incorporation of MOOCs in on-campus modules (Sandeen, 2013). These experiences have been shared in a large corpus of literature, some of which, identified by Israel et. al. (2015) are worth highlighting. For example, Caulfield et. al. (2013) report on the experience of using a Stanford MOOC as learning material in a module at a Puerto Rican university. Both the learners and the teacher benefited from the high quality materials (videos, articles, and quizzes), although the learners did not engage in the MOOC forums. Bruff et. al. (2013) also used a Stanford MOOC in their university -Vanderbilt-, integrating it simultaneously to their module with similar results. The learners in the module were encouraged to participate in all aspects of the of the MOOC, and they did so in all of them except the forums. Another experience shared was that of Holotescu et. al. (2014), who integrated a few MOOCs from different universities in a local Learning Management System in their own institution, the Polytechnic University of Timisoara. The experience was deemed as generally positive, mainly because of the opportunity of leveraging a wide choice of materials from a wide range of MOOCs. Andone (2015) repeated the experience with a similar approach in the same institution. In both cases, several learners reported to have benefited from the participation in the interaction spaces offered by the different MOOCs in which they participated, although the most used interaction tool was the one put in place by the university, not the one put in place by the MOOCs themselves. Therefore, there was interaction through the use of MOOCs, but there was not much interaction between the university learners and the wider MOOC participants.

The last case to be reported here is that of Griffiths (2013), who used a series of MOOCs in on-campus modules as an experiment over two years. Unlike the previous

cases, most of these MOOCs were created by the same university - University System of Maryland - and they were used as part of the syllabus. The results were generally positive, but students expressed dissatisfaction with the quantity of face-to-face interaction in the module, as they perceived that much of the face-to-face settings were replaced by online settings. This may indicate that prior expectations (and/or educational conditioning), such as expecting a suitable amount of face-to-face exposure to an 'expert', may lead to tension in these types of socio-technical approaches which are inevitably going to be different from traditional expectations.

The Intervention

The objective of our research was to investigate the impact of encouraging undergraduates to actively participate in two of the University's FutureLearn MOOCs on their exam performance in the Online Social Networks module, during semester two of the 2016-17 academic year. Previous observation of this module during semester two had indicated that the long Easter break just four weeks before the exam period might be adversely impacting learners' knowledge retention, revision strategies and exam performance. The repurposing of the Learning in the Network Age and Power of Social Media MOOCs to act as an intervention aimed at reversing some of these adverse effects was developed as the first in a number of possible experimental approaches.

During the four week period between the end of the Easter break and the start of the exam period, learners were encouraged to study the MOOCs, each of which ran for two weeks, as a revision tool. The bulk of the content covered by both MOOCs had been previously covered during standard module lectures in earlier parts of the semester. To assist with individual motivation, learners were made aware that some of the exam questions would be based directly on some of the relevant MOOC activities and steps.

As part of their module assessment, students also wrote a 500 word summary reflecting on the extent of the learning value they obtained from MOOC participation.

Research by Davis et al. (2012), for example, has indicated that within the UK A-level cohort, learners from certain higher socio-economic backgrounds and educational contexts were better equipped to make use of their networks of people and technologies for educational purposes, but were quite limited users of social media networks for sharing, creating and communicating. The opposite was true for those from lower socio-economic backgrounds and educational contexts, who were skilled social media users, but lacked literacies and skills in using their networks for learning. There were different expectations (of both learning and technology), different norms of behaviour, and different personal motivations which impacted the level of an individual's digital literacy and network skills.

It was therefore highly likely that not all learners on the module would have the same levels of motivation, nor of digital literacies, network skills or online confidence. As the BIS review stated of the situation in 2013, "Most studies show that the MOOC experience demands skill and aptitude in online social networking, and that these baseline capabilities are not widely enough shared for MOOCs to present a realistic format for many learners" (p.5) and that "The networking, reputational and learning skills that MOOC environments require for successful learning are an important issue." (p.8).

Consequently, an offline support programme was also developed. The timetabled face-to-face lecture sessions were repurposed to provide a more structured setting for participating in the MOOCs (as opposed to being used for independent self-study), where peers were on hand, and a teacher present to demonstrate. It was felt that this

would help to encourage offline networking and situated social interactions to complement those occurring online. In addition, the inclusion of the teacher (as facilitator - there to assist with any technical issues and to guide any in depth discussions arising from the MOOC content), was also intended to be reassuring to learners with more traditional expectations.

In order to investigate the impact of the intervention described above, the learners were surveyed at the start of the module to establish the extent of their prior experience with MOOCs and with online learning more generally. Analyses of both the assessed reflections and the end-of-module feedback forms were conducted. Finally module grades and results profiles were compared with those of previous years.

Results

The pre-course survey was completed by thirty-six students (18 female, 17 male, 1 trans) during the first face-to-face lecture of the Online Social Networks module in semester two 2016-17. Perhaps unsurprisingly for a module with this title and content, two thirds of respondents self-identified as somewhere on the Digital Resident side of White and Le Cornu's (2011) spectrum (67%), with only nineteen percent placing themselves on the Visitor side (the remaining fourteen percent did not complete the question).

Despite this potential sample bias towards Digital Residents and the fact that just over half the learners had participated in some form of online learning previously (53%), at the start of the course almost two thirds of the learners had, at best, only a vague idea about what a MOOC actually was (64%); over two thirds had never studied in a blended way (i.e. a course with a mix of face-to-face and online elements) (69%); and over eight out of ten had never participated in a MOOC before (81%).

Those who had completed a MOOC previously reported that they had found them useful. However, in the majority of questions, the attitude of those who had not participated in MOOCs before, unsurprisingly, indicated a lack of knowledge of the benefits/drawbacks of MOOCs ('neutral' or 'don't know' was the highest scoring category in all attitudinal questions). However, it was also clear that there was an overall positive attitude towards the potential for MOOCs to be of use. There were signs of positivity towards MOOCs being a convenient way to learn (44%), being useful for revision (36%) and being best when supported by face-to-face sessions (36%). Only one learner considered them a waste of time and inconvenient/difficult to use (3%).

Although the majority of respondents were neutral or did not know (62%), of particular interest is that when asked whether they learn more from MOOCs than from lectures, equal numbers of learners strongly or partially agreed (19%) as strongly or partially disagreed (19%). This suggests that for some the use of MOOCs as a replacement for traditional lectures may well be a divisive issue and of mixed benefit. Nevertheless, overall the survey showed that despite a largely Digital Resident cohort, starting knowledge of MOOCs was low and that attitudes towards them were consequently neutral or unknown. However, those with a view on MOOCs were generally well predisposed towards them as a potentially useful learning method.

The question of whether the integration of the MOOCs as a revision tool translated into better academic performance can be first seen through a comparison of module results from the same semester in previous years (Figure 1 below).

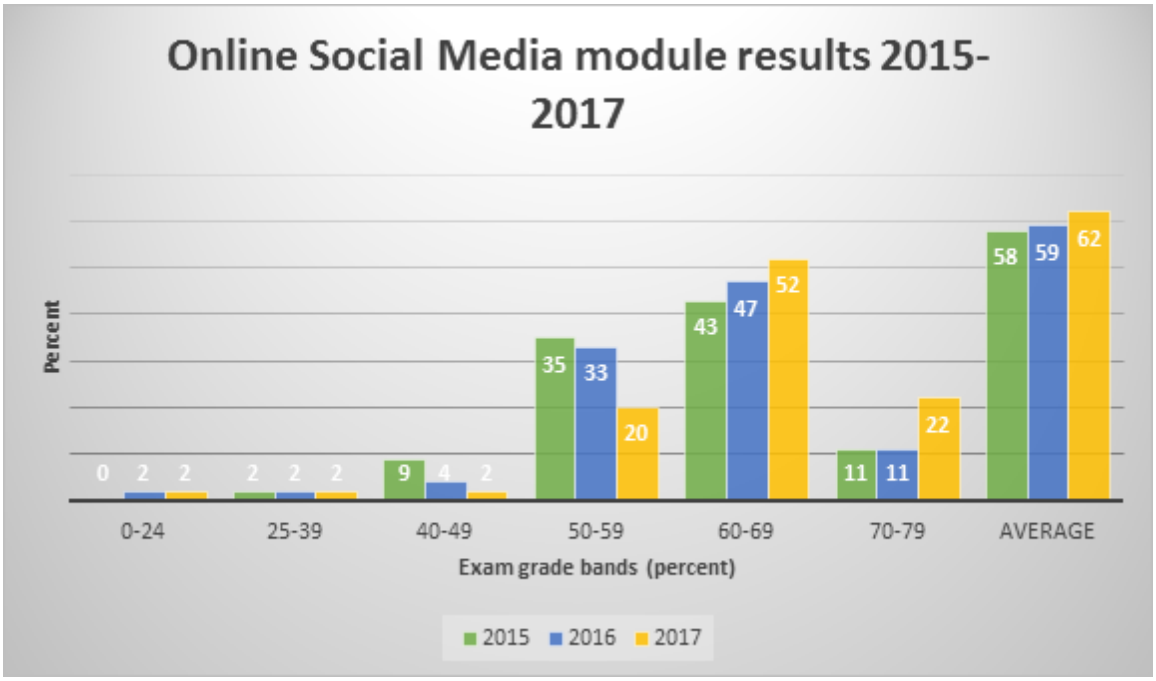

Figure 1: module results pre and post intervention

The figure shows that the percentage of learners achieving the highest grade band doubled in 2017. In addition, there was an increase in learners gaining a 2,i (60-69%) and a significant decrease in the number gaining a 2.ii (50-59%), leading to an average grade improvement of three percent. This equated to the movement of the module average grade upwards a grade band.

Clearly caution must be exercised here as a whole host of other mitigating factors may also have had an effect, including the different people involved (the learners), improved teacher/module experience, different exam questions, different marking teams, different performance in other parts of the module assessment, different personal, social and contextual influences on the exam day….and so on. This may be mitigated to a degree by the the fact that the previous two years profiles (2015 & 16) were remarkably similar. Nevertheless, no definitive causal significance can be attached to the changes having resulted from the MOOC intervention. However, it does seem that the increase in the award of 70-79% grades is significant and that the direction of travel is positive,

providing some possible weight to the beneficial impact of the intervention.

However, it is important to explore this possibility further by cross-referencing this with what the learners actually reported of their experiences. The first set of data to turn to is the reflective writing assessment which learners on the module were required to submit as part of their assessment activities. It is important to note that as a formal assessment activity, there may have been a perception on the learner's behalf that they should write what they think the tutors would like to hear. Whether this occurred or not was beyond the scope of this data to capture, however, it is necessary to keep in mind that there may be some task bias in effect.

The first aspect learners were invited to reflect on was the *specific value* which they felt they had received from participating in the MOOC as a revision tool. Interestingly, only 72% of the learners actually commented directly on this, although of those who did several commented in multiple ways. This could be interpreted positively - nearly three quarters of the learners considered the MOOC valuable - or it could be seen more negatively - just over a quarter gained no value from the experience. In fact, what this suggests is a mixed picture, although with a weighting towards it being a positive experience.

The comments were then grouped by theme in four broad areas arising from the analysis as follows:

- General features of being an online course
- Knowledge and understanding of content
- Multimedia aspects of the MOOC
- Interaction and participation

The results can be seen in the chart below (Figure 2).

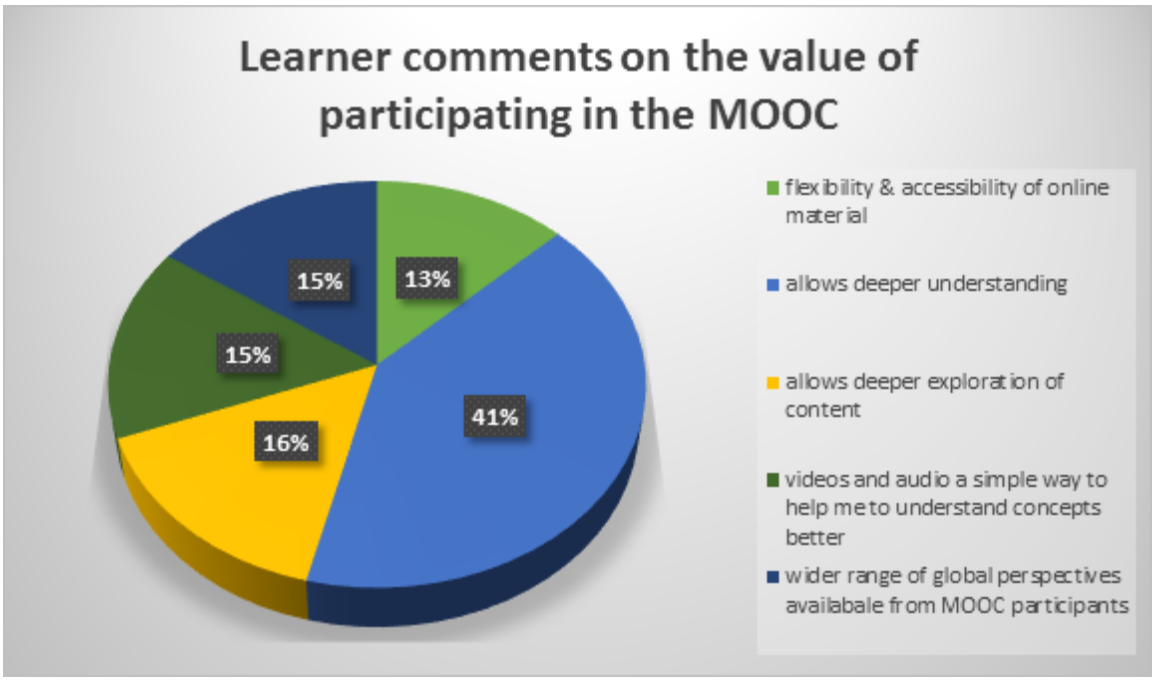

Figure 2: Reflections on the specific value of MOOC participation for learners

The results indicate that 72% of comments focussed on how the MOOC (and its audio and video) helped learners to gain a deeper understanding of the topic and explore more deeply into course content and concepts. Example comments in this area provides insight when the learners wrote:

> "I was able to deepen my understanding in a more connected way"
> "The idea that learning is occurring all around me had not occurred to me before, which is why developing my PLN [Personal Learning Network] had such a profound effect on me".
> "The MOOC was undoubtedly significant in extending my learning network to the digital environment in addition to the lecture theatre"
> "Using a networked learning approach makes everyone a teacher in their own unique fields, with the exchange of these experiences helping the learning of all involved."

This may suggest that, for some at least, the network learning approach added value to their depth of understanding. It may also be one possible reason for the doubling in top grades awarded for the module this year.

Learners also commented on the value of having access to a range of perspectives from a global cohort, with a number of them choosing to reflect specifically on the value they received from both *reading* the MOOC discussions (48%) and *contributing* to them (30%). On reading the discussions, example learner comments included:

> "The discussions surprised me with how much they furthered my knowledge. They gave insights and different perspectives that I would not have considered before"
> "The main benefit has been in signposting areas that I need to understand more, and having a huge community on hand to help".
> Concerning contributing to discussions, comments included:
> "By engaging with one of the learners who shared his knowledge, he gave me pointers to interesting and relevant contemporary essays – this is something that cannot be incorporated into a printed textbook"
> "I'm not confident asking questions in class but I got a lot of value from contributing to MOOC discussions"
> "Interacting with others to explore the content leads towards a higher quality learning experience."

These comments may suggest, that for some at least, the social learning approach, mediated through technology, also added value to the learning experience. This may be another reason why the module results showed an improvement this year.

However, it is important to note that there were many learners who did not contribute to discussions, citing a preference for lurking, a lack of confidence and a lack of time as the reasons. It was also felt that discussions on the MOOC moved on too rapidly, so late-comers were less likely to receive replies to the comments they did contribute.

Some learners also felt that the discussions were often *"fragmented and not always followed through, hence of limited use"* (learner comment). More generally, others reported finding themselves easily distracted, outside their comfort zone, or that it was hard to learn from a screen alone. Indeed, nine percent of learners explicitly stated that they felt a mix of online and offline was best.

As a further reference point, this time one without the potential task bias of the assessed reflections above, the anonymous end-of-module feedback forms provide additional data. Nineteen learners (41%) completed the feedback forms, with twenty-five percent reporting the MOOCs as the best feature of the module. One example learner commented, *"The MOOC's were extremely helpful in developing knowledge from lectures and good to use when revising"*. Taken as percentage of the total cohort, a little over eleven percent clearly found the MOOCs of considerable value to their learning.

However, an almost equal percentage of feedback respondents (23%) felt that how to use the MOOCs effectively had not been made clear enough and that they had not taken the maximum value from them. An example comment along these lines was, *"The use of the MOOC was not made that clear and the lectures seemed to cover most of what was online"*. It may be the case that these learners failed to take advantage of the weekly face-to-face support sessions which were an important part of the intervention design, nevertheless, for this eleven percent of the total cohort the integration of the MOOCs did not add value. Future interventions could be improved by developing more effective support programmes that reach out to all.

There may be interesting parallels between the equal percentages of the cohort who found the intervention beneficial (and not), with the equal percentages of learners who *before the start of the module* either strongly or partially agreed (and disagreed) with the

idea that MOOCs were more effective than traditional lectures for learning purposes (anonymisation makes a correlation impossible to confirm). This raises the intriguing possibility that prior positive/negative attitudes towards MOOCs may directly correlate to the value a learner can extract from a socio-technical approach to HE teaching and learning. Future studies exploring this would be useful.

In summary, the data concerning the effectiveness of the socio-technical intervention (the integration of the MOOCs into the module and the accompanying support programme) indicates a somewhat mixed picture. At the start of the module the majority of learners considered themselves to be somewhere on the Digital Resident side of the Resident-Visitor spectrum, the starting knowledge and experience of MOOCs was low and attitudes towards them were consequently neutral or unknown. Module results data, importantly, nevertheless indicated that there was a noticeable improvement in the 2017 module results profile compared with the two previous years, with a significant doubling in the number of top grades awarded. Although there may be a range of factors which could have impacted this, the fact that the previous two years profiles were remarkably similar provides some weight to the positive impact of the intervention. In addition, the data also suggests that in a majority of cases the integration of the MOOC helped learners to deepen their understanding, which may be reflected in the improved module results profile. In addition, both the network learning and social learning opportunities afforded by the MOOC were valued by learners. However, this was far from universal, with some learners not supported enough through the process, not valuing the MOOC discussions or the online nature of the MOOC, and a number deeming a mix of online and offline to be best. It may also be the case that prior attitudes towards MOOCs (or even online learning and the web more generally) impact on the value a learner can gain from these types of socio-technical interventions.

Discussion

It is perhaps not surprising that for individual learners the integration of the MOOCs into the module timetable produced mixed results. For some learners the intervention and the network and social learning approaches were highly beneficial, adding to depth of understanding and the range of perspectives and people they were exposed to. For others, it was unclear how the MOOCs should be used or what learning value they would bring. They were something outside their comfort zone and different from the norm. Even within a predominantly Digital Resident cohort, attitudes towards MOOCs, digital literacy levels, and network skills can not be considered equal. We each have our digital differences.

This finding illuminates two very important barriers to the more widespread adoption of socio-technical teaching approaches in HEIs. The first is that learner's attitudes to MOOCs, online learning and the web in general are likely to be shaped by previous experience and knowledge. Innovative interventions such as this one will tend to cause some students to have to leave their comfort zone, with potentially mixed results. For those conditioned to learning in the traditional modes and equipped with prior expectations of what it means 'to be taught and to learn', (expectations which may only be heightened by the contractual, transactional nature of the current HE model), having to move into less familiar contexts in which their traditional expectations are less clearly matched to the reality of their learning process, can have negative results. The negative impact on the learners however may be more perceived than real, as the improved module results profile may suggest.

The second barrier is that learner's digital literacies levels and network skills are also

likely to be very different and perhaps for some more aligned to traditional educational contexts. Through their prior schooling, with its necessary focus on content-led, exam-driven teaching approaches, learners come to university equipped with the literacies to thrive in those settings. While digital literacies are developed by individuals through their own online activities and increasingly encouraged in formal schooling, it still remains largely the case that "the literacies and skills required to benefit from MOOCs are very specific….[and]...it is also likely that primary and secondary education curricula are not addressing these learning skills adequately" (BIS, 2013). Therefore, when asked to participate in innovative HE modules some learners may find themselves with a reduced suite of literacies and skills to deploy, or reduced levels of self-confidence in their literacies and skills, which may have a negative impact for that learner.

This therefore leads to a catch-22 situation for HEIs, who understandably need firm evidence of the benefits of adopting a socio-technical approach to HE teaching and learning as a route to improved achievement and satisfaction. The catch: for as long as innovative modules featuring MOOCs remain the exception rather than the norm in an undergraduate's learning experience and for as long as little explicit effort is made to address the differences in learner's digital literacies and network skills, the results of research is always likely to indicate, put simply, that there are some who love it, most who are neutral, and some who hate it. Or, more reasonably, some who significantly benefit from it, many who benefit a little from it and some who do not benefit from it at all.

In conclusion, there is some promising evidence from this study that the integration of MOOCs into university modules, in this case as a revision tool, does positively impact the module results profile (e.g. double the number of firsts in 2017 compared with

previous years) as it can deepen learning and increase the range of perspectives and people learners are exposed to. The social and network learning approach is also of benefit to some learners, while structural and contextual factors create digital differences (in attitudes to MOOCs, digital literacies levels and network skills), which may be a barrier to the benefits being felt by all learners. More learner familiarity with socio-technical learning and more focus on the development of digital literacies and network skills would be of benefit to all. However, the integration of MOOCs into university modules is not a one-size-fits-all solution to improving achievement and student satisfaction, rather the right MOOC must be deployed in the right way for the right module and cohort. It is to be hoped that this paper will contribute to the discussions concerning the effectiveness of the adoption of MOOCs for internal purposes, and more generally, the adoption of a socio-technical approach to HE teaching and learning. In time, these contributions might empower those HEIs already committed to producing MOOCs to maximise their use throughout the curriculum as a gateway to providing an innovative, connected and effective learning environment for the networked students of today.

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