# From Disruption to Innovation:
## Thoughts on the Future of MOOCs

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**Abstract.** MOOCs have been heralded by some as disruptive of the higher education sector, but the reality is that they are examples of business rather than educational innovation. By enabling universities to focus on global scale and reach as they navigate the digital environment, current MOOCs mostly sustain existing learning practices rather than force pedagogical reconfiguration. Implementations to date have largely focussed on content delivery from superstar professors with little emphasis on the real needs of twenty-first century learners. We have reached a stage when all of our educational approaches need to be better suited for a new information ecology that has demonstrably different characteristics from the past. Information scarcity has given way to ubiquity and learners need the appropriate skills to thrive in a digital life and career—creativity, critical thinking, collaboration and communication. Whilst real innovation to address these challenges is already happening in both fully online and blended offerings at some institutions, they are not so common in the MOOC space. This paper argues that MOOCs offer an opportunity to truly disrupt learning at scale and become exemplars for real educational innovation.

**Keywords:** digital age, disruption, innovation, MOOC, connectivism, network, Silicon Valley, curricular design, xMOOC, cMOOC.

Since their emergence, Massive Open Online Courses have been hailed as disruptive. Just as the world wide web totally reshaped the newspaper industry, MOOCs were seen as the potential harbingers of creative destruction for the university sector; a digital tsunami that would lead to a reinvention of learning and teaching, but dramatic change has yet to happen, and the early hype seems to be merely fodder for critics of education innovation[1] [Harden, Hartsell 2014; Reeves, Hedberg 2014].

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[1] Christensen C.M., Michelle R. (2014) MOOCs' Disruption is Only Beginning // Boston Globe. May, 9. https://www.bostonglobe.com/opinion/2014/05/09/moocs-disruption-only-beginning/S2VlsXpK6rzRx4DMrS4ADM/story.html; Knowledge@Wharton (2012) MOOCs on the Move: How Coursera Is Disrupting the Traditional Classroom. http://knowledge.wharton.upenn.edu/article/moocs-on-the-move-how-coursera-is-disrupting-the-traditional-class-

This paper argues disruption may still happen, but attention has been misplaced; focussing so far on the *business* of learning rather than the real opportunity that lies in disrupting learning itself. The motivation of early MOOC companies and their venture-capital investors has been in building an education marketplace to exploit digital efficiencies. Our understanding of the disruptive potential of MOOCs must be broadened to include pedagogy.

Digital technologies have done nothing less than introduce a new information ecology, with entirely new parameters. Scarcity is replaced by ubiquity, the control of information has been redistributed, machines are increasingly capable, and the way humans connect with those machines, information, and each other has been reconfigured dramatically. Unfortunately, for the most part we are still educating people for the past, teaching them how to act in a world of information that no longer exists. What we need is a new education ecosystem, one which de-emphasises "knowing things" and instead builds the connected, collaborative problem-solving skills that are needed in the twenty-first century. As digital first (and digital only) teaching tools, MOOCs could play a significant role in that new education ecosystem. University teaching has its roots in centuries old traditions and was constructed for an information age that no longer exists. It is ripe for digital innovation and disruption. Now is the time to act, before the business of digital education is built on the same old thinking.

**A brief history of MOOC disruption**

The idea of disruption was popularised by Clayton Christensen in the mid-1990s with the term entering popular usage to "describe any situation in which an industry is shaken up and previously successful incumbents stumble"[2]. Christensen identifies two types of disruption—"low end" and "new market." Low-end disruption is the introduction of cheaper solutions to problems that are good enough for widespread adoption, despite being less fully featured than incumbent, more expensive, methods. New-market disruption refers to businesses that create new opportunities that compete against non-consumption.

In 2012, Coursera, Udacity and EdX spun out of US universities to become the first commercial MOOC platforms. At the time, online education was commonly derided as inferior to face-to-face approach-

room/; Lodge J. M. (2013) The Failure of Udacity: Lessons on Quality for Future MOOCs // The Conversation. November, 19. https://theconversation.com/the-failure-of-udacity-lessons-on-quality-for-future-moocs-20416; Head K. (2017) Disrupt This! MOOCs and the Promise of Technology. https://computinged.wordpress.com/2017/10/06/disrupt-this-moocs-and-the-promises-of-technology-by-karen-head/

[2] Christensen C.M., Michael E., McDonald R. (2015) What is Disruptive Innovation? // Harvard Business Review. December. https://hbr.org/2015/12/what-is-disruptive-innovation

es. MOOCs were potentially "good enough" to threaten traditional university offerings and provide low cost learning opportunities—classic low-end disruption. Udacity founder, Sebastian Thrun argued that MOOCs were the beginning of a world in which "in 50 years, there will only be 10 institutions in the world delivering higher education"[3]. MOOCs' disruptive nature would trigger change that could reinvent the entire education sector. Describing the early days of Coursera, Thomas Friedman in the New York Times wrote simply "Welcome to the college education revolution"[4], and David Brooks in the same newspaper wrote "What happened to the newspaper and magazine business is about to happen to higher education: a descrambling around the Web"[5]. There was, in the words of Stanford President John Hennessy "a tsunami coming"[6]. Such coverage certainly combined to give the impression that 2012 was "the year of the MOOC"[7], and the focus was squarely on how the massive open online model would disrupt the business of universities.

Spooked by the hype, universities embraced partnerships with MOOC platform providers, first as defensive positions and then for reasons of new-market disruption. Whilst initially keen to stay in the game, they began to see the global reach and scalability of MOOCs as an opportunity to attract students who otherwise would not have considered their educational institution. Many universities also used MOOCs as a demonstration of their ability to innovate and established teams to develop their engagement across the various providers[8].

The global reach of the MOOC platforms—Coursera has over 32 million learners from all around the world on its platform at the time of writing and is growing at a rate of 600,000 learners a month—meant that a university was able to leverage reach and develop reputation, as well as generate an alternative revenue stream. In reality, MOOCs largely fail as innovations as they essentially provide an online simulation of an existing on-campus experience. For example, massively popular MOOCs like Coursera's "Learning to Learn" still rely on content-heavy lecture material delivered by charismatic professors. Student engagement is still dependent on the reputation of the rock-star

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[3] Leckart S. (2012) The Stanford Education Experiment Could Change Higher Learning Forever. https://www.wired.com/2012/03/ff_aiclass/

[4] Friedman T. (2012) Come the Revolution // New York Times. May, 15.

[5] Brooks D. (2012) The Campus Tsunami // The New York Times. May, 3. https://www.nytimes.com/2012/05/04/opinion/brooks-the-campus-tsunami.html

[6] Auletta K. (2012) Get Rich U // New Yorker. April, 30.

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

[8] Dodd T. (2017) Massive Online Open Courses Are Back and They're Threatening Universities // Australian Financial Review. April, 12. https://www.afr.com/leadership/management/business-education/massive-online-open-courses-are-back-and-theyre-threatening-universities-20170406-gvfdsk

academic and their ability to deliver "edutainment." Even the MOOC-based, full-degree programs such as Coursera's iMBA are duplicative rather than innovative: the process of admission, enrolment, progression, and engagement is largely designed to replicate the face-to-face learner experience. Students still work through a structured program based on synchronous learning and highly regulated credit hours within traditional disciplinary thinking. This is understandable, as the motivation for these programs is not learning innovation, but expanding reach, enabling an institution to connect with more students, for reasons of revenue, reputation and, sometimes, social responsibility.

"I normally teach 400 students," Coursera founder Andrew Ng explained to Friedman, but last semester he taught 100,000 in an online course on machine learning. "To reach that many students before," Ng said, "I would have had to teach my normal Stanford class for 250 years"[9].

Business model aside, there is little truly new and innovative in MOOCs, which simply ape traditional teaching models.

**Disruption and the job to be done**

Students have many motivations for engaging with higher education so there are different ideas of what Christensen terms the "job to be done" by universities[10]. For many, learning is a means to an end, and much of the sector focuses on learning for the improvement of economic well-being. The increase in professional skills, be they in computer programming or business thinking, is certainly a driver for many learners. But many others are driven by other factors. Some want what many loosely call an education—what was historically understood as a preparation for engaged global citizenship and which has been the domain of liberal arts programs for some time. Others simply desire the social connections that educational institutions can provide by facilitating a community of like-minded individuals. Still others are driven by the status of attending or gaining a credential from an institution with a global brand.

Across these dimensions, there are many possibilities for disruption. But the easiest to understand revolves around the aforementioned business models and how universities might struggle with the challenge of low-end and relish the opportunity for new-market disruption.

For example, consider Coursera. Its mission is simple: "We envision a world where anyone, anywhere can transform their life by accessing the world's best learning experience," announces its webpage. From their mission statement, Coursera exists to provide a

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[9] Friedman T. (2012) Come the Revolution // New York Times. May, 15.

[10] Christensen C.M., Dillon K., Duncan D.S. (2016) Know Your Customers' "Jobs to Be Done" // Harvard Business Review. September. https://hbr.org/2016/09/know-your-customers-jobs-to-be-done

function—better life and career outcomes through transformational learning. But the next sentence on the same webpage is as follows: "Every course on Coursera is taught by top instructors from the world's best universities and educational institutions." All of a sudden, the pitch shifts. Not only is the learning important, but Coursera leverages the emotional pull of the world's leading universities to credential that learning. Tellingly, it is held to be self-evident that high-ranking universities will deliver the best transformational learning experience and outcomes. The model for Coursera has always been about partnering with a select group of highly ranked universities. The traditional virtue-signals remain in place, and the sole disruption is in enabling high-ranking universities to both protect and expand their market through greater reach on a scalable online platform[11].

In that environment, low-end disruption of the higher education sector has yet to play out as Sebastian Thrun and others predicted. In a perfect example of culture being harder to change than technology, universities continue to dominate the profitable end of the market. Udacity itself has pivoted to focus on corporate partnerships[12], and Thrun is no longer in charge[13]. In fact, most MOOC providers have refocussed their efforts to profit from full-degree offerings in partnership with universities.

The recent introduction of degree offerings has enabled some to think beyond the templated approach of the initial MOOC platforms, if only because they provide a bigger opportunity for innovation. Unlike a single short MOOC, which can be very narrow in scope, a full degree is long enough, broad enough, and has sufficiently sophisticated learning outcomes to enable innovation. There is an opportunity in the degree space to shift the focus of MOOCs as disruptors away from the *business* of learning onto the learning itself. So far this has not happened. At present, innovation is in accessibility. For example, many of these new degrees allow students to enter the full degree program via completing MOOCs successfully, and those individual MOOCS are marketed as "stackable," allowing degree completion via bite-sized chunks. Still, the degrees themselves differ little from existing models, and thus there is now little difference between MOOC companies and traditional online partner providers such as Pearson and Key Path. It may be that Coursera, EdX and FutureLearn are simply approaching that profit opportunity from a different starting point[14].

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[11] https://blog.coursera.org/about/
[12] Mitra S. (2016) How Billion-Dollar Udacity Plans to Make Money // Inc.com. April, 12. https://www.inc.com/linkedin/sramana-mitra/billion-dollar-unicorn-udacity-leans-industry-giants-sramana-mitra.html
[13] Rao L. (2016) Sebastian Thrun Steps Down as Udacity's CEO // Fortune. April, 22.
[14] ICEF (2018) Major MOOC Providers Shifting Focus to Fee-Paying Students. http://monitor.icef.com/2018/01/major-mooc-providers-shifting-focus-fee-paying-students/

There are other possibilities. For example, there is a distinction between xMOOCs and cMOOCs. xMOOCs were (and remain) the most common incarnation of the Massive Open Online Course as exemplified by Coursera and its ilk [Bates 2014; Siemens 2013]. cMOOCs have a very different philosophy, embracing a constructivist approach to learning. Whilst xMOOC implementation varies—just as in face-to-face offerings, instructors have a great deal of autonomy in their design and delivery—most are constrained by their platforms. As flagged, these generally include short video lectures from a "hero" professor, computer-graded quizzes, and peer-marked assessment tasks, shared discussion forums with some moderation from teaching assistants, a range of supporting material in the form of supplementary readings, multimedia resources and links, some form of certification on successful completion of the learning activities and a range of learning analytics providing instructors with opportunities to either intervene with struggling learners, or to modify their courses based on user engagement data.

In contrast to the mimicking of traditional passive learning that is the mainstay of these xMOOCs, the aforementioned cMOOCs revolve around autonomy of the learner, diversity of tools, participants, content and knowledge, real interactivity (co-operative learning, communications, emergent knowledge) and openness (access, activities and assessment). The idea of cMOOCs [Bates 2014] is built on George Siemens' thinking around connectivism as a model of learning for the digital environment, exemplified by CCK08, "Connectivism and Connective Knowledge," an online course offered through the University of Manitoba by Siemens and Stephen Downes in 2008. Downes recalls,

> What made CCK08 a watershed moment was the realization that the use of distributed open resources would support—with ease—an attendance in the thousands. We weren't expecting 2200 people in CCK08; George Siemens has quipped that we were expecting about 24 people, if we were lucky. After all, the course was devoted to a pretty obscure topic—the theory of Connectivism, a pedagogical theory articulated by George and myself. And the software and course design were the first to explicitly invoke the theory, and to focus on connections rather than content, which suggested the distributed and connected approach[15].

Rather than being delivered on bespoke platforms, cMOOCs are built on a networked approach of learners and technologies. They emphasise social media tools in conjunction with open access learning management systems (such as Moodle). Importantly, they are par-

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[15] Downes S. (2012) The Rise of MOOCs. http://halfanhour.blogspot.ca/2012/04/rise-of-moocs.html

ticipant-driven rather than instructor-led and are built around a community of practice, encouraging and inviting participation based on common interest, and emphasising conversation and engagement. In Tony Bates' words:

> cMOOCs therefore primarily use a networked approach to learning based on autonomous learners connecting with each other across open and connected social media and sharing knowledge through their own personal contributions. There is no pre-set curriculum and no formal teacher-student relationship, either for delivery of content or for learner support. Participants learn from the contributions of others, from the meta-level knowledge generated through the community, and from self-reflection on their own contributions [Bates 2014].

cMOOC and xMOOCs do completely different things and address entirely different audiences and learners. cMOOCs are best suited to self-directed students who are happy to engage with a loose network of fellow travellers to build emergent knowledge from their digital engagements. xMOOCs only allow engagement with a set of content, prescribed learning outcomes and a demonstration of that achievement with appropriate credentialing.

The music industry provides a parallel example. Responding to the realities of the digital age, and the easy movement of music files, that industry shifted from selling physical artefacts to selling digital artefacts to provide access to digital streams. Whilst there was much hand-wringing involved at the time, in hindsight the shift has occurred relatively quickly. After two decades of transition, the major industry stakeholders (the record labels) remain dominant, albeit with a shift in intermediaries from CD and record manufacturing plants to computer companies such as Apple, Google and Spotify. This parallels the xMOOC model: universities shifting from delivering physical experiences to online ones, remaining the dominant providers but with new intermediaries in the form of Coursera, Edx, FutureLearn, and others as their partners.

There is another side of the digital music revolution, however. As well as shifting the business of music production and distribution from long-play albums to streaming playlists, digital technologies also enable new possibilities for creativity and collaboration. Music itself has evolved to include remixes and mashups. For years, artists have enabled new creativity by releasing their raw tracks onto the internet for fans to remix and share[16]. Musicians from around the world have begun to work together on projects that, whilst not necessarily providing them with superstar status, have enabled them to fulfil creative aspi-

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[16]  UPI (2005) Trent Reznor Lets Fans Remix Single. https://www.upi.com/Trent-Reznor-lets-fans-remix-single/97151120411420/

rations [Collins, Young 2014]. A recent example is the band Superorganism, whose members come from all around the world, met and collaborated on the internet, and released music online before meeting in person[17]. Whilst the popularity of Coursera and others demonstrate that there is value in the xMOOC model, true learning innovation comes from elsewhere. cMOOCs may be too challenging for some, but I would argue that disruption of learning is grounded in the cMOOC approach and that approach is better suited to the needs of twenty-first century learners.

Those needs raise challenges that universities struggle to meet. Not only are defined career paths increasingly rare but the work to be done is constantly changing. As Richard Riley suggests: "We are currently preparing students for jobs that don't yet exist, using technologies that haven't been invented, in order to solve problems we don't even know are problems yet" [Gunderson, Jones, Scanland 2004]. In this world, learning creativity, collaboration, communication, and critical thinking are important. The classroom cannot be simply about knowledge transfer, it has to enable learners to connect, to create things together and communicate to a diverse global population. We must envisage that classroom as a means to create the educational *superorganism* where individuals with different strengths come together to solve global problems and create innovative responses to the challenges we face. This is learning that reflects the rhizomatic characteristics of the digital world.

Gilles Deleuze and Félix Guattari's notion of the rhizome describes a system that, unlike hierarchical trees, is characterised by connections from any point to any other point—a network with a complexity of interconnected points [Deleuze, Guattari 1987]. Early internet theorists applied the notion of the rhizome to the networks of computing and communication that make up the internet and extrapolated cultural and political understandings based on that analysis[18] [Hess 2008]. As the internet has evolved into the digital ecosystem in which we all act, our interactions with information, with machines, and with each other much more closely resembles a rhizome or what Simon Phipps calls "a meshed society"[19].

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[17] Miller N. (2018) Have Hit, Must Meet: How Internet Chums Superorganism Became the Next Big Thing // Sydney Morning Herald. May, 29. https://www.smh.com.au/entertainment/have-hit-must-meet-how-internet-chums-superorganism-became-the-next-big-thing-20180529-h10ovw.html

[18] Hammam R. (1996) Rhizome@Internet. http://www.socio.demon.co.uk/rhizome.html; Bluemink M. (2015) The Web as Rhizome in Deleuze and Guattari. https://bluelabyrinths.com/2015/07/15/the-web-as-rhizome-in-deleuze-and-guattari/; Flint J. (1997) Is the Internet a Rhizome? http://www.jamesflint.net/is-the-internet-a-rhizome/

[19] Phipps S. (2018) The Legislative Disconnect of the Meshed Society. https://meshedinsights.com/2018/07/02/the-legislative-disconnect-of-the-meshed-society/

cMOOCs represent an example of so-called rhizomatic educa-tion[20]. Just as the Super Organism of the music world was digitally en-abled, cMOOCs represent an educational superorganism that has the potential to set the tone for how digital learning should occur.

**MOOCs and the educational challenge**

Education is clearly different from recorded music. In many ways both the challenges and the opportunities are greater in an educational context. Just as Universities are grappling with shifting funding, gov-ernment policies, and increased competition, they are also expected to deliver graduates equipped for a completely different world. Whilst xMOOCs may provoke changes to university business models, they do little to progress the learning that happens in those institutions, at a time when our educational approach needs dramatic changes.

It's no exaggeration to suggest that the twenty-first century world of work—continually reshaped by digital technologies ranging from computer automation to machine learning—requires graduates to have a range of new skills and capabilities. Cognizant of the ever-pres-ent threat of a *Terminator*-style world where the robots are able to do existing jobs more effectively and more efficiently than humans, we need an education system that prepares its students with attributes relevant to the workplace into which they will graduate. To do that, we need an education system that is not only digitally enabled, but un-derstands the digital information ecosystem in which we exist. Being digital must be a primary principle of learning, something that is cur-rently not true.

The literature resonates with suggestions for the skills required in the new workplaces [McGaw 2013; Lamb 2017]. One example is the Four Cs (creativity, collaboration, critical thinking, and communica-tion), which are oft-cited replacements for the traditional Three Rs. In the United States, The National Education Association argues that:

> America's system of education was built for an economy and a so-ciety that no longer exists. In the manufacturing and agrarian econ-omies that existed 50 years ago, it was enough to master the "Three Rs" (reading, writing, and arithmetic). In the modern "flat world," the "Three Rs" simply aren't enough. If today's students want to com-pete in this global society, however, they must also be proficient communicators, creators, critical thinkers, and collaborators (the "Four Cs") [National Education Association 2017].

In Australia, the Foundation for Young Australians analysed 4.2 mil-lion unique job advertisements and identified a growth in demand for what they term "enterprise skills"— presentation skills, problem solv-

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[20] Gillies D. Rhizomatic Learning // A Brief Critical Dictionary of Education. www.dictionaryofeducation.co.uk

ing, creativity, critical thinking—which align with the Four Cs. Additionally, they identified digital literacy and language skills as being in extremely high demand. This suggests that there is also the need to be able to engage as a global citizen and that the context for all of these skills is the digital information ecosystem[21].

Importantly, because we live in a world in which we do almost everything digitally, from shopping to banking to reading and thinking, equipping our students with those relevant skills cannot happen using traditional pedagogies. There is little value in training students for a world without google or smartphones when the skills they need to survive and thrive require that they understand and can critically engage with those tools. K-12 schooling is visibly grappling with these challenges. For example, the NSW Education Department in Australia has commissioned a major piece of work exploring requirements for an AI world and there are many experiments to bring authenticity to the learning experience for school age learners [Loble, Greenaune, Hayes 2017].

Whilst many universities are embracing the digital reality, the traditional approach for learning and teaching retains a stranglehold. Much university teaching remains stubbornly focussed on the fifth C—content—which is arguably no longer as important as it once was. Certainly neither the NEA or the FYA research suggests that content recall is critical. Arguably, in this age of information ubiquity, "remembering" and "understanding" are increasingly less relevant than Bloom's higher order skills of analysis and synthesis[22], but university teaching has been designed around an information ecology based on the characteristics of print and have not evolved to properly understand the characteristics of the digital age. Rather than teaching delivery and activities which emphasise scarcity, authority, and isolation, our teaching needs to provide active engagement with multiple sources of content across many disciplines and ensure a range of appropriate literacies (see Figure 1).

A new information ecology means that we have student cohorts who expect to have a digital experience akin to other domains of their lives. As social media, online commerce, and an increasing reliance on internet enabled activities suggests, we need to integrate digital experiences and expectations into our educational practices. Ultimately, this requires a rethinking of pedagogy away from content delivery and knowledge testing and towards higher-level engagement, active problem solving, and linking content with enterprise-skills development.

On campus, these expectations are being slowly met through a range of changes. Students as partners in their learning is a common

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[21] AlphaBeta (2017) The New Basics: Big Data Reveals the Skills Young People Need for the New Work Order. fya.org.au

[22] Armstrong P. Bloom's Taxonomy. https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/

Fig 1. **Teaching then and now**

| Then (analog) | Teaching then | Now (digital) | Teaching Now |
|---|---|---|---|
| Scarce content | Content delivery, lectures | Ubiquitous content | Active Facilitation of Problem Solving |
| Authiritative | Remembering, Understanding, exams based | Contested | Application, Analysis, Evaluation and Creation |
| Isolated | Discipline specific, discourated groupwork | Contested | Trans-disciplinary, collaborative |
| Text-based | Academic literacy | Multimedia | Digital, Visual, Cultural literacies |

refrain [Healey, Flint, Harrington 2014] and much face-to-face teaching has shifted from the traditional passive lecture model to a more engaging active learning approach. Models for this include the flipped classroom, where video material (either produced or sourced) replaces lecture time and face-to-face engagement is based around facilitated activities often in small groups in bespoke spaces designed to encourage collaboration. This is often built as so-called problem-based learning, where the activities are focussed on solving specific problems—often set by external partners to provide authentic workplace examples. Project-based approaches differ perhaps only in scale and all sit within a practice-based curriculum emphasizing relevant workplace skills. Another approach gaining widespread adoption is experiential learning. Again, there is overlap with some of the other pedagogies described, but the emphasis is not on what some might have called book- or theoretical-learning so much as on learning from engaging in authentic activities. This might happen in a workplace, where it is called "work integrated learning," or in other offsite environments.

The other dimension of students-as-partners is to enable students to learn from each other and to empower them to co-create both their curriculum and the learning activities. The former might occur through formal peer-assisted learning programs where students who have already completed a subject may assist those who haven't or simply as a matter of designing activities where students are encouraged to contribute their diverse skills collaboratively. Co-creation might include empowering students to choose the areas of learning, create assessment tasks and rubrics, co-mark and curate resources. Of course, in universities, much can and does happens digitally in blended approaches. Flipped classrooms, collaborative workspaces such as google docs, curatorial tools and digital portfolios all provide not only platforms for activities but opportunities to develop the essential digital literacies. Indeed, teachers have used online technologies to address the challenges raised for quite some time [Hoppe, Ogata, Soller 2007; Raymond et al. 2016; Hakkinen, Hämäläinen 2012], and

it is easy to forget the immense progress in online pedagogical development outside of MOOCs.

The opportunity in the MOOC space is much bigger. cMOOCs suggest a model for learning that takes those fairly basic ideas and expands them to fully engage with the possibilities of the digital ecology, where the possibilities for collaboration, connection, and communication are vastly expanded. Fully online learning experiences designed specifically for a new educational ecosystem are the disruptors we need to ensure students are fully prepared for our brave new world. We have only just begun to explore the potential, and if we are serious, MOOCs can provide a real platform for progress.

## Thoughts on the future of learning

Most existing MOOC initiatives address the business of learning rather than the learning itself. Despite their digital origins, and their implicit place as part of the new information ecology, they largely exist as extensions of analogue habits. So far, they represent a missed opportunity for truly exciting learning opportunities. Other than early cMOOCs, there has been little thinking about how the new technologies might allow new pedagogies to thrive. Real innovation—and disruption—might occur when those digital technologies are employed to address the learning challenges identified above. Given the digital information ecology, we should utilise the new tools to ensure that learners are properly equipped for the world we have described.

It is beyond the scope of this short paper to comprehensively interrogate the possibilities and properly explore the experiments that might be enabled through creative thinking. But it is worth canvassing some thoughts on what those new pedagogies might be and how they might exist in our current MOOC provision. Broadly, there are three areas to consider, all technically possible, but perhaps culturally challenging: rethinking student engagement, connecting with external partners, and delivering relevant learning outcomes for an interdisciplinary world.

As previously suggested, many universities now espouse the mantra of students as partners or students as co-creators of their learning. The meaning varies—from ensuring that students are involved in academic governance activities or curriculum design, through formal peer-assisted learning programs, through learning activities built on active learning paradigms that emphasize the student's role in owning their learning. On most campuses, these activities happen through a blend of on-line and face-to-face engagement. This approach to pedagogy is embraced and designed by teachers who are happy to rethink their roles and become facilitators of learning rather than professors of knowledge.

At the moment, such rethinking is uncommon in the mainstream MOOC space. Even when platforms discuss their full degree offerings and expand into human-centric so-called "high touch" activities, they

continue to place the teacher (rather than the student) in the centre of the learning. The cMOOC approach—a loose network of advanced learners taking a constructivist approach—appears at first glance to demand too much of students who are more used to an educational approach where the content and learning are delivered on a platter. But a greater focus on social learning and empowering students should be possible through appropriate learning design. Structured group work, facilitated by the learning activities and enabled on platforms which encourage both strong and loose ties between learners and teachers, would go some of the way towards such a model. Whilst no such ideal platform currently exists, FutureLearn does take a more social learning approach, and platforms as diverse as D2L and UCroo in the non-MOOC space are attempting to address the need to better connect students with each other and their formal and informal learning. An ideal platform would enable self-identified groupings, emergent (and defined) peer learning approaches and generally encourage students to engage with their learning beyond absorbing and regurgitating content.

Embedded active learning approaches are also key. For example, rather than provide video lectures, it would be useful to ask students to identify and locate existing content relevant to the subject matter and to discuss and rate it in a structured manner. Similarly, they could be asked to co-create the required assessment tasks and extend existing peer-review approaches into full self-assessment through an agreed upon, co-created, rubric. Problem-based learning approaches are naturally aligned to this idea, and designing for scale on appropriate platforms would enable distinctive global perspectives to be brought into play, enabling a range of learning outcomes including inter-cultural communications competencies that are increasingly in demand in modern trans-national employment situations. Many learners, particularly so-called digital natives, would already be familiar with identifying, curating and sharing content on social media platforms, and it would an interesting challenge to re-imagine a platform for those activities in a more structured educational context.

The next obvious step for active, problem-based approaches to learning is to involve corporate and community partners in the design and delivery of curriculum. Universities already do this in a number of ways. Not only are corporate partners increasingly involved in curriculum design, but they participate through work integrated learning partnerships in incubators through hackathons and business innovation sessions. For example, my university has a comprehensive, work-integrated learning program that requires all of its undergraduate students to have an academically-relevant experiential learning opportunity with an external partner—a project which sees 8,000 students involved with over 2,000 partners every year. More elaborate examples include Swinburne University's Engineering Practice Academy, where the entire curriculum is designed around a project-based engi-

neering consultancy, solving real problems set by partner clients, with learning objectives met along the way. Such a reconfiguration of learning approaches is no doubt challenging online and at scale, but just as crowdsourcing online has resulted in innovative solutions (think Kickstarter or even YouTube), a sustained effort to construct such learning could result in real innovation. Again, online opportunities for co-creating would appear plentiful: it's easy to imagine collaborative networks emerging from linked-in connections for example. At the very least, MOOCs can (and do) offer the ability for learners to engage with a curriculum co-designed by industry and universities, presenting a mix of theoretical and applied that enables both desirable short term (a job) and long term outcomes (an education).

Which leads to the final area for disruption: the breaking down of disciplinary silos. The reality of twenty-first century work and life is the need for individuals to increasingly blur once-distinctive boundaries. Whilst it's entirely possible to forge a career within a single traditional discipline, doing so limits both individual and broader social opportunities. Creative outputs are more likely with diverse inputs and, conversely, the lack of diversity will often result in suboptimal outcomes. For example, Facebook's issues with privacy are no surprise to anyone who has studied ethics, and one wonders how Silicon Valley startups might approach their mission with greater input from those schooled in the traditional humanities. John Naughton goes as far as to say that the problem with our tech companies is that their leadership—technically adept and well-informed as they are—are only "half educated" without philosophy, history, anthropology and literature[23].

Most current MOOCs re-emphasise the divide. The most popular courses focus on particular skills and are designed to fulfil quite instrumental needs; indeed, Coursera even calls clusters of courses "Specialisations" in the hope of attracting paying learners with a clear focus. The opportunity exists to embed broader thinking into offerings. Whilst programmers might baulk at a curriculum which overtly embeds ethics, creative approaches might allow this to occur naturally. For example, case studies, assignments and assessments could easily incorporate broader educational opportunities and the design of the courses themselves could encourage diversity in all of its forms—thinking, culture, discipline, and so forth.

Finally, the instant connectivity of the online space makes linking diverse offerings very straightforward. Whilst is it possible to take an interdisciplinary approach within a single MOOC—Macquarie's Big History is an example, involving academics from nearly every discipline that the university offers—an alternative might be to curate a range of courses and offer them in an interdisciplinary specialisa-

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[23] Naughton J. (2017) How a Half-Educated Tech Elite Delivered Us into Chaos // The Guardian. November, 19. https://www.theguardian.com/commentisfree/2017/nov/19/how-tech-leaders-delivered-us-into-evil-john-naughton

tion, even across institutions. Finding ways to accredit (and generate revenue from) a cross-institutional, interdisciplinary, and global qualification would be a challenge worth taking up. Not only can these connections bridge the disciplines, but they can enable global collaborations. Diverse approaches from around the world could be connected to provide a truly international educational experience. An example might be to develop linkages using the United Nations Sustainable Development Goals, providing recognition for learners who have engaged with the SDGs and opportunities for teachers to contextualise their material with contemporary issues.

## Conclusion

The reality of the new information ecology demands a rethinking of our approach to higher education. The higher-order skills required by citizens and workers cannot be provided by a reliance on traditional teaching models that emphasise content transmission. Massive Open Online Courses have thus far focussed on business models that provide partner universities with a vehicle for both low-end and new-market disruption; however, MOOCs have the potential to be a vehicle for true disruption by enabling new approaches to learning and teaching that are designed to provide the educational opportunities needed by students around the world. Rather than merely disrupting the business of learning, we should leverage their presence to properly disrupt learning. They should be the harbinger for a new educational ecosystem. Not pursuing the opportunity for real disruption condemns us (and our children) to an increasingly irrelevant educational experience.

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