EDITORIAL

Developing a Strategic Approach to MOOCs

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During the last eight years, interest in massive open online courses (MOOCs) has grown fast and continuously worldwide. Universities that had never engaged with open or online learning have begun to run courses in these new environments. Millions of learners have joined these courses, many of them new to learning at this level. Amid all this learning and teaching activity, researchers have been busy investigating different aspects of this new phenomenon. In this contribution we look at one substantial body of work, publications on MOOCs that were produced at the 29 UK universities connected to the FutureLearn MOOC platform. Bringing these papers together, and considering them as a body of related work, reveals a set of nine priority areas for MOOC research and development. We suggest that these priority areas could be used to develop a strategic approach to learning at scale. We also show how the papers in this special issue align with these priority areas, forming a basis for future work.

Introduction

The first massive open online course (MOOC) was developed in 2008 (Cormier, 2008). 'Connectivism and Connectivism Knowledge (CCK08)' was a course about connectivism that aimed to put into practice the principles of that learning theory. Connectivism holds that learning and knowledge rest in diversity of opinions, that learning involves connecting information sources, and that the ability to make connections is a core skill (Siemens, 2005). This was not the first open course, the first online course or even the first massive course – but it was the first to bring these elements together in a way designed to support learning (Downes, 2008). In doing so, it linked around 1,800 learners worldwide.

Early connectivist MOOCs (cMOOCs) were later joined by MOOCs constructed on different principles, which extended classroom learning (xMOOCs). The numbers of people who signed up for these, and the consequent rapid proliferation of courses and platforms prompted the New York Times to declare 2012 'The Year of the MOOC' (Pappano, 2012). It was already clear at that point that institutions would develop very different strategies around MOOCs. The original focus on pedagogy had been overshadowed by a focus on learner numbers.

Nevertheless, the aims associated with each approach appeared similar. The original MOOCs had been designed to increase participation in lifelong learning (McAuley, Stewart, Siemens, & Cormier, 2010). The Coursera MOOC platform stated that its mission was 'to empower people with education that will improve their lives, the lives of their families, and the communities they live in', and the founder of the Udacity platform stated that he was 'against the imbalance that the present system brings to the world. I want to empower the 99 per cent' (Leckhart & Cheshire, 2012).

These ambitions were not confined to North America. European MOOC platforms include FutureLearn, iversity and the European Multiple MOOC aggregator. Miríada X produces courses in Spanish and Portuguese, uniting universities across Spain, Portugal and South America. The Malaysian government aims to make 30% of its higher education courses available as MOOCs by 2020 (Dodd, 2016), the Indian government is targeting millions of learners with MOOCs on the Swayam platform, and in China the government intends to use MOOCs to train 13 million teachers in education technology (Wang, 2015).

However, while the platforms and courses have proliferated, research has shown that the ambition of extending access is not yet being realised. Despite the potential for learning at scale to widen access by making education more affordable and more accessible, participants in MOOCs tend to be individuals with prior experience of higher education (Cannell & Macintyre, 2014). While this extends access for experienced learners, it does not widen participation for those who are currently distanced from education (Lane, 2013). A survey of Coursera students in 2013 showed that in many countries 'almost 80%

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of MOOC students come from the wealthiest and most well-educated 6% of the population' (Emanuel, 2013).

In addition, the completion rate for MOOCs is low – a study in 2015 found that the median completion rate was just 12.6% (Jordan, 2015). To some extent, this figure can be explained by the aims of the people who register. They may be bookmarking an interesting resource, trying out learning online, finding out more about a particular university or simply investigating what learning at scale involves. For some, their learning objectives can be met without completing the course. However, although these arguments go some way towards explaining the drop-out rate, they do not explain it completely. Most 'students seek not merely access, but access to success' (Daniel, 2012), but it seems that many currently encounter only failure when they learn at scale.

Very few universities have a commitment to widening access as part of their mission statement, so it may be that this is not actually their strategic aim when they produce MOOCs. These courses offer advantages for learners, for educators and for society. They give learners access to support from a wide range of other learners as well as to the resources that those learners provide in the form of discussion and different cultural perspectives. Educators often report that MOOCs are both exciting and challenging, and help to develop their teaching practice. MOOCs benefit society by helping to develop tools and resources for use in other contexts, by supporting the development of professional practice and, potentially, by their global impact (Sharples & Ferguson, 2014).

Many MOOCs have a social mission that can align with the aims of countries or international groupings such as the European Union. Courses including 'Innovation and Enterprise' by Loughborough University and 'Turning Ideas into Action' by Middlesex University Business School target the development of entrepreneurs. 'Introduction to Dutch' from the University of Groningen and 'Understanding IELTS' from the British Council are examples of the many free courses that can benefit migrants who need to increase their language skills. 'Numeracy Skills for Employability and the Workplace' and 'English for the Workplace' support people to acquire the skills they need in the workplace. The University of Edinburgh's Brexit MOOC, 'Why the European Union' from Pompeu Fabra, the University of Basel's course 'Switzerland in Europe: Money, Migration and Other Difficult Matters' and Groningen's 'European Culture and Politics' are just a few examples of large-scale courses with the potential to empower citizens to consider their options and make informed decisions about major political issues.

MOOCs have the potential to benefit learners, educators, and researchers through the crowdsourcing of data, for example from learner stories, different groupings in society, or society as a whole. Much of the necessary infrastructure is already in place. The number of massive open online courses on offer around the world has risen fast, from just three in 2010–11 to 4,550 in January 2016 (Online Course Report, 2016). At the same time, the main MOOC platforms have reported large increases in registered learners. The Class Central MOOC aggregator

reported that more than 35 million learners registered for at least one course in 2015 (Shah, 2015). However, in order to put an effective MOOC strategy in place, it is necessary to look beyond the hype around registration numbers. Now that we have trialled MOOCs around the world, how can they be used most effectively, and what needs to happen in order for that to take place?

In order to begin to answer that question, this paper examines a large body of MOOC research from different disciplines, and identifies priority areas for development.

Bringing together MOOC research

The widespread interest in MOOCs, their impact on universities, and the availability of large-scale datasets related to MOOC activity have inspired a great deal of research about MOOCs and learning at scale more generally. Much of this research has been carried out at institutions with little or no previous experience of open education, online education or learning at scale. As a result, some of the published work can appear naïve, and some lacks awareness of the substantial bodies of work that already exist in these fields. On the other hand, many researchers have used MOOC research as a way to extend their previous work, to trial methods and to test ideas developed in other contexts.

Some of the well-established MOOC platforms – particularly Coursera, EdX and FutureLearn – have been the focus for research at many universities that run MOOCs on those platforms. This work is shared at conferences and at more focused events. Working together in research networks around platforms means that it is possible to collaborate on related subjects using comparable data. Access to these datasets also opens up the possibility of carrying out randomised control trials or A/B testing across institutions on a scale that was not possible in the past. Bringing together work from different institutions that is related to the same platform makes it possible to compare perspectives and to identify the broad concerns of researchers and of those who make that research possible.

Here, we consider the research work on MOOCs that has been published by UK university partners of the FutureLearn MOOC platform.

The platform currently has 106 partners in total, including 38 specialist organisations (such as the European Space Agency), five centres of excellence (such as the Hans Christian Andersen Centre in Denmark) and 63 universities around the world. The FutureLearn Academic Network (FLAN) provides a research network that brings together these partners.

FLAN[1] is a network of world-leading universities engaged in research into design, analysis and evaluation of massive open online learning. Activities include analysis of learning to inform design of courses, design of innovative approaches to massive-scale learning, and evaluation of learning effectiveness. The network meets regularly at different universities, with live-streamed events, and an annual conference day for postgraduate students held at The Open University (OU) in the UK each spring.

Ferguson et al. (forthcoming) took the publications of the 29 UK partner universities as a sample. As the

original FutureLearn partners were UK based, they have already published a substantial body of work in this area. FutureLearn is the major MOOC platform in the UK, so most universities in the country that have engaged significantly with MOOC research are part of the FLAN network. FutureLearn draws on the expertise of its founding partner, The Open University, in the fields of open distance and massive education, as well as in fields such as online accessibility and computer-based assessment, and a focus on UK-based FLAN publications encompasses significant work in these areas. In addition, some of the UK partners – particularly the University of Reading and The Open University – have connections with MOOCs that stretch back to the original, CCK08 MOOC.

Data collection involved a search of each of the university repositories, looking for items that included 'MOOC' in their title or abstract. Some repositories provided a more general search option and, again, the search term was 'MOOC'. Due to the scale of this work, it was carried out in two stages. The Open University repository was searched in February 2016 and this search identified 66 publications. The repositories of other UK universities were searched in September 2016, and this search identified 243 publications.

Limitations of this approach are that the search will have missed research not lodged in institutional repositories and work not located by use of the search term 'MOOC' within those repositories. Papers from universities with a strong institutional policy on repository use, and an effective repository search system were therefore more likely to be included than others.

The criteria for inclusion in these repositories vary and occasionally the work stored within them is of uneven quality. In general, though, they contain peer-reviewed research published by university staff, together with other high-quality research outputs from the university that meet the Frascati[2] definition of research.

Some of the research located in this way was set aside. This was because (a) the search had returned words similar to MOOC, such as 'moon', (b) the MOOC combination of letters was not used to refer to massive open online courses, (c) the work simply made passing reference to MOOCs, or (d) the research named in the repository was not accessible and no detailed abstract was available. Once the filtering process was complete, we had a set of 173 publications from 20 universities, involving 241 different authors.

These publications were divided among members of the research team at The Open University (see Acknowledgements below). Team members read the papers (or abstracts where full papers were not accessible) and produced a short summary of each paper, together with a summary of any generalisable recommendations included in the paper. These summaries and recommendations were grouped by subject matter in two reports (Ferguson, Coughlan, & Herodotou, 2016; Ferguson, Coughlan, Herodotou, & Scanlon, forthcoming). This grouping led to the identification of nine priority areas for development.

1. Develop a strategic approach to MOOCs.
2. Expand the benefits of teaching and learning in MOOCs.
3. Offer well-designed assessment and accreditation.
4. Widen participation and extend access.
5. Develop and make effective use of appropriate pedagogies.
6. Support the development of educators.
7. Make effective use of learning design.
8. Develop methods of quality assurance.
9. Address issues related to privacy and ethics.

The sections below outline ways that work could be developed in all these areas, making links to research publications that raise these issues.

Develop a strategic approach to MOOCs

Overall, there is a need for a strategic approach that covers the role of MOOCs both now and in the future. Taking a long-term view, MOOC strategy should influence the development of lasting collaborations and the enablement of impact (White, Davis, Dickens, León Urrutia, & Sánchez-Vera, 2015). More broadly, MOOCs can be linked with sector, national and international institutions engaged in other types of open education initiative (Souto-Otero et al., 2016). We are starting to see forward thinking institutions restructuring their entire course portfolio around openness, flexibility and other key MOOC affordances. The University of New South Wales is a current example[3]. Developing links with these other forms of open learning could also help learners to widen their options. For example, some learners continue to study MOOCs after their end date and might therefore be better served by an open-ended course than by a MOOC (Onah, Sinclair, & Boyatt, 2014).

From the perspective of universities, it is important to keep in mind how MOOCs can be used to enhance the reputation of academics, academic departments and the university as a whole (White et al., 2015). MOOCs can also be used as a way of building learner communities that maintain engagement with the university over time, reducing the gap between students and alumni, and enabling people who have studied together to continue their conversations (Ferguson, Sharples, & Beale, 2015). MOOCs can be used to engage with the public on cutting edge research projects.

Expand the benefits of teaching and learning in MOOCs

From a learner perspective, MOOCs need to provide a clear introduction for learners new to the subject as well as support for continuing learners who may be working in a related area (Stokes, Towers, Jinks, & Symington, 2015).

Within most MOOCs, a significant percentage of learners have never experienced online learning or learning at this level before. It is therefore important to make explicit how to use particular resources, such as videos, or how to structure a debate among peers (Wintrup, Wakefield, Morris, & Davis, 2015). Approximate guidance on how long more complex activities require, if deeper learning

and integration are to take place, can help guide decisions about which activities to engage in and for how long.

Learners are also looking for information about what is expected of them, whether their learning develops incrementally or offers discrete blocks of learning, and how their MOOC is structured. Making this information easily visible, but not dominant, facilitates the learning experience and helps to manage learners' expectations. Educators can enable learners to be more strategic and to make informed choices about how to spend time and invest energy by making it clear how social learning and interactivity contribute to engaged learning, and which independent learning activities are most important if a learner does not have time to complete the entire MOOC (Wintrup, Wakefield, Morris, & Davis, 2015).

In addition to providing people with the skills that enable them to learn in MOOCs, a bigger issue is the value that they gain from that learning. In a time when degrees are often presented in terms of careers and financial return for the individual, MOOCs can offer access to other benefits of learning, such as health, social relationships and participation (Lane, 2013; Lane, Caird, & Weller, 2014).

Offer well-designed assessment and accreditation

Within MOOCs, an important way of providing feedback and assessment opportunities is through the use of peer feedback. Agreed good practice and guidelines for peer review would help to make this more effective (O'Toole, 2013). For example, when designing peer review, there could be options for differentiated support or peer groups for students with different ability levels, and opportunities to improve peer review skills (Meek, Blakemore, & Marks, 2016).

Assessment may lead to accreditation, and badging provides a soft route to doing this. Including badges as part of a MOOC design offers opportunities to reflect upon the assumptions that underpin the pedagogic approach and to reflect on the intended learning outcomes. When aligning badges with learning outcomes, it is important to ensure that the learning remains meaningful. If badges are used, their value needs to be clearly explained and the badge schema should be given a prominent place within the MOOC so that it is accessible to learners at all times and encourages badge collection. Badge award messages need to be pushed out as soon as badges have been awarded, in order to establish a clear link between the award and the associated task. In order to increase and reward engagement, some badges should be available at the start of tasks, to acknowledge engagement up to that point (Hauck & MacKinnon, 2016).

In addition to soft accreditation, universities should explore the options for validation, making it possible for learners to work towards full qualifications (Devaux & Souto-Otero, 2016). MOOCs offering accreditation need to take into account the needs of learners and should consider how accreditation impacts on pedagogy (Alston & Brabon, 2014). Stakeholders, and particularly learners, need to be aware of the options for validation and accreditation, and should be able to relate this information to the reasons why recognition is sought (Alston & Brabon, 2014).

Pathways that include both formal and informal learning are important (Ferguson et al., 2015). This could be achieved by improving measures to link learning gained through MOOCs and other open educational resources with generic systems for non-formal and informal learning and increasing support for credit transfer options (Witthaus et al., 2016).

Widen participation and extend access

MOOCs need to reach different sections of the population if the objective of widening access to study in higher education is to be achieved (Wintrup, Wakefield, & Davis, 2015). At a basic level, marketers and those communicating key messages about MOOCs need to consider in greater depth how to attract a more diverse cohort. However, if MOOCs are to provide a route to the full range of higher-level learning, accreditation of learning in ways aligned with university entry requirements will be necessary (Wintrup, Wakefield, & Davis, 2015).

It is important to ensure that no elements of learning design or platform design unnecessarily exclude people on the grounds of disability, age or location. Institutions and educators need to engage actively with the challenges that exclude learners due to disability and disadvantage (Sharples & Ferguson, 2014). Every MOOC platform should be compliant with accessibility standards, and should take into account the possible accessibility needs of both educators and learners (Iniesto & Rodrigo, 2015; Rodrigo & Iniesto, 2015).

However, openness is not simply a matter of barriers to access related to technological aspects, but is inherently cultural, social and situational. Widening participation will require a shift in emphasis, a shift that accounts for peoples, places and the practices of open education (Cannell & Macintyre, 2014).

Develop and make effective use of appropriate pedagogies

Massive numbers on a course can provide a negative experience for participants, so it is crucial to decide what is educationally valuable about learning at scale and then work with the massive rather than against it (Knox, 2014). If the development of more social forms of learning is a goal, then MOOC development teams could usefully consider how the diversity, commitment and focused interests of MOOC learners can best be harnessed and used to promote the formation of networks and communities (Knox, 2014). Teams could also consider possibilities for the creation of more effective opportunities for self-directed and open-ended learning. This should take into account how innovative approaches to learning and teaching can be surfaced and rewarded within the university in order to encourage others to experiment (Celina, Kharuffa, Preston, Comber, & Olivier, 2016).

Discussion is an important part of the learning process within many MOOCs (for example, the FutureLearn platform was designed to support conversational learning). Platform design cannot be the only support for discussion; it must also be incorporated within the learning design of MOOCs and in the approach of educators.

Research in other fields shows that early socialisation experiences have a long-term impact on newcomers' satisfaction, performance, and intention to stay in a group (Nazir, Davis, & Harris, 2015). One way to address this would be to pair new arrivals with more experienced MOOC learners, who can help them to understand the way the MOOC operates. As first-time posters who receive a response in an online community are more likely to post again, one option would be to raise the priority given to responding to a learner's first post. Subgroups within discussion areas can be used to organise learners and help them identify and comment on content they are interested in. Other approaches that support discussion are to highlight content that contributes to learning by commenting on it, or asking learners to link to videos and photographs and then comment on these to initiate interactions. MOOC learners are often nomadic and will move between communities, forming sub-communities within those platforms, and hashtags can be used to bring those groups together (Bozkurt et al., 2016).

More broadly, the pedagogy of MOOCs needs to pay attention to interaction between students, tutors and material; provide structured tasks to guide learners; offer motivating videos and broadcasts; ensure that teaching material is carefully crafted (McAndrew & Scanlon, 2013). MOOCs also have a role in adding value to classroom-based students when run alongside more traditional courses. This can be in terms of sharing relevant resources, building networks in their field of interest beyond the institution, or access to a diverse range of participants for mutual feedback and support (Harris & Molesworth, 2016).

Support the development of educators
Producing and presenting a MOOC involves teamwork across departments. For example, close collaboration is required between academic teams, producers and academic librarians on issues such as copyright and licensing of resources for MOOCs, support for MOOC design, access to resources and support for digital literacies for educators and learners on MOOCs (Wintrup, Wakefield, Morris, & Davis, 2015).

Educators are often willing to put in extra hours on new MOOCs, with many working to promote a sense of tutor presence and to engage with discussion (Murray, 2014; Teplechuk, 2013). However, as these MOOCs become business as usual, it is important to reconsider how time and resources are allocated to their production and presentation. For example, some students have proved willing to pay for additional tutor support, and this could be an option worth exploring (Onah et al., 2014).

In the future, more research will be necessary in order to gain a deeper understanding of the educational role of MOOC peer communities and their interactivity if MOOC teams are to make informed decisions about how best to invest time in supporting learners (Wintrup, Wakefield, & Davis, 2015). MOOC observatories and dashboards developed by the University of Southampton have the potential to make MOOC data easily accessible to a wide range of educators, supporting them to make informed decisions (León Urrutia, Cobos, Dickens, White, & Davis, 2016; León Urrutia, Wilde, White, Earl, & Harris, 2016).

Make effective use of learning design
Learning design provides a way to set out and describe the intent of learning material, making use of the many possibilities for MOOC design that have already been explored, so that it is possible to make judgments about what works and to make interventions with the help of learning analytics (Scanlon, McAndrew, & O'Shea, 2015; Wilde, 2016).

Design patterns provide a way of showcasing successful learning activities and design innovations, sharing them across faculties and institutions (O'Toole, 2013). Such patterns, and any MOOC learning design, need to take into account MOOC participants' perspectives on what they aim to achieve by joining a MOOC (Liyanagunawardena, Parslow, & Williams, 2014). Although it is important to concentrate on a target learner group, alternative pathways can provide options for other learners (Liyanagunawardena, Lundqvist, & Williams, 2015).

Providing guidance about ways to apply new knowledge to 'real world' problems could be helpful in deepening and sustaining understanding and promoting creativity. Including and eliciting learners' own ideas and projects would also be a way of developing greater involvement (Wintrup, Wakefield, & Davis, 2015). Collaboration is important, and MOOC providers need to consider in more detail how best to support collaboration (Celina et al., 2016; Hammond, 2016).

As dropout is a concern with MOOCs, it is important to identify measures that can be put in place to reveal what aspects of a course engage learners, and how particular activities engage different types of learners (Wintrup, Wakefield, & Davis, 2015). Distractions that do not support design objectives can be minimized by organising resources, enabling creative expression in tasks, automating mundane tasks, supporting scale and sustainability, and focusing on learning (Celina et al., 2016).

Develop methods of quality assurance
As yet, the published work on MOOC quality assurance is limited. However, quality assurance seems likely to be an increasingly important area, particularly given the growing interest in MOOC accreditation. Some basic guidelines identified so far in the literature are to set quality levels, work in teams, test before your learners do, allow feedback after release and pay attention to external quality assurance frameworks (Rosewell, 2015; Rosewell & Jansen, 2014). It is possible of course for changes to be made while the MOOC is live, for example if it is clear that learners are struggling with a topic, further resources or simplified explanations can be added in real time. This contrasts with face to face classes where the educator may well not know for sure how well students have absorbed the material until after the end of course assessment.

Address issues related to privacy and ethics
MOOC activity has captured standardised datasets about teaching and learning that are of great interest to researchers and developers. However, accessing and sharing these datasets raises ethical and privacy issues (Álvarez, 2014; Ashman et al., 2014; Yousef & Sunar, 2015). MOOC providers and higher education institutions need to work toward an

approach that engages and more fully informs learners about the positive and negative implications of allowing access to their personal data (Prinsloo & Slade, 2015). The way forward will require a coherent approach to consent, which accounts for the social science discoveries about how people make decisions about personal data and the development of more substantive privacy rules (Slade & Prinsloo, 2013).

Moving forward

This special issue identifies ways of moving forward with some of the themes identified above. These include themes related to the development of a strategic approach to MOOCs, extending access and developing educators.

We include a paper by Hodge describing the University of Warwick's FutureLearn MOOC *Literature and Mental Health: Reading for Wellbeing*. This course was seen as an opportunity to conduct some research into the course subject area, and was influenced by other research studies conducted within MOOCs. In particular she cites the influence of the first presentation of Monash University's *Mindfulness for Wellbeing and Peak Performance* FutureLearn MOOC, which distributed a stress survey to its learners to assess whether the course's mindfulness practices were effective.

We also have included here a paper by Iniesto and colleagues from The Open University on the accessibility of MOOCs. This work is aimed at understanding the provider perspective. Starting with the view that MOOCs have become an accepted way to make learning opportunities more available, this paper argues that only if accessibility is considered would widening participation be achieved, allowing flexibility of learning and benefits to all to be offered irrespective of disability. The approach here is to draw on experience in providing accessible online learning at distance universities. Applying these lessons to MOOCs requires an understanding of the various viewpoints and roles of stakeholders and how these impact on accessibility.

We have also included a paper by White and White from the University of Southampton on 'Learning Designers in the "Third Space": The Socio-Technical Construction of MOOCs and Their Relationship to Educator and Learning Designer Roles in HE' which looks at the relationship between social change and the construction of MOOCs within higher education. It uses an institutional case study to provide evidence of the extent to which MOOCs are socially constructed in a particular context, and the social implications of MOOCs for educators and learning designer roles. Their preliminary findings indicate that learning-designers occupy a hub-like position in the networks of actors involved in MOOC development within an emergent 'third space' between academics and managers. The analysis also reveals how certain seemingly peripheral actors exert a strong influence of on course production processes and content. This work contributes to the understanding of changing roles in higher education.

A paper by León Urrutia on 'Professional Development through MOOCs in Higher Education Institutions: Challenges and Opportunities for PhD students Working as Mentors' sheds some light on the challenges and opportunities presented when a university employs postgraduate students as MOOC mentors. PhD students in a number of disciplines were involved in focus group interviews conducted in an English university. These students described their experiences as mentors. In particular they developed teaching and digital skills, and had to cope with challenges in relation to their digital identity.

These papers specifically deal with three of the issues raised in our previous reviews described above:

Develop a strategic approach to MOOCs. Hodge's paper outlines how the development of one particular course was able to contribute to the conduct of research.

Widen participation and extend access. Iniesto et al.'s paper gives an opportunity to consider how accessibility issues could be considered by a provider's perspective.

Support the development of educators. In an institutional case study White et al. describe how different actors in higher education can operate in this new MOOC space, while Leon Urrutia describes the challenges and opportunities afforded to PhD students as MOOC mentors.

Moving forwards it is our intention as the FutureLearn Academic Network develops to use these nine themes as a framework with which to classify our individual and collaborative attempts to throw light on the new spaces for research created by our common interests in making MOOCs successful and from this research to derive specific recommendations for future MOOC developments.

Notes

[1] http://www.flnetwork.org/
[2] http://oro.open.ac.uk/help/helpfaq.html#What_is_the_Frascati_definition
[3] https://www.2025.unsw.edu.au/sites/default/files/uploads/unsw_2025strategy_201015.pdf

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Competing Interests

The three authors of this paper are members of the FutureLearn Academic Network (FLAN).

References

Alston, P and **Brabon, B** 2014 *'A hostage to fortune?' – validating massive open online courses (MOOCs) for university credit.* Paper presented at the European MOOC Stakeholder Summit: EMOOCs 2014 (10–12 Feb), Lausanne, Switzerland.

Álvarez, I 2014 Ethical and aesthetic considerations in language MOOCs. In Martín-Monje, E & Bárcena, E (Eds.), *Language MOOCs: Providing learning, transcending boundaries* (pp. 127–142). Warsaw: De Gruyter. DOI: http://dx.doi.org/10.2478/9783110420067.8

Ashman, H, Brailsford, T, Cristea, A I, Sheng, Q Z, Stewart, C, Toms, E G and **Wade, V** 2014 The

ethical and social implications of personalization technologies for e-learning. *Information & Management, 51*(6), 819–832. DOI: http://dx.doi.org/10.1016/j.im.2014.04.003

Bozkurt, A, Honeychurch, S, Caines, A, Bali, M, Koutropoulos, A and **Cormier, D** 2016 Community tracking in a cMOOC and nomadic learner behavior identification on a connectivist rhizomatic learning network. *Turkish Online Journal of Distance Education, 17*(4), 1. DOI: http://dx.doi.org/10.17718/tojde.09231

Cannell, P and **Macintyre, R** 2014 *Towards open educational practice.* Paper presented at the EADTU Annual Conference: New Technologies and the Future of Teaching and Learning (23–24 October), Krakow, Poland.

Celina, H, Kharuffa, A, Preston, A, Comber, R and **Olivier, P** 2016 *SOLE meets MOOC: designing infrastructure for online self-organised learning with a social mission.* Paper presented at the Designing Interactive Systems: DIS 2016 (4–8 June), Brisbane, Australia.

Cormier, D 2008 The CCK08 MOOC – Connectivism course, 1/4 way. (2 October). Retrieved from http://davecormier.com/edblog/2008/10/02/the-cck08-mooc-connectivism-course-14-way/.

Daniel, J 2012 Making sense of MOOCs: musings in a maze of myth, paradox and possibility. *Journal of Interactive Media in Education, 18.* http://www-jime.open.ac.uk/jime/article/view/2012–18, DOI: http://dx.doi.org/10.5334/2012-18

Devaux, A and **Souto-Otero, M** 2016 *Validation and open educational resources (OER). Thematic report for the 2016 update of the European inventory on validation.* Luxembourg: Publications Office of the European Union.

Dodd, T 2016 Australian start-up OpenLearning underpins Malaysian universities' push into online learning (2 October 2016). *Financial Review.*

Downes, S 2008 Places to go: connectivism and connective knowledge. *Innovate: Journal of Online Education, 5*(1), Article 6.

Emanuel, E J 2013 Online education: MOOCs taken by educated few. *Nature, 503*(342). DOI: http://dx.doi.org/10.1038/503342a

Ferguson, R, Coughlan, T and **Herodotou, C** 2016 MOOCs: what The Open University research tells us. *Quality Enhancement Reports.* Milton Keynes: The Open University. http://oro.open.ac.uk/46970/.

Ferguson, R, Coughlan, T, Herodotou, C and **Scanlon, E.** (forthcoming). MOOCs: What the Research of FutureLearn's UK Partners Tells Us. *Quality Enhancement Reports.* Milton Keynes: The Open University.

Ferguson, R, Sharples, M and **Beale, R** 2015 MOOCs 2030: A Future for Massive Online Learning. In Bonk, C J, Lee, M M, Reeves, T C & Reynolds, T H (Eds.), *MOOCs and Open Education Around the World*: Routledge.

Hammond, M 2016 Online collaboration and cooperation: the recurring importance of evidence, rationale and viability. *Education and Information Technologies,* 1–20. DOI: http://dx.doi.org/10.1007/s10639-016-9469-x

Harris, L and **Molesworth, M** 2016 *Engaging students and MOOC learners through social media.* Paper presented at Social Media for Learning in Higher Education (18 Dec), Sheffield, UK.

Hauck, M and **MacKinnon, T** 2016 A new approach to assessing online intercultural exchanges: soft certification of participant engagement. In O'Dowd, R & Lewis, T (Eds.), *Online Intercultural Exchange: Policy, Pedagogy, Practice* (pp. 209–234). Abingdon, UK: Routledge.

Iniesto, F and **Rodrigo, C** 2015 *Accessible user profile modeling for academic services based on MOOCs.* Paper presented at the XVI International Conference on Human Computer Interaction (INTERACCIÓN 2015), 7–9 September, Vilanova i la Geltrú, Spain. DOI: http://dx.doi.org/10.1145/2829875.2829922

Jordan, K 2015 Massive open online course completion rates revisited: assessment, length and attrition. *International Review of Research in Open and Distributed Learning, 16*(3), 341–358. DOI: http://dx.doi.org/10.19173/irrodl.v16i3.2112

Knox, J 2014 Digital culture clash: 'massive' education in the E-learning and Digital Cultures MOOC. *Distance Education, 35*(2), 164–177. DOI: http://dx.doi.org/10.1080/01587919.2014.917704

Lane, A 2013 *The potential of MOOCs to widen access to, and success in, higher education study.* Paper presented at the The Open and Flexible Higher Education Conference (23–25 October), EADTU, Paris.

Lane, A, Caird, S and **Weller, M** 2014 The potential social, economic and environmental benefits of MOOCs: operational and historical comparisons with a massive 'closed online' course. *Open Praxis International Journal, 6*(2), 115–123. DOI: http://dx.doi.org/10.5944/openpraxis.6.2.113

Leckhart, S and **Cheshire, T** 2012 University just got flipped: how online video is opening up knowledge to the world (May 2012). *Wired, 5: May 2012.* http://www.wired.co.uk/magazine/archive/2012/05/features/university-just-got-flipped?page=all.

León Urrutia, M, Cobos, R, Dickens, K, White, S and **Davis, H C** 2016 *Visualising the MOOC experience: a dynamic MOOC dashboard built through institutional collaboration.* Paper presented at MOOCs 2016 (22–24 February), Graz, Austria.

León Urrutia, M, Wilde, A, White, S, Earl, G and **Harris, L** 2016 *Cross-institutional MOOC data analysis and visualisation: A call for collaboration.* Paper presented at the FutureLearn Academic Network (7 June), Glasgow, UK.

Liyanagunawardena, T R, Lundqvist, K and **Williams, S A** 2015 Who are with us: MOOC learners on a FutureLearn course. *British Journal of Educational Technology, 46*(3), 557–569. DOI: http://dx.doi.org/10.1111/bjet.12261

Liyanagunawardena, T R, Parslow, P and **Williams, S A** 2014 *Dropout: MOOC participants' perspective.* Paper presented at the European MOOCs Stakeholders Summit: EMOOCs 2014 (10–12 Feb), Lausanne, Switzerland.

McAndrew, P and **Scanlon, E** 2013 Open learning at a distance: lessons for struggling MOOCs. *Science, 342*, 1450–1451. DOI: http://dx.doi.org/10.1126/science.1239686

McAuley, A, Stewart, B, Siemens, G and **Cormier, D** 2010 The MOOC model for digital practice. http://davecormier.com/edblog/wp-content/uploads/MOOC_Final.pdf.

Meek, S E M, Blakemore, L and **Marks, L** 2016 Is peer review an appropriate form of assessment in a MOOC? Student participation and performance in formative peer review. *Assessment and Evaluation in Higher Education (early view)*. DOI: http://dx.doi.org/10.1080/02602938.2016.1221052

Murray, J-A 2014 Participants' perceptions of a MOOC. *Insights: The UKSG Journal, 27*(2), 154–159.

Nazir, U, Davis, H C and **Harris, L** 2015 First day stands out as most popular among MOOC leavers. *International Journal of e-Education, e-Business, e-Management and e-Learning, 5*(3), 173.

Onah, D F O, Sinclair, J E and **Boyatt, R** 2014 *Dropout rates of massive open online courses: behavioural patterns.* Paper presented at the EDULEARN14 (7–9 July), Barcelona, Spain.

Online Course Report 2016 State of the MOOC 2016: A Year of Massive Landscape Change for Massive Open Online Courses. http://bit.ly/2dU0hVz.

O'Toole, R 2013 *Pedagogical strategies and technologies for peer assessment in Massively Open Online Courses (MOOCs). Discussion Paper.* University of Warwick. Coventry.

Pappano, L 2012 The Year of the MOOC, *New York Times (2 November 2012)*. Retrieved from http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html.

Prinsloo, P and **Slade, S** 2015 *Student privacy self-management: implications for learning analytics.* Paper presented at LAK '15 (16–20 March), Poughkeepsie, NY.

Rodrigo, C and **Iniesto, F** 2015 *Holistic vision for creating accessible services based on MOOCs.* Paper presented at the Open Education Global Conference 2015. Innovation and Entrepreneurship, 22–24 April, 2015, Banff, Alberta, Canada. DOI: http://dx.doi.org/10.1145/2723576.2723585

Rosewell, J 2015 *Benchmarks for MOOCs: the OpenupEd quality label.* Paper presented at the International Conference on Enhancement and Innovation in Higher Education, 9–11 June, Glasgow, UK.

Rosewell, J and **Jansen, D** 2014 The OpenupEd quality label: benchmarks for MOOCs. *INNOQUAL: The International Journal for Innovation and Quality in Learning, 2*(3), 88–100.

Scanlon, E, McAndrew, P and **O'Shea, T** 2015 Designing for educational technology to enhance the experience of learners in distance education: how open educational resources, learning design and MOOCs are influencing learning. *Journal of Interactive Media in Education, 2015* (1), Article 6.

Shah, D 2015 By The Numbers: MOOCS in 2015 (21 December). https://www.class-central.com/report/moocs-2015-stats/.

Sharples, M and **Ferguson, R** 2014 *Innovative Pedagogy at Massive Scale: Teaching and Learning in MOOCs.* Paper presented at EC-TEL 2014 (16–19 Sept.) Graz, Austria.

Siemens, G 2005 Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning, 2*(1).

Slade, S and **Prinsloo, P** 2013 Learning analytics: ethical issues and dilemmas. *American Behavioral Scientist*, 57 (10), 1510–1529. DOI: http://dx.doi.org/10.1177/0002764213479366

Souto-Otero, M, dos Santos, A I, Shields, R, Lažetić, P, Castaño Muñoz, J, Devaux, A and **Punie, Y** 2016 OpenCases: case studies on openness in education. Seville, Spain: IPTS, JRC, European Commission.

Stokes, C W, Towers, A C, Jinks, P V and **Symington, A** 2015 Discover Dentistry: encouraging wider participation in dentistry using a massive open online course (MOOC). *British Dental Journal, 219*, 81–85. DOI: http://dx.doi.org/10.1038/sj.bdj.2015.559

Teplechuk, E 2013 *Emergent models of massive open online courses: an exploration of sustainable practices for MOOC institutions in the context of the launch of MOOCs at the University of Edinburgh.* (MBA), The University of Edinburgh.

Wang, Y 2015 MOOCs in China are growing (6 June). Retrieved from http://blogs.worldbank.org/education/moocs-china-are-growing.

White, S, Davis, H C, Dickens, K, León Urrutia, M and **Sánchez-Vera, M M** 2015 MOOCs: what motivates the producers and participants? In Zvacek, S, Restivo, M T, Uhomoibhi, J & Helfert, M (Eds.), *Computer Supported Education: 6th International Conference, CSEDU 2014, Barcelona, Spain, April 1–3, 2014, Revised Selected Papers* (pp. 99–114). Cham: Springer International Publishing.

Wilde, A 2016 *Understanding persuasive technologies to improve completion rates in MOOCs.* Paper presented at HCI and the Educational Technology Revolution: HCI Educators Series at AVI 2016 (7 June), Bari, Italy.

Wintrup, J, Wakefield, K and **Davis, H C** 2015 Engaged learning in MOOCs: a study using the UK Engagement Survey. York, UK: HEA.

Wintrup, J, Wakefield, K, Morris, D and **Davis, H C** 2015 *Liberating learning: experiences of MOOCs.* York, UK: Higher Education Academy.

Witthaus, G, dos Santos, A I, Childs, M, Tannhäuser, A-C, Conole, G, Nkuyubwatsi, B and **Punie, Y** 2016 *Validation of non-formal MOOC-based learning: an analysis of assessment and recognition practices in Europe* (OpenCred) (Vol. EUR 27660 EN). Seville, Spain: IPTS, JRC.

Yousef, A M F and **Sunar, A S** 2015 *Opportunities and challenges in personalized MOOC experience.* Paper presented at the ACM WEB Science Conference 2015, Web Science Education Workshop (29 June), Oxford, UK.

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