The MOOC
What the research says

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Abstract

This article presents a critical overview of the MOOC (massive open online course) in university education. We review the history of this innovative education delivery mode, highlight the main university actors who developed the MOOC, address the issue of the "openness" or cost-freeness of the MOOC, and describe how the MOOC works. We also discuss the issue of supergroups: how can 100,000 students be taught at once? We then look at assessment methods and so-called connectivist MOOCs. We conclude by reviewing the results of about 100 studies on the MOOC.

Introduction

What are massive open online courses (MOOCs)? And why have they captured millions of learners around the planet? Is it a revolution, or just another way to deliver university courses? Should Quebec's universities occupy this niche? Are they behind the times? Should we be concerned that thousands of university students across America are joining this quiet revolution? Must we swap our grand lecture halls for virtual supergroups? How can 10,000 students be taught at once? What are the real benefits, limitations, and functions of MOOCs? What do the graduation rates look like? Is it about philanthropy, profitability, or conspiracy? Free or cut-rate diplomas? Have MOOCs done away with school fees? What does the research have to say about MOOCs? These are just a few of the questions we address in this article.

The rise of the MOOC

MOOCs may be considered a new kind of distance education, a kind that has taken universities in North America and elsewhere by storm. Since 2011, major American universities have hastened to join the new gold rush, and universities around the globe are increasingly embracing this innovative delivery mode. In fact, the numbers are troubling: Udacity, one of the three main actors in the MOOC arena, has enrolled 300,000 students in a course called "Introduction to Computer Science" (Figure 1), a record-breaking number for a MOOC.
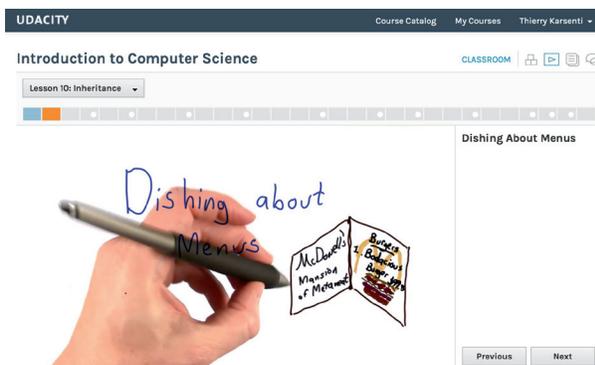
Figure 1. Screenshot of the course "Introduction to Computer Science" (CS101).

Altogether, some 20 million students in over 200 countries have enrolled in a MOOC, and the trend is rising sharply. Do MOOCs signal the dawn of university democratization? Whereas historians generally consider the nineteenth century—when compulsory grade school education was introduced—as the era of mass literacy, and the twentieth century as the era of mass high school education (see Gaffield, 2012), will the twenty-first century be the era of mass university education? Although the numbers of students taking MOOCs are impressive and thought-provoking, we must nevertheless keep in mind that higher education is alive and well in Canada. Of the 37 OECD and G20 countries for which data are available (OECD,2012), Canada tops the list in terms of the percentage of adults aged 25 to

64 who have received a tertiary education (51 %). And among 25- to 34-year-olds, the percentage is even higher, at 56% (versus 38% for the OECD average). Among 55- to 64-year-olds, the percentage is 42%, almost double the OECD average (23%)**.**

Will MOOCs take higher education to a whole new level? Many experts say yes. Others are not so sure. The *New York Times* called 2012 "The Year of the MOOC" (Pappano, 2012), while some have called it the "single most important experiment in higher education" (Weissmann, 2012). Yet very few studies have investigated this topic. Moreover, when MOOC success rates are disclosed, they are alarmingly low: often, less than 3% of students pass the final exam. Is the MOOC a revolution, or just a passing fad? Only time and research will tell.

In this article, based on a review of about 100 studies, we aimed to provide a critical overview of the issues involved in universities' use of MOOCs. We begin with some background on the MOOC, the main university players, the question of whether this innovative delivery mode is really free or "open," and what actually happens when virtual supergroups are taught through MOOCs. Assessment methods and the connectivist nature of the MOOC are then discussed. We wind up with a summary of the research in this area.

The MOOC is born

Many academics, including Watkins (1991), viewed the variety of adult education systems that were established in the United States toward the close of the nineteenth century as the first form of distance education, far ahead of what universities later instituted. For example, in 1873, a society was created in the Boston area to encourage studies at home, providing women of all classes with educational opportunities: about 10,000 members received correspondence instruction (see Ticknor, 1891). Teachers and learners communicated mainly through printed materials sent through the mail. The first official correspondence college was the Chautauqua College of Liberal Arts in New York State. This state-authorized college granted academic degrees

to students who completed the programs. Some of the work was done at the summer institutes, and for the remainder of the year, it was conducted by correspondence (see Watkins, 1991). At the beginning of the twentieth century, over 4 million Americans had enrolled in correspondence courses, most of which were designed to develop workplace skills (see Kett, 1994). However, despite the popularity of correspondence courses, questions were raised about their real educational value, just as many today are wondering about the real value of MOOCs. In 1933, more than 50 years after the first official correspondence university was set up, the University of Chicago authorized a distance education program as an "experiment" (see Gerrity, 1976). This scepticism has lingered, and its influence is still seen in the many criticisms of MOOCs. Correspondence courses have traditionally been viewed with suspicion. Furthermore, in 2013, a good number of universities in North America and Europe still do not recognize distance education. Apart from these exceptions, it was not until the 1960s that correspondence education began to be generally recognized, despite some enduring prejudices. Zigerell (1984) notes that Britain's Open University played a major role in this sense, by extolling the benefits of distance learning over traditional university lectures. It was during this time that Canada's two main distance learning universities were launched: Athabasca University in 1970 and Télé-université (TÉLUQ, now part of the Université du Québec network) in 1972. But it was only in the early 1990s that distance learning programs became a commonplace feature of North American universities (Duffy, 1994). This was a pivotal time for distance learning, when this new teaching mode was no longer the exclusive purview of specialized universities (see Karsenti, 2002). Nevertheless, the MOOC was still a long way off. None of the universities were offering free correspondence courses. Although at the beginning of the twenty-first century the Massachusetts Institute of Technology (MIT) had made some resources freely available online, that is, for other universities to use in their distance learning programs (see Karsenti, 2003), it was not until 2007 that complete courses, and

not just materials, were provided online. The Irish initiative ALISON (Advance Learning Interactive Systems Online), which offered free online courses to develop basic education and workplace skills, is widely considered to be the first MOOC in its current sense (see Booker, 2013). MOOCs are part of a continuous trend toward online open educational resources, in which MIT played a key role with its OpenCourseWare project.[1] Their objective was, and still is, to publish most of their course materials online and make them widely available and free to everyone.

The term MOOC was coined by Dave Cormier of the University of Prince Edward Island and Bryan Alexander of the National Institute for Technology in Liberal Education, in response to a course developed by George Siemens, a professor at Athabaska University, and Stephen Downes of Canada's National Research Council. Over 2,200 students from the general public took the online course, called "Connectivism and Connective Knowledge" (CCK08). All the course content was available through RSS feeds, and online students could participate through a variety of collaborative and social tools, including blog posts, threaded discussions in Moodle, and Second Life online meetings (see Downes, 2008).

Key stakeholders

The three leading actors in the MOOC arena are generally thought to be Coursera (coursera.org), edX (edx.com), and Udacity (udacity.com). How do these programs work? They are much more than just distance learning platforms, such as Moodle. For instance, Coursera's vision is to partner with top universities and organizations worldwide to offer free, universally available online courses (Coursera, n.d.). In addition, their technology enables teaching not just hundreds, but thousands of students. Clearly, Coursera goes far beyond Moodle, which is an Open Source Course Management System (CMS). Coursera is an education company that has been featured in the magazine *Forbes* (Anders,

2013). Coursera was founded by two professors in the Computer Science Department at Stanford University. It now counts over 80 university partners across several countries, including the École Polytechnique de Paris, the National University of Singapore, the Chinese University of Hong Kong, and the Universidad Nacional Autónoma of Mexico. Concerned that online university teaching would become too commercialized, MIT set up its own platform, MITx, later called edX when Harvard University came on board. Today the consortium comprises 29 partner universities, including McGill University and the University of Toronto in Canada and the Polytechnique Fédérale de Lausanne in Switzerland, which offers courses in French. Udacity, which bills itself as "the future of online higher education,"[2] is very active in the MOOC arena. It is the aftermath of a Stanford University experiment. Professors Sebastian Thrun and Peter Norvig offered an online course called "Introduction to Artificial Intelligence," in which over 160,000 students from more than 190 countries enrolled. One of the chief differences between Udacity and its two main rivals, Coursera and edX, is that there is no predetermined calendar for taking a course. It takes only a few clicks and some responses to a handful of questions for a student to begin taking a Udacity course, and there are no time or space constraints. In distance learning terms, Udacity offers asynchronous learning, whereas Coursera and edX offer training that may sometimes require synchronous learning.

Are MOOCs really free or "open"?

One of the features of the MOOC that contributes greatly to its popularity is the extremely low cost—it is free. However, one must be careful to look behind the façade. Although many MOOCs appear to be free at first glance, this is often a come-on, like the ones that advertisers use to entice customers. In this case, students are the target customers. For example, the first entirely MOOC-supported master's degree, offered by Georgia Tech University, came at a cost of $7,000. And what about other uni-

versities, that never fail to remind their students—who are also potential customers—on almost every MOOC page, that they can get *more* for *less*? Studies should investigate this type of suggestive advertising. Take the case of the "Dino 101" course given by the University of Alberta. On many of its Web pages (posted on Coursera), students are urged to "Join Signature Track for this course," a kind of business class for MOOC students. However, the offer is for a limited time only (Figure 2), like the commercial ads appearing on late-night TV.

Figure 2. Screenshot of an ad for a special option in connection with a MOOC.

When students click on this tempting offer, they find out that they can get an official certificate at a special introductory price of $69, but for a limited time only (Figure 3).

Figure 3. Screenshot of an announcement for a payment option for a MOOC.

For just a little more money ($263), you can also get credit for the MOOC. For this MOOC, however, students must take two mandatory examinations. This is not a unique case at this university, although "Dino 101" serves as a particularly informative example. This is a common practice adopted by increasing numbers of universities that offer MOOCs.

Ways you can take Dino 101	What do you get	What do I get for completing/passing	What does it cost me	How I register?
Free course	Complete course	A Statement of Accomplishment	Free	You don't need to do anything else
Signature Track	Complete course + Identity Verification	Verified Certificate from Coursera and UAlberta (non-credit)	$69	Register here
Signature Track + Proctored Exams	Complete course + Identity Verification + Proctored midterm and final exam	A Credit by Proxy statement that includes the verification of Signature Track and your grade as marked by the University of Alberta. If you have a passing grade, you will have achieved the equivalent of a University of Alberta course credit.	$69 for Signature Track $263 for the two proctored exams	First, register for Signature Track here After the first three weeks of the course you will sent a link to register for the midterm and final

Figure 4. Screenshot of the range of payment options for a MOOC.

The business models of the main players in the MOOC industry (Coursera, edX, and Udacity) provide both challenges and benefits for their university partners. Kolowich (2013) claims that Coursera takes a large cut of all generated revenues, but requires no minimum payment, whereas edX, in which MIT and Harvard University have invested $30 million each, has a minimum required payment from course providers, but then takes a smaller cut of any profit made. The various options, which are described by Kolowich, include an option for universities to invest about $250,000 for each new course, as well as $50,000 every time a course is offered.

Traditional university teaching has been undermined by the advent of the MOOC. Many business experts (see Haggard, 2013) are particularly concerned by the business model for the university MOOC (see Haggard, 2013; Moody's Investors Services, 2012; Yuan & Powell, 2013). In other words, is it financially sustainable? Despite the rapid maturation of the MOOC, an effective business model has failed to emerge. And, with the mass arrival of MOOCs, many universities have had to rethink their hiring strategies along with their investment strategies (see Bourcieu & Léon, 2013; Haggard, 2013; Pence, 2013). On the one hand, setting up a

MOOC requires substantial funds. On the other hand, universities are trying to strike a balance between "open" and "complementary" courses combined with traditional course offerings (see EDUCAUSE, 2012; Voss, 2013). The ultimate aim is to realize a return on investments made in the MOOCs (Dellarocas & Van Alstyne, 2013).

In the belly of the beast, or how to teach 300,000 students

The idea behind the MOOC is to offer to a virtual super-group of students opportunities to participate—ideally interactively—in online learning. A MOOC normally includes traditional pedagogical resources like those used in university classrooms: assignments, quizzes, round-table discussions, lesson plans, schedules, assessment tools, information about the professor, and so on (see Figure 5). It may also include—and this is a core feature of the MOOC—video lectures. These are usually PowerPoint or Keynote presentations, often of high quality, in which the professor is giving a lecture to students (Figure 6). This type of online video teaching was largely inspired by the open online resources provided by the Khan Academy[3] since 2006, with about 5,000 "mini-courses" in various subjects.
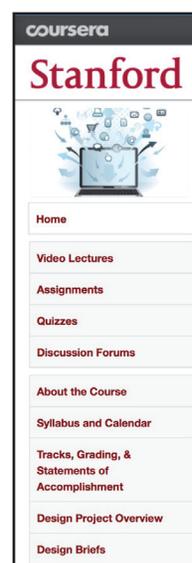
Figure 5. Screenshot of the main resources offered under a Coursera MOOC.

Figure 6. Screenshot of a video lecture as part of a Coursera MOOC.

In other words, and in very concrete terms, the MOOC is a derivative of the distance learning mode with the addition of video lectures. These multimedia presentations, in which the professor appears in person, constitute a new form of the school textbook according to some authors (Young, 2013). Nevertheless, many are wondering how the thousands of upcoming students will be taught. This promises to be a thorny problem. Can these enormous numbers really be taught all at once? When there is no actual communication with the students, is it still teaching? MOOCs normally use flexible teaching, and there is little standardization (Shirky, 2013). Furthermore, some authors contend that MOOCs lack pedagogical rigor (Vardi, 2012), and that they are comparable to a huge knowledge marketplace. Moreover, whereas MOOCs are acknowledged to be innovative, even revolutionary, in concrete terms they include a range of collaborative tools that learners do not actually use. Instead, they most often end up watching video lectures, which are basically another form of "chalk and talk" teaching, only online and at a distance.

Of course, there are also quizzes and other interactive elements, many of which are featured in Udacity. However, at the end of the day, the traditional teaching methods predominate. Aside from the fact that they are transmitted by the latest technologies, the teaching methods themselves are not particularly innovative. In addition, most MOOCs do not support much—or any—communication between teachers and learners. Thus, according to Khalil and Ebner (2013), MOOCs make it difficult or even impossible to achieve interaction between teachers and learners, especially in view of the large enrollments. A survey by Kolowich (n.d.) revealed that for the 103 professors who developed MOOCs, their interaction with learners was limited to a commentary posted on the class discussion board, and only once a week on average. A weekly critique on a public message board: is this what university teaching has come to? Does this almost non-existent interaction between teachers and students explain in part the students' extremely low success rates? For example, Duke University offered a course on bioelectricity last fall, and of the 12,725 students

who enrolled, only 313 passed the final exam (see Catropa, 2013). This amounts to a 2.45% success rate. And what about schools that do not disclose their success rates? Could they be even worse?

Many authors (see Yeager, Hurley-Dasgupta, & Bliss, 2013) stress that MOOCs also provide opportunities for thousands of learners to interact with each other, especially in discussion forums, and to build a kind of learning community. Most MOOCs include this feature, but so do many university courses, whether or not they are delivered at a distance. Certainly, the number of learners enrolled in MOOCs raises the diversity of the participants to epic degrees, particularly in cases where over 100,000 learners are enrolled. However, the handful of studies that have been conducted on MOOCs have demonstrated that notwithstanding the enormous popularity of MOOCs today, the vast majority of learners do not participate in discussion forums (see Kop, 2011; Kop, Fournier, & Mak, 2011; Sanders & Manning, 2013). The forums are intended mainly to re-create a classroom-like atmosphere. In other words, to really benefit from the diversity of the thousands of students enrolled in the MOOC, students would have to engage in the collaborative activities that are provided, and the discussion forums in particular. Otherwise, there is really no diversity. In the view of Sanders and Manning (2013), any conclusions about the effectiveness of MOOCs should be drawn with caution. For instance, if it is claimed that MOOCs are effective because they enable interaction, but the students actually interact to widely varying degrees, this claim must be brought into question. Apart from the appalling success rates, many studies have shown that the degree of autonomy and the social presence required of the students constitute major challenges (see Kop et al., 2011).

Similarly to distance learning, there is an enormous range of possibilities for creating a MOOC. Some feel that it requires a team of experts, including a film crew, programmers, graphic artists, and more. Others note that many software programs allow producing video lectures based on slides. A simple screenshot program on which a video is juxtaposed can also do the job. However, like producing a high-quality distance learning program, producing a MOOC can be time-consuming. Thus, the survey that Kolowich (n.d.) administered to 103 professors revealed that they had spent an average of more than 100 hours designing a MOOC, even before the course began, in addition to the time they spent receiving technical assistance. And speaking of the technology, MOOCS must be supported by infrastructures that are sufficiently robust to accommodate thousands of students at the same time. An open platform called XBlock,[4] developed jointly by edX and Stanford, is currently available online for free, although it is still in the fine-tuning stage, and the installation documentation remains very basic.

How to assess the work of thousands of students in an MOOC?

How can the work of tens of thousands of learners be assessed? The two most common methods of MOOC assessment are machine-graded multiple-choice quizzes or tests and peer-reviewed written assignments. Both of these come with significant problems of management and rigor. Other assessment approaches are been developed, such as machine-grading of written assignments. One thing is certain: students who enroll in a MOOC cannot expect to receive individual feedback on their work from their instructor. This is the price to be paid for educating thousands of students at once, as corroborated by the survey by Kolowich (n.d.). In the best-case scenario, another student will correct the work. However, in most cases, a machine will do the evaluation. Sometimes, especially when university credits are at issue, examinations are taken at a certain location, either at the university or else at one of the partnering centers. Naturally, this implies logistic and geographic limitations. It is surprising not to find more innovative online assessment practices, such as the Script Concordance (SC) test (see Charlin, Gagnon, Sibert, & Van der Vleuten, 2002), where students are faced with a problem that has more than one solution (i.e., more than one choice),

but one choice is better than the others, and they must select the best response. This method is designed to assess the examinees' knowledge in written but authentic clinical situations in which they must interpret data to make decisions. The main advantage of this method compared to the usual quizzes found in MOOCs is that it allows appraising not only factual knowledge, but also whether the examinees can organize that knowledge efficiently, or effect a hierarchical organization of knowledge. In this type of assessment, which is commonly used in the medical field, students who submit an erroneous response receive feedback from experts (by text, video, or audio), who explain why it was erroneous. This postevaluative teaching strategy is particularly appreciated by students because they can get individualized feedback on a computerized test. In contrast, most MOOC quizzes are machine-graded. When students make an error, the correct response is simply indicated, with no explanation. Some MOOC tests just suggest that the student review the video lecture (Figure 7).
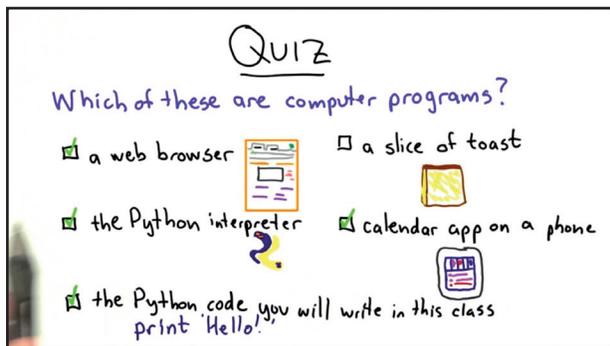

Figure 7. Screenshot of a MOOC quiz with automatic correction.

Connectivist MOOCs: somewhere between reality and fiction

Many types of MOOCs are mentioned in the literature, sometimes described as either "good" or "bad" MOOCs. MOOCs are also described as either more "connectivist" or more "traditional" (see Siemens, 2012). Some go so far as to classify them as c-MOOCs or x-MOOCS, to distinguish between the connectivist and traditional types, respectively (see Downes, 2011; Rodriguez, 2013). The c-MOOCs are usually associated with the pedagogical principles espoused by Siemens (2005), by which students are required to genuinely commit to the program in terms of developing learning objectives and producing course content. Due to competing obligations, adult learners do not always find this easy to do (see Fini, 2009).

The x-MOOCs are generally associated with more traditional pedagogical approaches, such as knowledge transmission, and are designed to provide some form of certification. This type of reward is particularly well appreciated by students who dream of obtaining a degree from a prestigious North American university. Thus, growing numbers of universities are offering these degrees to students, including the University of Alberta, with its course called "Dino 101: Dinosaur Paleobiology." The benefits of receiving this certificate are clearly stated at the beginning of the course (Figure 8). The x-MOOCs are also more specifically designed for mass teaching (see Downes, 2011). These MOOCs are usually offered by major America universities like Harvard and Stanford.

Figure 8. Screenshot of an official certificate awarded to graduates of a MOOC offered by the University of Alberta.

The connectivist MOOCs tend to foster peer interaction. In contrast, the more traditional MOOCs use more automated feedback. In both cases, the courses are offered to a large number of students. There is no doubt that some MOOCs lend themselves better to collaborative work and peer exchange. But can we really call them connectivist when they are designed to instruct thousands of students at once? It is sometimes too easy to associate connectivism with the MOOC. We should ask ourselves if this is really viable in learning programs that are offered to such a vast student body, with little opportunity to interact (see Kop et al., 2011). Certainly, the idea is appealing, but many studies have clearly shown that students generally do not interact much online (see Belanger & Thornton, 2013; Breslow et al., 2013; Gillani, 2013), unless participation counts for the final mark. In other words, if participating in a discussion forum will raise their mark, they will do it. This does not happen only in MOOCs. Students in traditional university courses often show the same behavior: it is immensely challenging to get them to participate in discussions. For example, we have conducted a series of experiments over the years with thousands of students, using forums and other tools, and we have invited them to participate in online collaborations (see Karsenti, Gervais, & Lepage, 2002). The same observation is made over and over: very rarely do students participate beyond what is expected of them. If they are to be marked on three forum posts during the course, they will produce the three posts, and no more. But if there are no marks for posting, and they realize that the time they invest in it will not be rewarded with tangible results, they quickly stop participating, regardless of whether the activity is supposed to be collaborative. Of course, the issue of online collaboration among learners is a little more complex. Nevertheless, the reality of today's university students, and more particularly those who enroll in a MOOC—usually they hold a job or are otherwise very busy—does not encourage them to participate in these types of exchanges unless they stand to gain a concrete reward. This has been confirmed many times over in studies on MOOCs (see Alario-Hoyos et al., 2013; Bruff, Fisher, McEwen, &

Smith, 2013; Cross, 2013; Gillani, 2013). We may add to this that a large percentage of students whose first language is not the same as the language in which the MOOC is given find it very difficult to interact in another language. So, if there is little interaction, where is the connectivism? Moreover, can we really call it connectivism when we know that, in actual fact, there is often no interaction at all between the teacher and the student? On top of all these challenges for students who participate in so-called connectivist forums, we must add that the forum can become a chaotic place if nobody is managing it. Forum management takes time and effort, which can be viewed as wasted and unrelated to the training objective. Forums are then left to go their own way, which may depart from the goals of the course (see Mackness, Mak, & Williams, 2010). Furthermore, Gillani (2013) notes that forum participants come together rapidly and disperse just as readily, like a crowd of students rather than a community of learners. Gillani proposed that this type of participation can be explained by the very nature of MOOCs: they allow students to engage in and disengage from the course freely, and sometimes very rapidly.

MOOCs and studies in university pedagogy

In our literature review, we found slightly more than 100 studies on MOOCs. In the mass media, such as *The Chronicle of Higher Education* and *University Business,* and in blogs, we found plenty of information about MOOCs. However, our literature review is based primarily on articles published in academic journals, research reports, and government papers. The first finding is that the academic literature is overwhelmingly in favor of technology and not very critical about the challenges involved in MOOCs. In fact, they are thought to be a panacea for problems of university teaching. A recent report by the Department for Business, Innovation and Skills (Haggard, 2013) describes some pro-MOOCs, or MOOC enthusiasts, who are generating a conspicuous literature that is not very critical

of this fresh approach. There is also a body of academic literature that is more nuanced and critical but much less prolific, and which is produced by less endowed universities that oppose MOOCs and question the actual benefits. We therefore find in studies on university pedagogy two rather disparate positions toward the uses, benefits, and challenges of MOOCs. There is the view of the technoenthusiasts, the pro-MOOCs, who overwhelming tout the advantages of using MOOCs for teaching, learning, and assessment in university education (see Glance, Forsey, & Riley, 2013; Sonwalkar, 2013). They highlight the main benefits of MOOCS, which are related to their potential capacity to resolve problems of access to education, such as distance, the job–family–school balance, and high tuition fees (see Hyman, 2012; Schroeder & Levin, 2012). Apart from pedagogical and access issues, the academic literature also addresses the advantages, such as the development of autonomy (see Mackness et al., 2010) and the creation of learning communities (see Alario-Hoyos et al., 2013), which are undoubtedly positive impacts of MOOCs. For Yeager et al. (2013), MOOCs also contribute to the development of twenty-first century skills, either formally or informally (Sangrà & Wheeler, 2013). Furthermore, the academic literature shows that students who complete a MOOC program are generally satisfied. The greatest source of satisfaction is gaining access to course content offered by a prestigious university. However, these studies also show that students very frequently participate passively in MOOCs. The question has been repeatedly raised as to whether passive or partial participation in a MOOC could not also be considered a kind of success (see Milligan, Littlejohn, & Margaryan, 2013).

The greatest skeptics, who are not necessarily against the introduction of MOOCs but are simply offering their opinions based on less than admirable outcomes, have put forward a number of arguments to qualify the positive impacts of MOOCs. First, according to these skeptics (see Fini, 2009; Gillani, 2013; Yuan & Powell, 2013), many of the advantages of MOOCs are actually advantages that are associated with distance learning. This more

critical body of literature also shows that the main advantage of MOOCs is first and foremost the free cost of the education, along with the universal accessibility, which however may come at the cost of teaching quality (Harder, 2013). The challenges noted are related to the low success rates (see Breslow et al., 2013; Gillani, 2013), intellectual property issues surrounding course content (see EDUCAUSE, 2012; Fowler & Smith, 2013; Porter, 2013), and assessment mechanisms for certification purposes (see Cisel & Bruillard, 2012; Liss, 2013; Yuan & Powell, 2013). One daunting challenge for MOOCs is to ensure support for the learning process, a process that requires learners to be highly autonomous (see Kop, 2011; Kop et al., 2011; Tschofen & Mackness, 2012). Apart from the universities' business models, which are undermined by MOOCs, there are the recognized benefits of granting to the world at large more universal access to knowledge (see UNESCO, 2012) and of furthering the democratization of education (see Barber, 2013; Pantò & Comas-Quinn, 2013).

Conclusion

Almost 20 million learners in over 203 countries have enrolled in a massive open online course (MOOC). Moreover, in the wake of the new Californian law, Bill SB520, which is designed to encourage university campuses to provide credit-bearing, transferable online courses, this number is expected to grow exponentially in the coming months. Is this a revolution, or simply a passing fad? Maybe it's a little of both. On the one hand, we are definitely in unknown territory, as never before imagined. What would we have thought 10, 20, or 30 years ago if someone had predicted that a university course could be given to 300,000 students across 203 countries at the same time, and online? It would have been unbelievable. On the other hand, and even though many academics have praised the MOOC as one of the most significant innovations in university education, we note that the pedagogical practices applied in MOOCs are really very similar to those used in distance learning, and they have been around for some time already, even

in what are considered traditional university courses. Revolution or fad? Only time and research will tell. For there is certainly a need to investigate this still fledgling trend in university teaching. This brief overview of studies conducted on MOOCs for university teaching reveals 12 main impacts, which are related to the various functions.

1. The first impact is the greater visibility of universities that have embraced the MOOC. The MOOC has proven to be an unprecedented marketing tool for universities. But universities can also go beyond the limitations of this role, and they can avoid derivative forms that approach fraudulent status.

2. The second impact concerns people's perceptions that universities embark on this type of enterprise for philanthropic reasons. This impact is perhaps related to the origins of the MOOC and to initiatives to develop open education resources online.

3. The third impact is that vast numbers of new students have been recruited, students who will eventually enroll in other courses offered by the university that offered the MOOC.

4. The fourth impact, which is connected to the third, is the possibility of recruiting better students. For instance, universities can choose the top performers within a population of thousands of students who took an online quiz. Why recruit computer science students at random when you can select the 100 best among the 300,000 who took a certain course? These virtual students, if they are genuine, represent safe investments for the university.

5. Fifth, MOOCs could also be used to try out online teaching and learning methods as well as new, computerized assessment methods.

6. MOOCs could also be used to determine the popularity of new curricula and course contents that would eventually be offered to non-virtual students. In addition, MOOCs could allow the university to diversify its education offer, for instance, through continuing education programs.

7. Many studies have indirectly demonstrated that MOOCs also enable students to develop certain skills and competencies (e.g., autonomous learning, computer skills) that would be highly useful for distance learning. MOOCs would therefore help students prepare for distance learning programs.

8. MOOCs have also made distance learning programs more popular, and this trend will only increase in future. No, MOOCs do not herald the end of distance education. In place of a dichotomy between traditional face-to-face teaching in the classroom and distance learning, whose reputation is more difficult to defend, MOOCs have shifted the debate and helped boost the reputation of distance learning.

9. MOOCs, like all forms of distance learning, enable learning from any place, at any time. This is an undeniable advantage in terms of mass access to a university education. Formerly, it would never have been possible for some people to take a course at Harvard, Stanford, and MIT over a single summer. Financially and time-wise, the advantages are even more evident. Thanks to the MOOC, all this becomes possible, wherever you live, for rich and poor alike. Despite the pitfalls and challenges, MOOCs have provided a universal entry point to a university education. However, we must not forget that MOOCs could also end up widening the gap between the major and minor universities. The fact that the most world-renowned universities are investing heavily in MOOCs is worrying, because of the potentially negative effects on smaller universities, which are funded mainly by students' fees. Do the universities that offer MOOCs really have a vision of democratized education? We will have the answer only when the universities' business models reach a certain maturity.

10. In the near future, MOOCs will also wield an impact on the legitimacy of certain university degrees and training programs. Within a very short time, employers will be asking job candidates if they got their qualifications through a MOOC or at a "real" university. If the teaching quality remains as uneven as it is now, MOOCs are liable to acquire the stained reputation that correspondence courses used to bear.

11. MOOCs could also better prepare young and not-so-young students to live in tomorrow's world, in the information society, where technology reigns.

12. Finally, even though MOOCs have not yet gained full academic recognition, MOOCs enable students to develop new skill sets, and consequently to improve their personal and professional lives.

Can the MOOC become an agent for change in university education? There is no doubt that the existing university teaching models will have to change with not only the ascendance of MOOCs, but also the momentum that they have given the distance-learning population. Do MOOCs really foster greater academic equality, or will they act to worsen the disparity between the techno-rich and the techno-poor, and between elite and run-of-the-mill universities? Are Quebec's universities prepared for this change? At least, we must acknowledge that MOOCs have arrived in Quebec, thanks to the EDUlib initiative by HEC Montréal[5] and a number of other projects that will be launched in the coming months. The most important idea to take away from all this, in our opinion, is that these initiatives should be made in a reflective manner, taking current research in the field into account. It would also be important to keep uppermost in our minds that neither technologies in general nor MOOCs in particular will foster successful university careers. Instead, it is the use that the students will make of them. MOOCs have a place in higher education only if they are aligned with the university's mission. Nonetheless, the growing popularity of this innovative delivery system suggests that it constitutes a necessary risk. This technological innovation has extraordinary potential, both for student recruitment and for testing distance-learning

schemes. It has become clear that the MOOC will be a transformative influence in our universities, even if the transformation may not be smooth.

Notes

1. http://ocw.mit.edu/index.htm
2. https://www.udacity.com/
3. http://khanacademy.org
4. https://github.com/edX/XBlock
5. http://edulib.hec.ca

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