The Disruption and Global Implications of Massive Open Online Courses (MOOCs) for Higher Education

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Abstract There has been a great deal of discussion on Massive Open Online Courses (MOOCs) since 2012 (considered by some as the year of the MOOCs). The emergence of MOOCs caused a great deal of interest among academics and technology experts as well as the general public. Some of the authors who wrote on MOOCs predicted it would be the next big thing to disrupt education. Other authors saw it as another fad that will go away once it had run its course (as most fads often do). But MOOCs did not turn out to be as such, and they are still around. Most importantly, they have evolved into something that resembles a viable business model. This development will have global implications for higher education and raises the prospect of bridging the North-South divide. This chapter examines this phenomenon and its implications from the theoretical frameworks of disruptive innovations and Jobs to Be Done—as developed by Clayton Christensen and his colleagues—and also explores its global dimension and its implications for higher education.

1 Introduction

Digital technology has impacted and continues to impact on many aspects of our personal and professional lives. This impact is continuously evolving as new developments in technology emerge. Like other industries, education has been affected by digital innovations. Cloud computing, the Internet, and wearable technology have transformed learning and teaching at schools, colleges, and universities (Sultan 2010, 2013, 2014, 2015a, b). One consequence of this transformation is MOOCs. MOOCs are courses provided free of charge and are widely available to all. At least, this is how they were being sold to people since 2012. This model differs from the online educational model that existed before. Online education has been

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(and continues to be) used by educational institutes throughout the world as a tool that complements class-based curriculum delivery.

The MOOCs model has great implications for educational institutes, especially, higher education. It raises many issues that impact several important aspects of traditional education in terms of income, quality, student experience, employability, and acceptability. Most importantly, the MOOCs model raises a big question over the future of education (especially higher education). Moreover, it has global implications for education and the potential to bridge the south-north divide in this area.

2 Objectives and Methodology

In this article, MOOCs are examined within the theoretical frameworks of disruptive innovations and Jobs to Be Done (developed by Clayton Christensen and his colleagues). This approach is helpful as it will highlight the process, implications, and future direction of this innovation in relation to education. More specifically, this chapter has three main objectives. It is aimed at:

1. Establishing MOOCs as a disruptive innovation (both new market and low-end)
2. Predicting its impact on higher education (especially in Western countries)
3. Predicting its impact on higher education in developing countries

These theories are the product of years of research into the failures and successes of many innovations and organizations, and their insightful, convincing interpretations of historical and current events are widely acknowledged by executives, directors, and authors throughout the world (McGregor 2007). This approach will be preceded by an introduction of the MOOCs phenomenon and its recent origins.

3 Background

3.1 MOOCs

The history of using the Web to provide courses to the masses for free goes back to 2006 with the establishment of the Khan Academy, a nonprofit organization founded by Salman Khan (an American of an Asian origin). The Khan Academy is a portal that contains thousands of free educational resources on different subjects (some made available through YouTube) translated into different languages. Subsequently, two Canadians by names of George Siemens (an educator Professor at the Center for Distance Education) and Stephen Downes (an online learning designer and researcher) delivered a free online course in 2008 entitled "Connectivism and Connective Knowledge 2008 (CCK08)." The course was also offered formally through the University of Manitoba and informally through open enrolment (at no

cost) to everyone in the world (Fini 2009). Some initiatives aimed at providing free university education have emerged since then. One of those was initiated by the University of the People (UoPeople). UoPeople was founded in 2009 by Shai Reshef (an Israeli educational entrepreneur. Courses provided by UoPeople are free, but students are required to pay a one-time application processing fee (e.g., US$60) and subsequent examination processing fee (e.g., US$100–200) levied per course. UoPeople offers undergraduate and postgraduate programs in business administration and computer science and has more than 9000 students from 194 countries.

It is interesting to note that since 2011, there has been a surge in interest in MOOCs by leading highly prestigious US universities that seemed keen to deliver their own online courses for "free." Examples include Harvard, Stanford, Michigan, Pennsylvania, Princeton, and MIT (to name but a few). Several start-up companies (for-profit and nonprofit) emerged since then and developed partnerships with universities and professors to offer MOOCs. By 2015 companies such as Coursera, Udacity, and edX became the biggest providers in terms of numbers of students registered. There are now over 7000 MOOCs worldwide and tens of MOOC providers worldwide (Shah 2017). The biggest and most successful of the MOOC providers are those which operate from the USA and have partnerships with leading American universities.

Despite the universal use of the term "MOOCs," some analysts (with some justification) claim that there are mainly two types of MOOCs: xMOOCs and cMOOCs. According to these views, xMOOCs relate to platforms that employ courses delivered by institutions to subscribers (a traditional one-to-many instructor-students model). xMOOCs employ a cognitive-behaviorist or instructivist pedagogical approach which relies on content-based training delivered at scale through a one-to-many learning environment (Anders 2015). Many existing MOOCs provided by companies such as edX, Coursera, and Udacity fall into this category which is the focus of this chapter. The origin of the letter "X" comes from "eXtended" or "eXtension" to indicate that the offering is an extension of the core curriculum. cMOOCs, on the other hand, relate to platforms where the subscribers can also be instructors who deliver content and take part in the discussions and learning (a kind of many-to-many model of learning). The C in cMOOCs is borrowed from the early open course Canadian initiative that began with the aforementioned course "Connectivism and Connective Knowledge" (Kennedy 2014). cMOOcs follow the pedagogic principles of connectivism through which learning is viewed as residing in the connections that exist between people and digital artifacts within a ubiquitous network (Milligan et al. 2013). Examples of cMOOCs include Change 11, Personal Learning Environments Networks and Knowledge (PLENK 2010), and Connectivism and Connected Knowledge 2011 (CCK11).

4 Theoretical Frameworks

4.1 Disruptive Innovations

The concept of disruptive innovations was first proposed and developed into a theory known as the "theory of disruptive innovations" by Christensen and his Harvard colleagues (Christensen 1997; Christensen and Raynor 2003; Christensen et al. 2004).

According to this theory, there are two types of innovations: sustaining innovations and disruptive innovations. Sustaining innovations take place frequently and are developed by large and well-established incumbent companies in order to improve/enhance the performance of their existing products or services that already have strong market share. New models of mobile phones and enhancements to popular software are examples of this type of innovation. Disruptive innovations, on the other hand, occur less frequently and initially tend to have performance problems. Furthermore, there are two main types of disruptive innovations: new market and low-end disruptions. Disruptive innovations that create new markets, according to this theory, occur when characteristics of existing products and services limit the number of potential consumers (defined in the theory as "non-consumers")—perhaps due to price or complexity—or force consumption to take place in inconvenient or centralized settings. Moreover, such innovations tend—initially—to be of lower quality than the well-established ones and often take a long time before they overcome such limitations. The personal computer (PC) is one example of a new market disruptive innovation. Prior to using PCs, gaining access to software and hardware for business and personal tasks could only be provided by gaining access to a terminal connected to a mainframe or minicomputer. Mini and mainframe computers were very expensive to buy and rent, and using their services often required a great deal of effort and expertise (e.g., requiring authorization, travel to gain access to a building that houses the terminal, technical skills). Moreover, when the PCs emerged, they had many limitations (e.g., limited memory, storage, and processing power and limited screen resolution) but were able eventually to overcome those limitations and disrupt the mainframe and minicomputers and create a new market in PCs.

Low-end disruptions affect the low-end of the original business or mainstream value network by attracting customers at this level of the business, who are often over served (i.e., they have too many excellent products to choose from). One example of this type of disruption was the Korean automakers' entry into the US market. The Korean automakers did not create a new market; they simply attracted the "least attractive" customers (e.g., those who could not afford the big cars and are happy with a "good-enough" vehicle). A hybrid of the two types (new market and low-end) of disruption can also exist. The American low-cost Southwest Airlines is one example of a hybrid disruption. It initially targeted people who were not flying (the non-consumers of air travel who used cars or buses) but later pulled customers out of the low-end of the major airlines' value network as well.

Faced with this type of disruption, managers (often those who successfully built their companies) tend to ignore or dismiss the potential of these innovations. The classical example is William Orton (President of Western Union in 1876) who called Alexander Graham Bell's telephone invention an "electrical toy." Western Union then had a monopoly on the telegraph which at the time was the world's most advanced communication technology (Melville 2015). Christensen (1997) does not fault these executives because he argues that these people are essentially following what is taught at business schools as being two principles of good management. These are as follows: (1) you should always listen to and respond to the needs of your best customers and (2) you should focus investments on those innovations that promise the highest returns. What often happens (according to Christensen) is that these two principles actually sow the seeds of every successful company's ultimate demise. Christensen brands it the "innovator's dilemma" because doing the right thing is the wrong thing.

The theory of disruptive innovations has recently been criticized due to the emergence of disruptive innovations (e.g., Uber, Airbnb, Google Maps) which did not go through the usual process/trajectory of suffering from performance issues in the initial stages of their development. The discussion of this critique is beyond the scope of this article. However, in a recent Web article, Michael Raynor (one of Clayton Christensen's colleagues) argues that the disruption theory, like any good theory, has remained a work in progress and that it has matured into a core set of concepts without slipping into an ossified orthodoxy. As such, disruptive innovations need not start with cheap and poor quality products which less resourceful (and unattractive) customers can afford. Rather, disruptive innovations can also get their start in entirely new markets, quite independent of the characteristics of the customers or markets in question (Raynor 2014).

4.2 Jobs to Be Done

In his recent writings, Christensen (see Christensen et al. 2016) describes the theory of disruptive innovations as "a theory of competitive response to an innovation." He claims that the theory explains and predicts the behavior of companies in danger of being disrupted and provides insights into the mistakes that incumbent leaders make in response to what initially seem to be minuscule threats. According to Christensen, the theory does not explain where to look for new opportunities, and it does not predict or explain how companies should innovate to undermine established leaders or where to create new markets. Nor does the theory explain how to create products and services that customers will want to buy or predict which new products will succeed. However, he claims in his thought-provoking book *Competing Against Luck: The Story of Innovation and Customer Choice* that the theory of Jobs to Be Done (his new theory) can address these deficiencies.

The theory of Jobs to Be Done (according to Christensen) is developed through inductive research and is the result of two decades of research to determine what

motivates customers to buy products and services. The theory is based on the premise that it is not the customer, but rather the job that a customer is trying to do is the right unit of analysis. What causes people to buy products and services (according to Christensen) is the "stuff" that happens to all of us every day. He contends that we all have jobs that we need to do which arise in our day-to-day lives and consumers buy or "hire" products and services to get these jobs done. He argues that this is what causes people to buy these products and services: to get a job done. He further explains that not everything we do is a job. For example, the need to eat is not a job to be done and neither is the need to feel healthy. The job to be done (according to Christensen) is different from the traditional marketing concept of "needs" because it entails a much higher degree of specificity of what one is trying to achieve. As such, a job to be done is progress that an individual seeks to achieve in a given circumstance. The circumstance is fundamental to defining the job (and finding a solution for it) because the nature of the desired progress will always be influenced (according to Christensen) by the circumstance.

Christensen provides the case of "milkshake" in his book as the first example of what motivates people to buy and prefer one product to another. He narrates the story of a US fast-food restaurant trying to determine how to increase sales of its milkshake. Having conducted a series of interviews with customers and improved its products based on those interviews sales of milkshake did not grow. When the restaurant managers finally approached a team of consultants to look into this matter further, the team looked at the problem from a different perspective. Following several observations inside the restaurant, it became clear that most sales of milkshakes took place early in the morning (before 9:0 a.m.). When customers—who purchased the milkshake—were interviewed when leaving the restaurant, it transpired that the milkshake fulfilled one purpose for them: to keep them full when midmorning hunger strikes. Other competitor products did not seem to fulfill this job very well. Customers were able to consume the product (milkshake) while driving on their way to work. Other products available (e.g., bagels, doughnuts) did not do the job so well because they were more difficult to consume. Bagels were often dry and tasteless. Doughnuts can be crumbly and leave customers' fingers sticky. The research team learned (following this experience) that what these buyers had in common had nothing to do with individual demographics or product characteristics. Rather, they all shared a common job that needed to get done in the morning.

The question that poses itself then is: To what extent can we make sense of these theories in understanding MOOCs and predicting their future? This question is addressed in the following section.

5 Disrupting Higher Education

Christensen et al. (2010) see great potential for online education to have a disruptive impact on traditional class-based teaching. This is because there are significant areas of non-consumption (often one of the main targets of disruptive innovations) that

online education can meet. The authors highlighted online learning as a classic example of a new market disrupting or substituting an existing business model (i.e., class-based education). They argue that this substitution is already happening because of the technological and economic advantages of computer-based learning, compared to the monolithic school model. Online technology provides accessibility for those who previously would not have been able to take the course. Moreover, it provides convenience for students to fit the course into their schedules at the time and place that is most desirable to them and, as such, can scale with ease (ibid.).

The high cost of Western higher education is also likely to create non-consumption among many students who are unable (or unwilling to be in debt) to meet the rising costs of degree qualifications. Degree courses delivered fully through online education are relatively inexpensive when compared with traditional college or university degrees (Clark 2009). This is especially true in many Western countries. In the UK, for example, a university home student can pay a total of up to £27,000 in fees for a 3-year undergraduate degree. In the USA, the annual degree fees charged by some universities can exceed US$40,000 (Bridgestock 2012). Online learning enables people to gain access to education at a significantly reduced cost. It also removes many of the inconveniences associated with a traditional education, e.g., registering at rigid, predetermined times of the year, commuting, attending classes, finding a seat in a crowded classroom.

> The MOOC phenomenon is an interesting case of online learning. Like online learning, digital technology is used for its delivery but differs in the sense that it is delivered on a massive scale and is also free or much cheaper. Given the aforementioned "rationale" of the theory of disruptive innovation, it is argued here that the MOOCs phenomenon has the potential to become both a new market and low-end disruption (i.e., hybrid disruption). MOOCs can target non-consumers of higher education (i.e., those who cannot afford its increasing costs) and can pull the least attractive students (especially from low tier higher education institutes that normally charge low fees) who want degrees that bear the names of "prestigious" universities. On that basis, the potential impact on higher education institutes worldwide could be huge (as will be demonstrated later in this chapter). MOOCs are not a sustaining innovation because sustaining innovations often target demanding, high-end users with better performance than what was previously available. For example, MOOCs are not an improvement to the online degrees that are currently being offered by many educational institutes throughout the world. By contrast, disruptive innovations do not attempt to bring better products to existing markets. Rather, they disrupt (as is the case with MOOCs) by introducing products or services that are less expensive to use, simple and convenient that appeal to new (non-consumers) or less-demanding customers (Christensen and Raynor 2003). Moreover, MOOCs did have performance issues (as disruptive innovations often do) when they emerged. For example, preventing cheating in online tests was a concern. Inability to provide credits and acceptability by employers was also a major challenge (Palin 2013). As MOOCs develop, solutions are being offered by MOOC providers to overcome these challenges. For example, many MOOC providers have adopted processes and technology to ensure effective proctoring in exams. Moreover, an increasing number of providers now offer credits and degrees, and some (as explained below) have teamed up with industry leaders to provide opportunities for internships and employment. The MOOC phenomenon is unlikely (at least not in the short or medium term) to radically impact existing educational practices and force traditional education providers (as disruptive innovations often do) out of business. However, if MOOCs manage to overcome its challenges (and win the trust of employers), its future impact on higher education could be

massive. This scenario will materialize when MOOC degrees (delivered by MOOC providers) become a viable and attractive alternative to traditional university degrees (i.e., when they establish a new market in this sector). When this happens, there will be two main winners and losers. The winners: these will be high tier reputable universities delivering MOOCs, either themselves or in partnership with entrepreneurial MOOC providers, and relying on massive revenues from substantial numbers of MOOC students worldwide. The losers: these will be the low tier and less reputable universities as MOOCs begin to attract the least attractive students (e.g., students with limited resources) from these universities. Some universities (of all sizes and backgrounds) tried to develop some MOOCs. However, these attempts were often more reactive than purposeful. Moreover, by introducing MOOCs, these universities could risk impacting their own traditional degrees as they will not be able to gain the international MOOC appeal and market that seems to be dominated by top-tier international universities that are in partnership with well-established and innovative MOOC providers. In a rare Web article, Horn and Christensen (2013) acknowledged that most universities which currently try to embrace MOOCs do so for fear of being left behind and because "disruption theory is finally widely enough understood that astute leaders know how to identify and chase opportunities early." However, much of the future of MOOCs will depend on the extent to which employers will be willing to recognize MOOC qualifications.

Recent announcements and activities by MOOC providers have created a great deal of debate on the future of MOOCs. In November 2013 Udacity (to the delight of MOOC sceptics) announced a radical change of its business model. Its co-founder (Sebastian Thrun) branded it a "great pivot." Since 2013, Udacity began to concentrate on providing courses that are vocational in nature (and partnering with employers) with the purpose of enabling learners find employment or improve their career prospects and also helping companies find candidates with the right skills. For example, Coursera partnered with Snapdeal, Shazam, and Instagram, Edx partnered with Microsoft, and Udacity partnered with Google, Facebook, Amazon, GitHub, and AT&T (Murray 2016).

What is significant about these partnerships is the emergence of MOOC credits that can be used to enter college or university and nanodegrees (Shah 2016). Nanodegrees are small programs aimed at addressing specific skills (often technical such as front-end Web developing, iOS, Android programming, and machine learning) and cost less than US$1000. Students pay US$200 per month for the course and can take as little or as much time as they need to finish. Those who finish within 12 months receive half of their tuition back, thus keeping the cost of tuition below US$1000 for most students. Upon completion, students receive a nanodegree. This credential may not mean much to traditional academia but is increasingly recognized by Udacity's partner technology companies looking for programmers and other skilled workers. AT&T, for instance, has pledged to reserve 100 paid internships for Udacity's nanodegree program graduates, and Google has invited top nanodegree graduates to visit its Silicon Valley campus.

Furthermore, in an effort to further legitimize its nanodegrees, the company began by attaching a job-placement guarantee onto some of its degrees. Although more costly at US$299 per month, Udacity's "nanodegree plus" programs come with a commitment from the MOOC provider to place graduates in jobs related to their coursework within 6 months of graduation or a full refund of tuition costs will be given.

To provide an example of the potential of this development, Udacity has enrolled more than 11,000 students on its nanodegree programs and graduated 3000 of those. In 2015, according to Thrun (one of its main founders), Udacity's revenue was growing nearly 30% each month, thus pushing the company into profit and its valuation to approximately US$1.1 billion (Dillow 2016). This development is a milestone for MOOC providers. Courses and degrees offered by such MOOC providers are developed in partnership with reputable American universities. As such, this relationship enables universities to achieve two objectives: (1) allow large number of its own students to take the MOOC course (possibly for credit) and (2) open the class to the public who might be interested in taking the course on a noncredit basis (Ong and Grigoryan 2015).

When MOOCs began in 2011, they lacked a real business model. According to Christensen et al. (2011), the most reliable sources of unexpected growth in revenues and margins are disruptive products and business models. They began by offering courses to everyone in the world for free (they still do). They had vague ideas of how to generate profit and began to struggle financially. However, developments since 2014 and 2015 saw a number of MOOC providers partnering with companies to offer short courses and degrees based on skills that are in demand by employers. These developments suggest that MOOC providers may have finally managed to carve a business model which will ensure their survival. Weise (2014) contends that this approach appeared to map well to employer needs and what can be described as areas of non-consumption (which disruptive innovations often target). Weise also argues that by not focusing on career-oriented training, colleges and universities have unwittingly left unattended a niche of low-end consumers who are over-served by traditional forms of higher education, underprepared for the workforce, and seeking lifelong learning pathways (ibid.). Winning the trust and confidence of employers could be a turning point for the future of MOOCs and the disruption this might cause to traditional higher education institutes, both high tier and low tier ones. The fact that MOOCs finally seem to have found a viable business model could be a game changer for their providers. According to Christensen et al. (2015), disrupters tend to focus on getting the business model, rather than merely the product, right. But when they succeed in doing so, they become able to move from the fringe to the mainstream, thus eroding first the incumbents' market share and then their profitability.

Education technology companies and alternative learning providers are, according to Christensen and Weise (2014), finding disruptive footholds by targeting non-consumers and graduates from well-regarded colleges who are struggling to launch their careers, make it into the workforce, or transition between jobs.

This is further echoed by Horn (one of Christensen's co-authors of the theory of disruptive innovations) who contends that the real disruption in US higher education was never going to come from "slapping" traditional courses online for free. The real disruption in higher education, according to Horn, was always going to come from a new system that looks quite different from the current one, a system that begins by serving non-consumers of traditional higher education and linking the learning provision with employer needs (Horn 2013).

MOOCs will eventually impact higher education establishments. The extent of this impact is not yet clear. However, small and less endowed universities and colleges (referred to as low tier in this chapter) will most likely be affected as they will struggle to team up with MOOC providers who will be interested in keeping the brand affinity almost exclusively with "pedigree" universities (Ong and Grigoryan 2015). Moreover, any attempts by these low tier universities and colleges to develop their own MOOCs could risk impacting their own campus-based degree programs which are the mainstay of these universities. Thrun (the founder of Udacity) once predicted that in 50 years' time (thanks to MOOCs), there would only be ten universities left in the world (Watters 2013). He listed these as:

1. Oxford
2. Cambridge
3. Harvard
4. MIT
5. Stanford
6. Princeton
7. The University of Pearson (acquires Coursera, 2016)
8. The University of Google (acquires Udacity, 2014)
9. The University of Walmart (acquires University of Phoenix, 2017)
10. Brigham Young University

This doomsday scenario for traditional higher education is probably far from reality and may not even happen. This is because there will always be consumers of brick-and-mortar educational establishments. These will be people who seek more than just the skills and the knowledge that are provided by these entities but also the social and emotional experience. Moreover, there are subject areas that cannot be fully replaced by MOOCs such as medicine. Nevertheless, MOOCs could impact the future income and growth of higher education establishments. This brings to mind the rationale proposed by the theory of Jobs to Be Done (introduced above). There will always be possibilities to "hire" brick-and-mortar higher education institutes by some consumers, not just for the social or emotional experience they provide but maybe also for the type of degree and the future aspirations of those consumers (dictated by their own circumstances) in order to get a job done. The same thing can also be said about MOOCs. Some consumers of higher education could hire certain MOOCs to do or accomplish an objective or progress such as getting a job or gaining a special skill that will enhance their career (a job to be done) but does not require years of training and high expenses. Indeed, research suggests that many of the registered students with MOOCs already have degrees. For example, a study revealed that 83% of MOOC students have a postsecondary degree, 79.4% of students have a Bachelor's degree or higher, and 44.2% indicated a level of education beyond a bachelor degree (Bayeck 2016). These students do not necessarily require another degree which may take several years to complete. This type of students would normally turn to higher education institutes for continuous professional development (and employer-recognized) courses in order to upgrade their

skills or gain new knowledge for career or employment purposes. But these students are now turning to MOCCs.

MOOCs are essentially cloud-based educational platforms. As such, people with access to the Web are able to access and use them. This factor creates huge opportunities for the MOOC providers. In fact, MOOCs owe their popularity to the international appeal and interest which was created when they first started. They have globalized education in a manner that is unprecedented in history. Moreover, we are only witnessing the beginning of this phenomenon. Their potential disruption to higher education has global implications, especially in developing countries.

6 The Global Impact on MOOCs

The Web has opened learning possibilities for people all over the world and is likely to have a major impact on developing countries in particular which have suffered for decades from poor education due to factors including lack of resources, bureaucracy, political interferences, and ill-equipped teaching and academic staff. The Web offers almost unhindered access to the developing world and opens opportunities for learning which did not previously exist. This situation could accelerate further due to the increasing penetration of the Internet in many of these countries (Internet World Stats 2018).

High rates of Internet usage in developing countries provide huge opportunities for MOOCs from international MOOC providers and reputable Western universities to enhance education in these regions that promise quality and the prospects of recognition by global companies such as Google and Amazon. Indeed, MOOCs have the potential to bridge the educational gap that exists between developing and developed countries.

However, there are massive IT infrastructural problems in many developing countries; many of which were the consequences of decades of neglect and corrupt regimes. In this type of environment, mobile technology could be the answer to this problem. If there is any future in taking advantage of the learning that is made available through the Web by new online learning and teaching developments such as MOOCs, it is likely to be through Web-enabled mobile devices. Shipments for smartphones are expected to reach almost 1.9 billion by 2018, a tenfold increase from the amount of shipments in 2009 (Statistica 2018). The increase in demand for smartphones is driven partly by their availability at low prices and partly by increased consumer appetite for Internet browsing, content consumption, and engaging with apps and services on mobile devices (Canalys 2012).

Accessing Internet services over lightweight portable devices, according to Dikaiakos et al. (2009), is one of the visions of the twenty-first-century computing. Using traditional desktop PCs to access the Web through broadband coverage is likely to be problematic in many developing countries (especially Africa) which suffer from low penetrations of broadband coverage and frequent power cuts. The difficulties of rolling out fixed-line networks across the continent's vast land mass

explains why in mid-2010 mobile users constituted around 90% of all African telephone subscribers (Internet World Stats 2012).

However, the advent of low-cost smartphones and netbooks with mobile data capabilities could be a game changer for many learners in developing countries to overcome problems related to lack or inadequacy of broadband coverage and power blackouts that often afflict many of their cities. Interestingly, some MOOC providers such as Coursera and Khan Academy began to develop mobile apps in order to enable learners to access MOOC material through their mobile devices. The comfort level of mobile phone usage in these countries—combined with such infrastructural limitations—offers learners a unique opportunity to take advantage of free and/or low-cost online learning opportunities made available by MOOCs. Such a scenario will no doubt have a disruptive impact on the ability of developing counties to access IT resources and will potentially bridge the digital and the educational divide that currently exists between them and the developed world. Most interestingly, free (or low cost) learning offerings by MOOCs could have a huge transformational impact on education in developing countries and could potentially improve the lives of many millions of people by reducing poverty which is often caused by lack of access to proper education. According to a UNESCO publication, education can reduce poverty in a number of ways.

Firstly, educated people are more likely to get jobs, be more productive, and earn high salaries. Secondly, although there is no simple causal relationship between educational attainment and the economic growth of a country, recent research shows that quality-adjusted education is important for economic growth. More and better education improves a poor country's economic growth and thereby generates economic opportunities and incomes (Van der Berg 2008).

The MOOCs phenomenon (as a disruptive innovation) will have a fertile ground of non-consumption in developing countries. Many learners in developing countries are unable to gain access to Western universities due to their inability to afford the fees, travel, relative high cost of living in Western countries, and the unrecognized status of their existing qualifications. Such prospective learners could find MOOCs provided by popular Western MOOC providers (associated with reputable universities) hugely attractive and maybe willing to pay for them if they offer credits for their courses and/or become widely acceptable for using their courses or degrees to gain further education or employment (as some popular MOOCs now do).

As is the case in Western societies, acceptability of online qualifications (including those emanating from MOOCs) will depend on the extent to which society (especially employers) are able to see value in them. In many Western societies, online degrees (granted by well-established universities) have become popular with students and accepted by many employers. Indeed, MOOCs experience with employers in the USA (as outlined in this chapter) is a good indication of the preparedness of employers to accept (and indeed support) credentials gained through online learning. This new development of online education provider–employer relationship could inspire other developing countries to recognize the merits of online education which may not be the case currently. In some developing countries

(e.g., Arab), job applications still require indications that applicants have qualified through full time, part time, or distant/open learning methods.

7 Concluding Thoughts

As demonstrated in this article, the MOOCs phenomenon has exhibited characteristics of a disruptive innovation: both low-end and new market. It has the potential (as evidenced from the provided examples) to attract low-end consumers (those who are overserved by traditional higher education offerings that shunned job-oriented training) and also to attract non-consumers (those who do not have the means to go to higher education colleges or universities). Many of these non-consumers exist in developing countries which have traditionally suffered from lack of resources and poor educational standards.

However, MOOCs are evolving, and it is early days to suggest that MOOCs will disrupt higher education in the way the PCs disrupted minicomputers. To replace the traditional college or university experience, MOOCs will have to operate like one, and there is no strong evidence to suggest that this is what MOOC providers intend to do. Some MOOC providers have acknowledged this fact and adopted a different business model that seems to be paying dividends. Partnerships with businesses to provide students with sought-after skills and jobs (a vocational business model) are where some major MOOC providers are focusing their resources. This direction seems to be successful.

Research indicates that many of the students who subscribe to MOOCs often have college and university degrees. This suggests that MOOC providers could be providing some of their consumers with opportunities to "hire" courses or short duration degrees to enable them to do a job that they need to do such as improving their careers or employment prospects. Focusing on the Jobs to Be Done, MOOC providers have the potential to attract huge numbers of consumers who wish to study or "pull" MOOC courses or degrees into their lives.

In summary, MOOCs (provided by innovative MOOC providers in partnership with reputable universities) have the potential to compete with higher education institutes by disrupting them in three ways: (1) new market disruption by competing with higher education establishments on quality and employability; (2) low market disruption by attracting the least desired or well-off students (both national and international); and (3) by attracting huge numbers of students who would traditionally approach higher education institutes for continuous professional development courses or postgraduate programs in order to upgrade their skills or gain new knowledge for employment and career purposes.

Realistically, no one can predict how MOOCs will eventually develop. We can only speculate. If the theory of disruptive innovations holds true, we could be at the beginning of a major change that will impact higher education and indeed the way we learn in the future. With developments in data-enabled smart mobile devices, learning and teaching provided by MOOCs could turn education into a scalable and

ubiquitous service. Many non-consumers in the world (especially in developing counties) could, as argued in this chapter, benefit hugely from this innovation. Ultimately, the success of MOOCs will depend on the extent to which employers (in developed and developing countries) are prepared for a cultural change. Recent developments of MOOCs suggest that employers (at least in the developed world) are beginning to see merit in this educational innovation. What is certain, however, is that MOOCs are evolving and their future impact on higher education could potentially create few winners and many losers in this sector.

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