Lessons from *'MOOCs for credit'* -- turning non-formal learning into formal credit

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Abstract

The unprecedented growth in learning material freely available on the web appears to offer enormous opportunities to learners and educators all over the world, especially in countries keen to accelerate educational development but hampered by lack of resources (Garrido and Koepke, 2016; Kursun, 2016; Laurillard and Kennedy, 2017; Sclater, 2016). Imagining the University of the future in Africa demands consideration of the role to be played by such material in curriculum and delivery. However, integrating Massive Open Online Courses (MOOCs) and other Open Educational Resources (OERs) into, or alongside, formal accredited learning has its challenges. MOOCs often draw on educational paradigms which may be inconsistent with formal qualifications (Anders, 2015; Bradshaw, et al., 2017); OERs require discovery, evaluation and adaptation (Petrides et al., 2010); and incorporating OERs and MOOCs into credit-bearing qualifications can create tension with existing administrative systems (O'Sullivan, 2018) and external stakeholders (Daniel, in Latcham, 2012; Universities UK, 2013). This paper reflects on how the UK Open University's *MOOCs for Credit* initiative has addressed these challenges in offering the UK's first explicit route to formal academic credit from non-formal study in FutureLearn MOOCs (Weale, 2016). Taking into account processes of planning, production, marketing, administration and delivery, the paper discusses advantages and disadvantages of the *MOOCs for Credit* model compared to alternatives, and identifies implications for practice. The heady initial promise of MOOCs and OERs as profound disruptors of global Higher Education may well have been unrealistic, but, consciously adapted and managed, such resources still have substantial potential in the creation of 'new higher education credentials, business models, and approaches to delivering degrees' (Gallagher, 2017) in Africa and elsewhere.

Introduction

The unprecedented growth in learning material freely available on the web appears to offer enormous opportunities to learners and educators all over the world, especially in countries keen to accelerate educational development but hampered by lack of resources (Garrido and Koepke, 2016; Kursun, 2016; Laurillard and Kennedy, 2017; Sclater, 2016). Sub-Saharan Africa is a case in point, with a burgeoning population of young people on whose education and skills the future prosperity of their economies depends. Yet only one in ten of them is currently in tertiary education, compared to one in four in South Asia, and one in two in South America (The Economist, 2019). Lack of finance is likely to remain a limiting factor in the absence of radical change. African campus-based universities already have over twice as many students per faculty member as their counterparts elsewhere, suggesting that there is little scope to find further economies in face to face teaching (The Economist, 2019). With face to face institutions across the continent struggling to reduce their cost bases, the case for re-imagining the University of the future in Africa appears to be urgent. While by no means a panacea, making more use of Massive Open Online Courses (MOOCs) and other Open Educational Resources (OERs) may have a role to play in this process. But as I shall argue in this

paper, integrating non-formal learning from such resources into the formal accredited learning that is at the heart of the higher education business model has its challenges.

MOOCs and OERs are classified as 'non-formal' learning (Infed, n.d.). This sets them apart from the informal learning that takes place as a result of watching educational television, and the formal learning that takes place through modules and programmes that lead to qualifications. Non-formal learning shares some of the organisational characteristics of formal learning, such as the course-like structure of most MOOCs, with beginnings and endings, assessment opportunities of various kinds, and a sense of a cohort. Taking advantage of the growing number of high quality, low cost resources available on the web seems an obvious way to accelerate curriculum development for any hard-pressed Higher Education Institution. But their open nature, allowing learners to dip in and out at will, is qualitatively different from the regulated environment in which formal education takes place.

MOOCs often draw on educational paradigms which may be inconsistent with formal qualifications (Anders, 2015; Bradshaw, et al., 2017); OERs require discovery, evaluation and adaptation (Petrides et al., 2010); and incorporating OERs and MOOCs into credit-bearing qualifications can create tension with existing administrative systems (O'Sullivan, 2018) and external stakeholders (Daniel, in Latcham, 2012; Universities UK, 2013). This paper reflects on how the UK Open University's *MOOCs for Credit* initiative has addressed these challenges in offering the UK's first explicit route to formal academic credit from non-formal study in FutureLearn MOOCs (Weale, 2016). Taking into account processes of planning, production, marketing, administration and delivery, the paper discusses advantages and disadvantages of the *MOOCs for Credit* model compared to alternatives, and identifies implications for practice. The heady initial promise of MOOCs and OERs as profound disruptors of global Higher Education may well have been unrealistic, but, consciously adapted and managed, such resources still have substantial potential in the creation of 'new higher education credentials, business models, and approaches to delivering degrees' (Gallagher, 2017) in Africa and elsewhere.

History

Although the concept of massive open online courses was not entirely new to the world by that point, MOOCs first presented themselves to public attention in 2012 as a counterblast to the exclusive, expensive and elitist world of North American higher education. Udacity founder Sebastian Thrun's original Massive Open Online Course CS221 'Introduction to Artificial Intelligence', was a free online version of a module he was already teaching face-to-face at Stanford University to fee paying students. He had been inspired to put it online by watching a TED Talk featuring Sal Khan, who started posting maths coaching videos on his YouTube channel in 2006 and now leads Khan Academy, a global network of free learning resources aimed primarily at school students and their educators. Being free of charge is central to Khan's mission, and Thrun was keen to emulate this. But what got him into trouble with the Stanford authorities was not that he was giving away expensive intellectual property, but that he was proposing to include academic credit and a certificate as part of the package (Leckart, 2012). In the end a compromise was reached whereby learners earned a statement of achievement (rather than a certificate) which made it clear that there was no university credit from Stanford attached. Thus, the uncomfortable relationship between formal academic learning with its strictly policed regulatory frameworks, and the buccaneering world of non-formal learning in which MOOCs and other Open Educational Resources exist, has been a challenge since the outset. The *MOOCs for credit* initiative from the Open University Business School (OUBS) was a way of reconciling this tension between non-formal and formal learning.

It originated, as innovations often do, from a mixture of senior management enthusiasm, new technological opportunities and a perceived gap in the market. Peter Horrocks, who joined the Open University as Vice Chancellor in 2015, was keen to populate FutureLearn, an OU-funded MOOC platform, with compelling, vocationally-oriented content from OUBS that would attract large numbers of learners. At this point there was no thought of such courses being associated with credit. Instead, the idea was to test FutureLearn's emerging business model which was premised at that point in its history on reaching massive numbers, a small proportion of whom would be prepared to buy Statements of Participation. With massive learner numbers, even a small proportion of learners on a course becoming purchasers promised a significant revenue stream. As a result, the ten FutureLearn MOOCs for whose production the OUBS received strategic development funding from the central University in 2015 were known internally in their production period as the Revenue MOOCs. The venture aimed to open up a new market – large-scale personal continuous professional development online. Demand had previously been served by relatively expensive short courses offered mainly face-to-face by training providers, professional associations and colleges of Further Education (part of the tertiary sector in the UK, but separately funded from Universities and offering different kinds of qualifications). Our expectation was one of potentially rapid growth with the addition of an online route. A further attraction was the radically international profile of FutureLearn's audience – 75%% of whom are outside the UK (O'Grady, 2016). For example, the August 2019 run of the *Effective Networking* MOOC, for which I am lead educator, drew almost 22% of its registrations from the African continent, with Nigeria featuring particularly strongly (FutureLearn, 2019).

Indeed, FutureLearn's internationalisation is not just a matter of where in the world it finds its learners. Its Partners (the universities and other institutions which provide courses) come from Europe, Asia, Australia, the US and Africa – although African membership is currently limited to the Universities of Stellenbosch and Cape Town. Adam (2019) sees this relative lack of African representation as evidence of what she calls digital neo-colonialism, as the economics of MOOC production exclude the Global South and perpetuate Western discourses of education. However, African input is key in a number of FutureLearn MOOCs – for example the College of Medicine of the University of Lagos is one of three organisations behind a recent MOOC on anti-microbial resistance in an African context (BSAC, 2019); and as we have seen, the Open University's TESSA project has been conceived and developed in close collaboration with African institutions and has manifested itself in a FutureLearn MOOC (The Open University, 2017)) amongst other initiatives.

The Revenue MOOC curriculum was chosen after an extensive consultative process within OUBS involving several 'big tent' meetings and idea-generation initiatives, including soliciting course proposals based on what people felt passionate about teaching. The unfamiliarity of MOOCs as an opportunity encouraged the school to step outside its habitual model of itself as dominated by rational goals, and engage with a more flexible human-relations cultural model (Quinn, 1988). Alongside this internal 'crowdsourcing' process, planning also took account of external thinking on 'in-demand' curriculum from the European Foundation for Management Development, the UK's Chartered Association of Business Schools, and the UK's Chartered Management Institute (which has considerable international influence on business education through its Chartered Manager award). FutureLearn, with its own developing sense of what MOOC learners were interested in, was also a very important influence on the proposed content.

As to the format of the Revenue MOOCs, the Open University's emerging experience with FutureLearn MOOCs suggested that the 'sweet spot' for retention was a MOOC lasting four weeks, with three hours learning a week. The finalised topics of the MOOCs were as follows:

- Two 'Management and Leadership' MOOCs based on a Chartered Management Institute level 5 qualification curriculum
- Four 'employability' MOOCs covering skills relevant to learners at an early stage in their careers: Communications, Networking, Customer Engagement and Project Management. These were all chosen as generic skills, relevant to the widest possible range of vocational contexts – commercial, non-profit and voluntary. Furthermore, the courses were conceived with international learners in mind. Although financial resources and the time available meant that the illustrative material tended to be drawn from UK contexts, we avoided culturally-specific cases and information which would limit the applicability on a global basis. An important aim of the Effective Communications MOOC was to develop cultural and interpersonal sensitivity in learners' communication behaviour.
- Four 'Digital Economy' MOOCs, aimed at learners who were more advanced in their careers but wanted to revisit management thinking in the context of rapid technological change in the areas of Supply Chain Management, Marketing, Sales and Finance. These MOOCs covered some of the concepts and models you might expect to encounter in an MBA, but reframed in the context of digital technology as it is shaping business opportunities.

Production planning was well underway in 2015 when a new factor entered the equation. In the USA, Arizona State University (ASU) had recently announced an initiative with EdX, a MOOC platform born from Harvard and MIT. Launching in Autumn 2015, 'Global Freshman Academy' offered applicants the chance to gain freshman year credits at a fraction of the cost of traditional face-to-face tuition through a combination of study in MOOCs and assessment through ASU (ASU, 2018). It looked as if the prospect of gaining academic credit for study in MOOCs was back on the agenda. In spite of the differences between the US and UK context, Peter Horrocks tasked OUBS with finding a way to add value to the Revenue MOOCs by linking them to the award of academic credit.

The challenge of credit

Academic credits are, in effect, the currency of higher education. Whether expressed as credit points as in the UK Credit Accumulation Transfer System (CATS) or European Credit Transfer System (ECTS), as Semester Credit Hours (SCH) in American parlance, or in one of the idiosyncratic ways in which several other universities calculate them, they indicate 'the volume of learning based on the defined learning outcomes and their associated workload' (European Commission, 2015). Thus, as a measure, credits are at the same time qualitative (indicating the kind and level of learning, as reflected in learning outcomes) and quantitative (indicating the amount of learning, expressed in the time it might be expected to take). Credits are the potential, or latent, value attached to a learning experience. They are realised (or generated) through assessment which confirms that an individual learner has completed the necessary learning, achieved the required learning outcomes and can be awarded appropriately. This has been described as the 'dominant discourse' of assessment, which 'constructs learners as passive subjects' and neglects the developmental role of participating in assessment -- which can lead learners to be better judges of their own work and that of others (Boud and Falchikov, 2007, p. 17). However, the concepts of assessment as a measurement of learning, and credit as a warrant of learning, are not irreconcilable with assessment as a learning experience in itself. Furthermore, without the outcome of credit from assessment, the business model of universities as providers of qualifications in exchange for the fees and effort of their students, would collapse.

Like any national or international currency, the value of credits is supported by convention and trust. To ensure comparability between different institutions and national providers, credits depend on the institutions associated with formal learning, including universities themselves and government agencies. An important institutional convention is that credits are generated by what is known as controlled assessment. In other words, there must be systems in place to ensure that the assessment process is objective and fair (for example through examination invigilation to prevent cheating) and that the person being assessed for credits is who they claim to be. These processes of proctoring and identity verification, along with the extensive regimes of regulation, peer review and inspection which underpin the reliability and validity of assessment for credit, are a key focus of university effort and expenditure.

The integrity of academic credit benefits those who earn credit through study and assessment by offering objective evidence of their achievements. It is therefore essential to the teaching mission and business models of the institutions which award it. We should never lose sight of the fact that credit is only available as part of a business ecosystem (Moore, 2003) in which provider organisations need to sustain themselves financially. Their ability to do so in the long term depends on how effectively they work together to find new forms of value through innovation, including the opportunity offered by MOOCs. Moore (2003, p. 76) argues that innovative organisations are best understood not as members of individual industries, but as parts of business ecosystems spanning several different industries where they 'co-evolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovation'. As stakeholders in this ecosystem, funders and fee-paying students need to be convinced that credit is worth paying for, and valued by other stakeholders such as employers, professional bodies and government. The innovation of MOOCs introduces a new opportunity for ecosystem members, but also the need to co-evolve new capabilities. For universities this entails working with MOOC platforms, technologists and policy makers to facilitate flexible routes to credit which have value and credibility.

Defending the integrity of credit, for reasons both mission-minded and business-minded, is fundamental to the problem of generating credit from MOOCs. As we have seen, the problem features in one of the 'foundational myths' of MOOC culture – Sebastian Thrun's clash with the Stanford authorities over the availability of credit from the open version of an established face to face class. Originally excluded from formal credit systems, MOOC providers have created alternative currencies – nanodegrees or MicroMasters (such as industry-relevant qualifications focused on in-demand skills like coding) and other forms of recognition which demonstrate learner achievement to interested stakeholders (such as digital certificates of achievement to enhance a learner's LinkedIn profile). These alternative currencies have gained considerable credibility with learners and employers, although as the MOOC industry matures, its effect on the qualifications landscape appears to have been co-evolutionary rather than radically disruptive as originally mooted (Gallagher, 2019).

Potential solutions for awarding credit for MOOCs study

As a university operating within the institutional framework for the award of credit in the UK, three possibilities presented themselves to us in our thinking on how to establish a credit path from MOOC study. The first, and most radical, would have been to assess for credit within the MOOCs themselves. The second would have been to work within the existing mechanisms of Recognition of Prior Learning, either using the university's central mechanism for doing so, or an 'empty box'

module which was already in limited use in Business School for such recognition. The third option, creating tailored assessment vehicles targeting a specific group of modules, had elements of both solutions, and was the one chosen. But here we will discuss each option in more detail in turn.

Within-MOOC assessment

First, could we find a way to award credit for MOOC learning that was assessed within the MOOCs themselves? This would offer a seamless experience to the learner and establish the MOOC as on par with other forms of higher education. But serious practical obstacles lay in the way given the crucial role of controlled assessment in generating credit.

Because of their scale, assessment in MOOCs is largely automated. Multiple-choice testing with feedback is common (both as formative assessment to consolidate learning, and as summative assessment to justify the award of a credential such as a Certificate of Achievement). Multiple choice questions can be designed to test higher-order skills (Palmer and Devitt, 2007), but the relatively simple testing format available on the FutureLearn platform was better suited to simple knowledge recall. As we have seen, the 'qualitative' aspect of academic credit as a measure implies learning outcomes appropriate to higher education (e.g. not just simple recall). Such learning outcomes should include synthesis and critical analysis. On their own, therefore, multiple choice tests were insufficient to the purpose. Other forms of assessment, such as peer assessment, are well-suited to MOOCs' ability to connect learners who share and build on each other's work; and peer assessment is highly developmental for learners. The process of internalising and applying a set of evaluative criteria to the work of a fellow-student deepens one's understanding and ability to be assessed oneself, and is recognised as making learners more independent (Boud and Falchikov, 2007, p. 134). But summative peer assessment in the 'open' circumstances of a MOOC would have been incompatible with the controlled assessment necessary to generating credit. Tutor marked assignments (for example essays or reports), submitted within the MOOC environment, looked more promising as an option, but would have added significant cost for learners because of the need to pay tutors to grade them, and could not be managed easily as controlled assessments because of the issue of identity verification. A final option, exams at physical assessment centres, would have satisfied the controlled assessment criteria, but added complexity and cost (particularly considering the geographical spread of the learner population). Proctoring technology – such as verification of learner identity through retinal scanning, and machine surveillance of candidates while taking exams – were mooted as remote solutions which might render attendance at physical centres unnecessary, but the technology was still at a nascent stage.

Perhaps the most fundamental obstacle had nothing to do with technology or assessment methods. It was simply that, under the regulations that governed the award of credit at the Open University at the time, the minimum credit value of any module was 15 CATS points, and the minimum for an undergraduate module 30 CATS points. This is an example of the institutional aspect of credit – the micro-regulations which establish the precise conditions under which it is available in a particular institution. We have already seen how academic credit is a quantitative as well as a qualitative measure. The amount of learning time that sums into a 15 credit module is 150 hours (based on the convention that a full academic year's worth of study commits a learner to 1200 hours of study, measured as 120 CATS points, or 60 ECTS, or 30 SCH, divided between module activities, reading and assessments; and the work students do on their own account, such as contextualising their learning outside the formal confines of their studies, or performing the administrative tasks which being a student entails). Our choice of a 12-hour template for each of the Revenue MOOCs limited the potentially available credit value to one credit per MOOC – meaning that even if we found a way to

award such credit, it would have no further currency in the credit system, being too small to combine with other modules into a qualification.

Recognition of Prior Learning (RPL)

A second potential route to awarding credit for MOOC learning was the established one of Recognition of Prior Learning (RPL) – already part of the Open University's practice when admitting students from different backgrounds (Open University, 2019). Talbot (2016) surveyed English and Welsh Universities and found that Work-Based Learning departments were assessing prior learning from activities including MOOCs, and in some cases awarding credit where MOOCs had been part of the package of learning. RPL can take account of a wide range of prior learning, whether certificated (towards the formal end of the learning continuum) or experiential (towards the informal end, where it is recognised as Prior Experiential Learning, or RPEL). MOOCs, while a relatively recent addition to such learning activities in 2016, would have as good a claim to be considered in an RPL process as any other form of prior learning (for example study for professional qualifications, or study at other UK or non-UK higher education providers).

RPL and RPEL take place at an institutional level. At a programme level the OUBS module U810 *Continuing professional development in practice* also had the capacity to take in MOOC study, along with other forms of continuous professional development, as material for structured reflection and synthesis to generate credit at masters level. Our explicit focus, however, was to create a route to credit focused uniquely on the FutureLearn MOOCs we were producing, so the generic route offered by U810 would not have been appropriate. There was the additional problem that U810 required candidates to identify a minimum of 150 hours of continuous professional development to bring into the module, which then involved study hours of its own, to result in a final credit value of 30 CATS points. Because of the limited duration of the MOOCs we were creating, the U810 route would not have worked without supplementing the targeted MOOCs with a great deal of additional prior learning.

The 'empty box' module model remains an attractive one, however. It is interesting to note the 2017 launch of YXM 130 *Making your learning count,* an OU Level 1 Undergraduate module which takes a similar approach to U810 but targets the learner's individual selection of FutureLearn and OpenLearn courses, other MOOCs and OERs and even paid-for short courses. This module is part of the Open University's Open Programme, which allows students to construct personalised degrees from modules across all faculties. However, in accordance with institutional policy on module minimum credit, YXM 130 still requires learners to bring in at least 150 hours of learning in MOOCs and OERs, so would not have offered a solution to our challenge.

Tailored assessment vehicle

In the end, we took the option of creating two tailored assessment vehicles -- one to assess learning from the Digital Economy MOOCs, and one to assess learning from what were being called the 'employability' MOOCs at the time. Their collective name changed to Business and Finance Fundamentals when they were augmented by four more MOOCs on personal finance created at very short notice by remixing materials from some existing open courses. This augmentation was necessary to double the MOOC study hours to 96 in total, in order to make the relationship between the MOOCs component and the tailored assessment module component more balanced in terms of study hours.

As we have seen, credit implies level as well as quantity of study. So any pathway from MOOCs to credit must lead to credit awarded at a specified level. The Business and Finance Fundamentals program of MOOCs and its tailored assessment vehicle were pitched at undergraduate level,

reflecting the level of experience of our target learners for this program. Part of the rationale for the creation of this set of MOOCs was to support the development of skills that would help learners become more employable (either helping them into jobs, or helping them to progress in their early careers). The Digital Economy program, as we have mentioned, was pitched at a more sophisticated level, with MOOC content tailored to an audience with some management experience and a more demanding assessment component to deliver credit at Masters level.

The Business and Finance Fundamentals program is illustrated in Figure 1. We produced both the undergraduate and postgraduate sets of MOOCs and their respective assessment vehicles in parallel. The issues they raised in terms of establishing a route to credit are similar in many ways. For example, they both needed to achieve an appropriate quantity of learning. The Business and Finance Fundamentals package of eight MOOCs and one assessment module totals 300 study hours – 96 hours in MOOCs, and 204 hours in the assessment module divided into 154 of directed learning and 50 hours of mainly student-directed assessment preparation over 22 weeks (the standard weekly length for a 30 credit undergraduate business module at the Open University – though other universities may have different conventions of course).

[Figure 1 here: caption 'OU Undergraduate Assessment module for 30 credits']

The tailored assessment vehicle model we used was a variant on RPL, but different in that the prior learning in question was identified uniquely as the eight Business and Finance Fundamentals MOOCs on FutureLearn. Learners proved they had studied them by producing Certificates of Achievement as a prerequisite to registration on the assessment module. These Certificates of Achievement are earned as a result of having viewed at least 90% of the content and scoring at least 70% on any summative tests administered in the course of the MOOCs. Learners pay an upgrade fee per MOOC to upgrade their status to include summative assessment by tests. As we have seen, the tests were multiple choice tests designed to indicate recall and understanding but were not sophisticated enough to test undergraduate level skills such as analysis or reflection. Controlled assessment via the assessment module of what had been learned in the MOOCs was necessary to generate credit, but also to demonstrate skills appropriate to undergraduate achievement.

The assessment module avoided introducing any new conceptual content on any of the topics covered in the MOOCs. This was essential to its claim to be assessing learning from the MOOCs, each of which was devoted to a particular topic such as marketing or project management. However, in order to ensure the undergraduate level of the credits awarded, the assessment module provided a means to consolidate, integrate and synthesise different elements of content from the MOOCs via a series of case studies. Supported by study skills development throughout the assessment module, learners created and submitted a series of useful written artefacts (such as a brand analysis, a personal 'elevator pitch', a risk assessment, and so on) to demonstrate the employability skills and understanding they had acquired in their MOOC study. Finally learners were introduced to a selection of reflective models to enable them to reflect on and analyse their use of what they had learned in the MOOCs in their personal employment context. This part of the assessment ensured that they were producing work for assessment at the appropriate level, leading to the award of undergraduate credits.

Implications of tailored assessment route to credit from MOOCs

Let's return to the list of necessary conditions surrounding the availability of credit touched on earlier when discussing the challenge of credit. Taking each one in turn, we can see how the tailored assessment vehicle approach fulfilled the condition in question. While this solution is not the only one that might be appropriate to creating a route to academic credit from non-formal learning, it highlights many of the necessary issues that need to be addressed in doing so.

Adherence to institutional frameworks associated with formal learning (for example with regard to level and learning hours)

We have seen how the tailored assessment route adhered to general expectations of the relationship between study hours and credit value, as well as the local requirements of the awarding institution in terms of minimum credit rating for an undergraduate module.

We addressed the qualitative issue of appropriateness to learning outcomes at a given level of study by triangulating the content of the Business and Finance Fundamentals MOOCs to the content of the first level of a business degree at the Open University. We analysed existing skills content in the relevant curriculum and sought to incorporate skills into the MOOCs/module package which complemented or extended them. These include developing as an independent learner, finding and using online resources, cross-cultural communication and personal planning. In this way, while compatible with existing content in the OU Level 1 curriculum, the MOOCs/module package enhanced what was already available. In terms of conceptual content, we chose to include theories and interpretations consistent with what was already being taught in areas such as marketing and finance, but extended into new areas such as risk management and business communication that, while appropriate to the level of study, were not yet being covered in the OU Level 1 business curriculum.

As far as possible (given that the MOOCs were non-formal learning) we applied the same kinds of quality controls to the production of the MOOCs as to any other Open University learning materials – for example a comprehensive Learning Design process, interim review of material by critical readers, technical testing and, immediately before publication, a formal review from FutureLearn in the context of their emerging quality criteria for online courses (Weber, 2017). Given its formal learning status, the assessment module underwent the standard quality assurance process for internal approvals, including having its business case accepted by a curriculum approval committee. Quality control procedures included enlisting a senior academic specialist from another university as external assessor to provide objective comment and guidance on the coherence and level of material. For example the content about reflection skills, critical to any claim to undergraduate credit, benefited from the external assessor's input because of his expertise in this area of learning.

In one respect we departed from the normal institutional pattern for a level one module in that we deliberately omitted an Associate Lecturer (AL) from the design on the ground of cost. This might appear counter-intuitive in a Level 1 module. A part-time faculty member, the AL is responsible for advising, tutoring, grading assignments and providing formative feedback to a group of students on a module. This allows teaching at scale while maintaining a personal experience for each student. However, because the assessment module was planned to run with minimal resources, ALs were not included in the mix. Instead we opted for lighter-touch student support from a Learning Advisor – an approach similar to that operated on some non-credit-bearing short courses offered by OUBS. The Learning Advisor role is conceived as responding to questions rather than actively tutoring as would be the case with an AL on a standard module. Instead of having responsibility for a defined group of students, the Learning Advisor works as a reactive resource across the entire module population.

The decision here was influenced by our conviction that learners who had managed to study MOOCs successfully would be highly self-regulating (Littlejohn, et al., 2016). Used to the peer interaction with other learners in FutureLearn MOOCs, they would be able to manage with less support than would normally be the case in an OU level 1 business module.

Controlled assessment for credit

One of the crucial roles an Associate Lecturer carries out, however, is identify verification for controlled assessments other than exams (where candidates have to produce identification documents for inspection by the invigilator). Based on their experience of interacting with a student over a series of written assignments, ALs are expected to be able to offer an authoritative opinion on the authorship of a piece of work from their prior knowledge of that student. In the absence of an Associate Lecturer, our method of identity verification for the purposes of controlled assessment relied on design choices – both in module activities and in the assessment itself. In order to build on learners' experience of FutureLearn MOOCs, with their pervasive discussion forums, we devised a number of forum activities as part of the assessment module (for example, for case study discussion tasks) and asked the candidates to relate their assessment submissions (e.g. brand analysis, a personal 'elevator pitch', a risk assessment, and so on) to their personal context. Over the course of the assessment a coherent impression of the student emerges, triangulated by their contributions to forum activities. In effect this provides a similar measure of reassurance on identity verification as the accepted AL system. In combination with these internal checks, the submitted assignments undergo automated plagiarism and collusion checks. In agreeing this design-based system of identity verification, we were conscious that even the requirement to produce identity documentation in person at an exam is capable of being defrauded by a sufficiently determined candidate. We remain confident that identity verification is working as planned within the Business and Finance Fundamentals program, but will evolve further as learning and assessment moves online more generally, and technology develops to support it.

Business ecosystem

A final consideration in our list concerning the challenge of credit is that its availability depends on a business ecosystem of organisations who are able to sustain themselves through innovation (Moore, 2003). In one sense making credit available is a commercial service, akin to many other expert services which cost money, require specialist expertise from suppliers and investment of effort and other expenditure by clients, are subject to (self)regulation, and keep substantial industries afloat. This observation may seem obvious, but the discourse of quality in Higher Education often seems to step around the topic of its own economics, in spite of the dominant neoliberal logic on the economic value of the qualifications produced (Peters, 2012). The co-evolving organisations which need to sustain themselves with respect to MOOCs for credit are, of course, the Open University which charges a fee for the assessment module, but also FutureLearn which takes a share of revenue on the upgrade fees necessary to gaining the Certificates of Achievement for registration on to the module.

The precise details of the financial arrangements here are beyond the scope of this paper. But viewed as a path to credit, where a learner enters a funnel at one end by signing up for a MOOC and exits at the other with 30 credits, the income flows are open to negotiation. One could interpret the value dynamics of the situation in different ways, each leading to a different distribution of the available income. For example, one might regard the MOOCs as the reason why learners become aware of the possibility of credit, leading them to progress to an OU module, and then on to a degree. In this scenario one might well feel that FutureLearn might be entitled to a finder's fee (in the same way that, say, an educational agent recruiting for a university might expect a commission).

On the other hand, if you take the view that the potential to earn credit was a strong incentive to attract learners to register for MOOCs in the first place, then the OU should have the lion's share of revenue, from its position as generating the basic value in the system. Even learners with no intention of gaining credit might be attracted to a MOOC that offered a route to credit, seeing it as preferable (perhaps more intellectually rigorous?) to a comparable MOOC that did not.

The assessment module was designed to be low cost, both in presentation (hence the Learning Advisor rather than Associate Lecturers) and in production (for example the extensive use of Open Educational Resources and existing assets such as OU study skill support resources). This economy of production was reflected in its pricing – at a considerable discount compared to other 30 credit undergraduate modules. Even with the cost of eight Certificates of Achievement rolled into a total price, there is still an attractive saving. This expresses the strategic intention that *MOOCs for credit* might act, at least to some extent, as a recruitment tool for students who would not otherwise consider the Open University. The opportunity to study MOOC by MOOC and gain the respective Certificates of Achievement over an extended period spreads the cost of study compared to the one-off payment required for a standard module. For some learners, the extended period of study (eight four-week stretches which are not necessarily continuous) might act as a disincentive. But for others, perhaps less confident in their ability to survive higher education, or less prepared to risk an upfront investment in study about which they are uncertain, the facility to learn gradually while amassing the potential for credit when the time comes, might well be an attractive addition to the options available for entering university. This currently underserved market represents an enormous opportunity in African and other low-income countries, where the strength of demand for higher education and the aspirations it supports is frustrated by lack of financial resources.

Marketing, administration and delivery

Its very flexibility complicates the marketing, administration and delivery of the *MOOCs for credit* model compared to what we might term standard offerings at the Open University. In common with any large organisation, the OU has developed ways of marketing and administration that are perfect for business as usual (that is, offering distance learning at scale to part time students) but which can prove incompatible with new developments. Much of this incompatibility derives from the familiar differences between formal and non-formal learning. For example, in order to prevent misunderstandings about precisely what students could expect by signing up for MOOCs with the promise of eventual credit, the marketing had to underline that the MOOCs themselves were not what conferred the credit. At the same time, FutureLearn were keen to stress the benefits of their Certificates of Achievement as credentials, irrespective of the credit that might be available further down the line. In the tightly regulated world of HE in the United Kingdom, even the use of the word 'Certificate' by a university creates expectations of what a learner can expect. Its use by an organisation that is closely associated with a University, and in some respects even in competition with it, creates potential confusion and conflict (however unintentional). The key to this conundrum lies in market segmentation. Given different sets of customers will be interested in different mixtures of benefits, the theoretical solution would be to ensure you apply the right messages to the right audiences. In practice, however, neither the OU nor FutureLearn's ability to target messages is capable of such subtle targeting. It is a complicated sell, particularly when presented in parallel with other messages about standard routes into higher education, or MOOC-based alternatives for learners who want non-credit bearing credentials.

Perhaps this complexity is reflected in the administrative challenges that have accompanied the recruitment and registration of each new cohort of learners on the assessment module. In spite of writing and rewriting the information available on the relevant webpages in an attempt to make it clearer, we have been unable to prevent large numbers of applicants registering for the module without having obtained the required Certificates of Achievement from MOOC study. The Open University's online registration system means that we cannot stop applicants from registering for modules other than through the information we provide, which includes regulations (such as the need for prerequisites) which will lead to their being deregistered later if necessary.

Taking the registration offline would force students to speak to a recruitment advisor to confirm their eligibility before payment was made. But it would tie up resources desperately needed elsewhere on standard modules in the busy recruitment and registration period. In any case, our default setting as an open learning institution is to avoid prerequisites where possible, so having eight specific Certificates of Achievement as an entry requirement to a module is counter-intuitive if you are used to the OU way of doing things. Combined with this cultural default setting, the discounted price of the module appears to speak louder than any marketing or information copy can. The unfortunate consequence of this is that each new presentation involves the deregistration of many students who have signed up in error, which is never a good experience. It wastes staff time and causes student resentment. On the other hand, there is a real sense that, for several of those students who have chosen this route into higher education and have the required Certificates of Achievement after protracted and gradual study on FutureLearn, *MOOCs for credit* has opened a door that would not have been there for them otherwise.

Conclusion and implications for practice

This case study of educational innovation is, like any case study, peculiar to its own circumstances. Educators interested in adopting MOOCs and OERs into their existing credit-bearing programmes for reasons of efficiency and economy are unlikely to be contemplating creating their own programs of MOOCs and assessment vehicles in order to do so. However, there are some generalisable points from this experience which I will conclude by offering as implications for practice , however tentatively.

First, at risk of repetition, the award of credit is part of an institutional arrangement necessarily oriented to protect and enlarge a system of formal learning. Bringing elements of non-formal learning into this system causes turbulence. It's important to see the tensions created as opportunities rather than problems. For example, creating and publishing a number of short courses in the FutureLearn environment in a short space of time provided relatively inexperienced colleagues with a much earlier opportunity to get serious production responsibility than would normally have been the case. Producing both the MOOCs and the assessment modules needed to be done at a pace not normally associated with traditional modules, leading to the development of ways of working which have fed into practice more generally. The analogy here for an organisation seeking use existing MOOCs and OERs as components of more traditional qualifications, rather than create new ones, is that such a process creates new opportunities to evaluate, curate and adapt material in a creative and developmental way. One of the exciting things about MOOCs and many other OERs is their fresh take on pedagogy. You cannot incorporate the material without incorporating at least some of the pedagogy it implies. For example the use of short instructional videos from YouTube such as those published by Marginal Revolution University (MRU, n.d.) implies

a lively, experiential approach to topics in economics which needs to be reflected in other aspects of a learning experience in which it is incorporated.

Just as this creative tension can work to the benefit of educators, so it can help learners to become more independent. Feedback from OU students who have had experience of *MOOCs for credit* as well as more traditional modules indicates strong approval for the visual, interactive style of FutureLearn's material compared with the relatively text-oriented style of modules mixing online with printed material. MOOCs and OERs which have been born digital, so to speak, help students adapt to online learning in a way which can prompt reflection on their personal preferences and goals. This has the potential to make them more discerning and reflective as they continue their learning journey.

As we have discussed at some length in the article, considerations of level (learning outcomes) and extent (learning hours) are inextricable from credit value. Thus, part of the challenge of incorporating MOOCs and other OERs into credit-bearing programmes of study is to judge the level of material and the amount of time – both module-directed and student-directed – that its effective use is likely to require of learners. In one sense the level of material is less important than what you require learners to do with it. For example knowledge and understanding of the same model or concept can be taught at either undergraduate or postgraduate level. While concepts can be of varying levels of complexity, what really differentiates between levels is intended student response (for example the amount of criticality or synthesis required in activities and assessments, or the independence with which they are expected to find and process the required knowledge). Some MOOCs and OERs will lend themselves more easily to advanced study than others, but integrating such resources into learning and assessment for credit at the appropriate level is a demanding process which benefits from careful internal and external scrutiny. Furthermore, it is essential to build in enough time for such activities, and to sequence them in a way which facilitates the achievement of learning outcomes of the desired sophistication. OERs cannot just be grafted on to an existing module or qualification – they need thorough and considered integration.

Finally, with regard to the business ecosystem within which credit becomes available, the incorporation of MOOCs and OERs into more traditional programmes is likely to create questions of how to manage value flows within the system. Most resources are available through licences such as Creative Commons, making them free of financial charge but, depending on the precise terms of the licence, carrying other obligations on users of type of use (e.g. non-commercial), attribution or non-adaptation (Creative Commons, n.d.). Other resources, for example some MOOCs, may require licences to be negotiated which include payment of some sort. In such circumstances time and sometimes money needs to be factored into the process. Wider stakeholder needs also demand satisfaction in such ecosystems. Regulatory authorities may be reluctant to recognise departures from traditional, classroom-based methods. This does not, of course, proscribe web-based resources, but makes it necessary to think about how their use relates to face to face activities (if the latter are seen by the relevant authorities as necessary to the approval of qualifications or the right to confer them). To make the most of the developing potential of MOOCs and OERs in formal education, careful negotiation with such authorities may be necessary, whether in Ministries of Higher Education, or in industry lead bodies who influence professional qualifications.

One thing is certain, however. As MOOCs and OERs (such as instructional videos on YouTube) become a taken-for-granted part of learners' personal learning environments, their use by formal education providers in credit-bearing qualifications is destined to become part of their students' expectations. Universities in general need to be more eclectic in their discovery and use of such material, and flexible enough to embrace the changes that such use inevitably brings.

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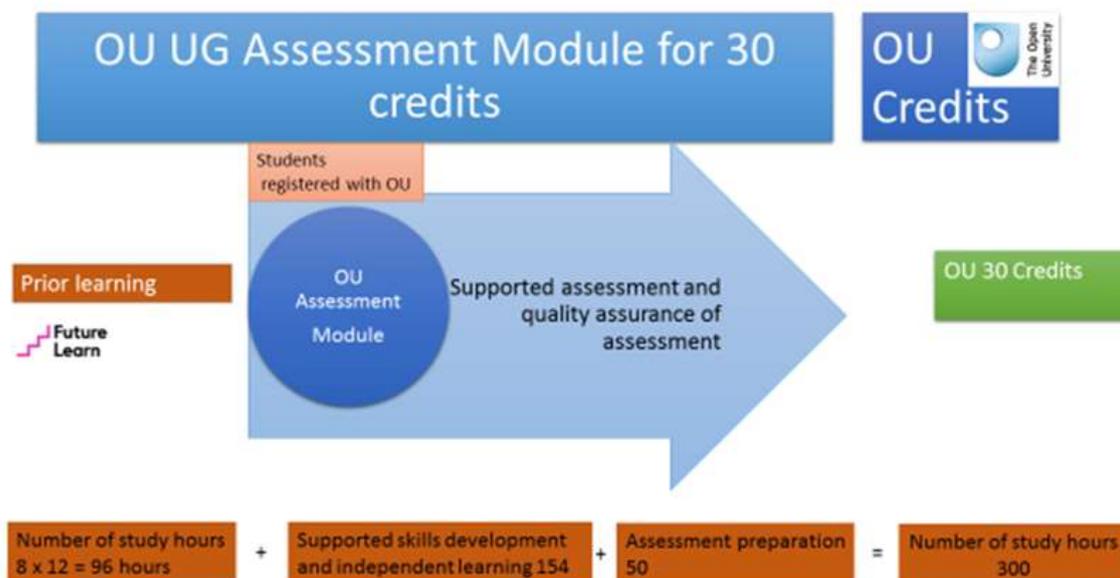
Figure 1

Figure 1: OU Undergraduate Assessment module for 30 credits