The MOOC Revolution: The Search for Revenues and its Implications for Higher Education

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ABSTRACT

The world of higher education has been transformed by the advent of Massive Open Online Courses, or MOOCs offered both by traditional universities and by independent MOOC providers such as Coursera and Udacity. As these MOOCs evolve, providers are experimenting with ways to generate revenue while still adhering to their vision of making education accessible to students everywhere and in all phases of life. What business model they settle on will have implications for the financing of traditional higher education. This paper will summarize the revenue sources of the largest MOOC providers today and draw some conclusions and implications for the higher education sector.

INTRODUCTION

MOOC is a term that joined the vocabulary of higher education in 2008. Its most innovative letter was M, for Massive. Massive Open Online Courses have exploded since that time until they claim today almost 100 million registered users on their sites.

The potential of the MOOCs to open the way for students everywhere to access excellent university courses was recognized from the first moment: "Nothing has more potential to lift more people out of poverty," Thomas Friedman said in an editorial[1]. At the same time, there was both worry and celebration over their potential to radically shake up the world of traditional higher education. On the one hand, Sebastian Thrun, the co-founder of MOOC provider Udacity, stated: "Education is broken. Face it … It is so broken at so many ends, it requires a little bit of Silicon Valley magic … What is missing is scale.[2]" (Wolfson, 2013) Meanwhile, another observer likened the MOOCs to "supersizing in the fast food industry" and proposed that "MOOC practices need either improvement or rejection, in order to prevent the uncontrolled spread of junk education."[3]

One of the biggest unanswered questions facing MOOC providers is whether they can keep their product free while carving out a business model that enables them to cover costs and even make profits. This paper explores what some of the biggest MOOC providers have done in the

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[1] Friedman, T., 2013. Revolution Hits the Universities. The New York Times, January 26, 2013. http://www.nytimes.com/2013/01/27/opinion/sunday/friedman-revolution-hits-the-universities.html?_r=0
[2] http://www.bloomberg.com/news/articles/2013-06-18/venture-capital-needed-for-broken-u-s-education-thrun-says
[3] Baggaley, 2014.

2012-2014 period to find revenue streams while still defending the basic features of their model. The paper will start with a brief history of the MOOCs and then explore the avenues pursued to generate revenues by 13 MOOC providers from five countries, shown in the Table 1. It will end with some reflections on how this emerging model could affect traditional higher education and its own business model.

A BRIEF HISTORY

The groundwork for the MOOCs was laid in the early days of personal computing and the internet. The pioneering work of MIR with its OpenCourseWare in 2001 led to many experiments, including the one that is generally considered to be the first MOOC, at the University of Manitoba in 2008. The basic characteristics of this evolving phenomenon were three: no fees, no formal acceptance procedures or course prerequisites, and no predefined required level of participation in the courses. As was natural in such a context, there was also no formal accreditation offered for courses completed in a MOOC[4]. Interest was vast: the Artificial Intelligence course offered free and online by Stanford University in 2011 attracted 160,000 students. MOOC providers had objectives that were both ambitious and idealistic: edX´s vision was "to continue to work with universities, faculty, learning scientists and students to innovate and transform education, making it accessible on a global level to everyone regardless of social status or income, and revolutionizing on-campus learning, while improving quality[5]."

As MOOCs emerged and evolved, it became clear that they were not attracting the same profile of participants as a typical university course. One of the first surprises, revealed by the statistics from course offerings, was that the average MOOC student was not a pre-university candidate in a developing country who could not afford access to higher education, as MOOC providers´ mission statements might have anticipated. Instead, the average student was an American or West European with a college degree and sometimes a graduate degree, who wanted to continue learning. For instance, in 2014, Coursera reported that more than 60% of its enrolled students had either a bachelor´s or a master´s degree, 58% were from North America and Europe, and 70% were more than 30 years old. When asked why they take a course, some students indicate

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[4] Liyanagunawardena, Adams and Williams, 2013.
[5] Quoting founder and CEO of edX Anant Agrawal, in an interview by the European Distance Learning Education Association EDLEA) in 2014: http://edlea.org/index.php/news/409-edx-ceo-anant-agarwal-on-the-future-of-online-learning

that they want a "taster" of a particular subject matter or a particular professor. Some are independently cobbling together a degree, or want to learn about a subject unrelated to their profession or studies. Others indicate that particular employers are impressed when they see completion certificates from certain MOOCs as they sift through job applications[6].

A second surprise that emerged as MOOCs began to operate and grow was that the completion rates for the courses were extremely low. Dropout rates were very high: though completion rates can approach 40% and sometimes even more, the average for MOOCs is closer to 15%[7], which would not be considered remotely acceptable in a traditional university classroom or program. One study of learners´ patterns of engagement identified three levels of involvement among MOOC students: lurkers, passive participants, and active participants, with the latter being the smallest minority.[8]

If 2012 was the "year of the MOOCs"[9] and the moment when most big newcomers joined the market, 2014 was the year when they embarked on a serious search for a business model. The large MOOC providers had come on the market powered by large amounts of venture capital, which ranged up to $85m in the case of Coursera. Table 2 shows the sources of capital for some of the MOOCs analyzed in this paper.

The first concern of these nascent MOOC providers was to expand and carve out market niches. By 2014, however, the search for revenues had begun in earnest, both for the non-profit MOOC providers and those with commercial ambitions. Dellaroca and val Astyne (2013) predicted that the types of revenue streams collected would depend on who was paying and on what they were paying for. Based on this consideration, they developed a simple classification of where income for MOOC providers might come from. As they grow and evolve, different companies are populating some of the cells in this table in their search for revenues.(Table 3)

While these categories are helpful, for the purpose of this paper, a more interesting classification is to divide the emerging revenue streams for MOOC providers into traditional and non-traditional sources of revenues. See Table 4. In the first category appear some versions of those sources that have historically been used by universities to fund their activities, such as tuition

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[6] Coursera presentation to IE Business School, November 2014.

[7] http://www.katyjordan.com/MOOCproject.html

[8] Adams, et al, 2014, p. 204. Citing Siemens and Downes, 2011.

[9] Fischer, 2014, p. 149.

and fees. In the second are other sources that are either new or very marginal for normal universities compared to what they are or could become for MOOC providers.

TRADITIONAL REVENUE SOURCES

One of the most traditional sources of income for universities is government funding or private grants and endowments. As Table 2 above shows, many MOOC providers made early use of this revenue source to launch their operations. Some European MOOC providers currently receive government funding. Among the U.S. MOOC providers, universities are subsidizing the free course offerings in some cases (edX), while other providers have received large amounts of donations besides the venture capital from private interests shown in Table 2.

Funding from the public education budget is a source of revenue that could take on more importance in the future. The state of California, for instance, is expanding the use of MOOCs in public universities and colleges, following San Jose State University´s experiments with edX and Udacity in some basic courses (math and statistics). With the economic crisis causing budget cuts in California public universities in the wake of the financial crisis, many of them reduced course offerings, which meant that students struggled to get their required courses. In Spring 2013, SJSU launched SJSU Plus: three college courses required for most students to graduate were offered as MOOCs through Udacity's platform, which attracted more than 15,000 students. Failure rates for these courses (Elementary Mathematics, College Algebra and Elementary Statistics) were traditionally high. Student performance improved by about 30% under the new blended model, the Augmented Online Learning Environment. The program included an agreement for revenue sharing between Udacity and SJSU.[10] U.S. MOOC providers are also very interested in obtaining access to student financial aid, which could open a wide new door for them to provide alternatives to traditional classroom education, for pay.

Another traditional source of educational revenue is tuition and fees paid by students. MOOC providers have moved quickly from offering their courses entirely free to find ways to charge at least something to some of their students. While keeping courses free, some MOOC providers now charge for completion certificates or evidence of mastery, testing, or processing or

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[10] Firmin, et. al, 2014 and
http://www.sjsu.edu/chemistry/People/Faculty/Collins_Research_Page/AOLE%20Report%20-September%2010%202013%20final.pdf

other fees, an approach which some have dubbed "freemium to premium."

Coursera was one of the first MOOC providers to charge for certificates, starting in 2012 with fees in the $30-$90 range. By 2013 and 2014, many others had followed suit. There were basically two approaches to this source of revenue. One was similar to Coursera´s: to offer courses that were 100% free but to charge students for certificates of completion or attainment. This was the model followed by ALISON (€30-120 fees for its certificates), iversity (a processing fee is applied to the courses it offers that are eligible for the European Credit Transfer and Accumulation System (ECTA)) and FutureLearn (charges for its Certificate of Attainment). A look at Udemy´s webpage of course offerings shows that its prices range from free to $895. NovoEd´s fees run as high as $1,000 and the Open Training Institute charges even more: $1690-3900 for a certificate.

In order to certify that students have done their own work in a remote learning setting so that they can be granted certificates of completion, which are credible, some MOOC providers also, or alternatively, charge testing fees. edX, for instance, is partnering with Pearson´s extensive network of testing centers to offer fee-based validation services following proctored exams. Coursera is also experimenting with technology to verify students´ identities and proctor their exams online in collaboration with ProctorU, for an additional fee. FutureLearn charges £119 for a Statement of Attainment, once students have taken their tests in a testing center.

As universities begin to accept MOOCs for credit, the volume of revenue that the providers are able to obtain from tuition and fees will expand. Some universities already give credit for MOOCs if they are combined with a fee paid to the university and assessments taken and supervised there: the University of Washington, the University of Alberta, the Technical University of Denmark (DTS) and the University of Tel Aviv are some examples. The new Global Freshman Academy, offered by Arizona State University in collaboration with edX, offers a collection of freshman-level MOOCs in math, English, humanities, art and design and the sciences which may be applied toward a degree. Payment is made only once the course is passed with a verified proctor, if students want to receive credit, at a fraction of the cost of a traditional course[11]. Coursera currently offers five courses which the American Council on Education´s College Credit Recommendation Service (ACE Credit) has recommended for college credit, at the discretion of the students´ universities. The courses are taught by professors at Duke, Penn State and UC Irvine,

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[11] https://www.edx.org/gfa

and students sign up for them as part of Coursera´s Signature Track and then take an online proctored exam to complete the course. These types of accreditation decisions, by ACE Credit or Europe´s ECTS (European Credit Transfer and Accumulation System), would greatly enhance the revenue potential of MOOC providers and give them a giant push toward achieving stable revenue streams from tuition and fees.

Another approach, which is different from traditional tuition collection and which alters the incentives for students taking MOOCs, is to charge a monthly fee for student access. This places the burden on students to complete courses more quickly if they want to keep the cost low. The system was pioneered by Udacity, which first charged $200 per month for its verified certificate, and now charges the same amount for students who are completing one of its new "nanodegrees." Schoo also offers one lesson per month free of charge but then applies a monthly fee of ¥525 for those who want to take an unlimited number of lessons or courses.

Additionally, Udacity provides for a fee access to tutors who can answer student questions and coach them with their work in its MOOCs. This fee is currently $200 per course, for unlimited access to tutoring. (Some independent enterprises have moved into this space, such as MOOCs mentor, an Indian startup, which promotes a toll-free helpline for MOOC students in the United States and India, for a fee of about $30 per course.) Other providers may move in the direction of "genius bars" and other forms of tutoring services to collect additional revenue. All of the services included in what some MOOC providers call the "envelope of learning" –libraries, tutors, peer assistance, diagnostics and other services—could potentially generate additional revenues.

2014 also saw moves toward mini-degrees for a fee, for students who want to cobble their courses into a degree or certification that could appear on their resumes and boost their employment opportunities. In this spirit, Udacity launched its "nanodegrees" in 2014 for front-end web developers and data analysts, also for a fee of $200 per month while students are studying. The nanodegree has a final graded project to complete the program. Coursera in 2015 followed suit with a series of "specializations" that will be offered in collaboration with various university partners. These involve three or four compulsory, specialized courses plus a final "capstone project," for a fee of between $147 and $470 for the degree. edX is also offering "Xseries" certificates upon successful completion of two to five specific courses, for between $100 and $450.

Along these lines, but at the much higher end of the revenue curve, some MOOC providers

have negotiated partnerships with universities for traditional degrees, at a higher cost compared to other MOOCs but a much lower cost for traditional education. Georgia Tech was the first university to offer a Master´s degree in computer science in collaboration with MOOC providers, at a fraction of the cost of a normal degree. In 2014 two important variations on this theme were announced. Coursera unveiled plans to offer jointly with the University of Illinois an iMBA degree which students could approach in three ways: they could follow courses with no cost or credit; they could opt for a series of Specializations in different areas for a fee; or they could combine their Specializations and earn an MBA degree from the University of Illinois, at less than a third the cost of a traditional degree[12]. And the Stanford Graduate School of Business announced plans to partner with NovoEd to offer a LEAD certificate program on Corporate Innovation for $16,000. Stanford states that the program is not a MOOC since application is required, access is limited to 100 students and the learning experience is to be much more interactive[13].

Many variants on this theme will continue to emerge as the MOOCs evolve. Among the probable future directions is for universities to form consortia where each contribute their best digital courses and make them available to other members for a fee. MOOCs could also be combined with local study groups at participating universities, in a version of the "flipped" classroom. Experiments are underway in both of these directions, and others.

NON-TRADITIONAL REVENUE SOURCES

On the frontier between traditional and novel, MOOC providers are beginning to move into the area of company-sponsored courses or groups of courses, which are tailor-made and more specialized. The reason for this move is clear: a high proportion of students (50% in the case of Coursera) say they are studying to obtain career-relevant skills[14]. Company sponsors obtain visibility as well as access to a pool of skilled graduates, whom they might employ to help cover their skills shortages. A leader in this area is Udacity, which has AT&T sponsorship for its front-end web developer nanodegree, and Google patronage for its new Developing Android Apps nanodegree. Georgia Tech´s online, university certified course in computer science is sponsored

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[12] http://blog.coursera.org/post/118152158892/daphne-koller-announcing-the-first-mba-on
[13] https://www.gsb.stanford.edu/newsroom/school-news/stanford-graduate-school-business-creates-new-online-executive-learning
[14] Coursera presentation to IE Business School, November 2014.

by AT&T as well. As demand for highly specialized workers expands, so could demand for these types of relatively short and highly specialized degrees. The sponsoring companies might eventually seek access not only to skilled graduates and brand recognition but also to a broad range of diagnostic and analytical information on potential candidates, whose every keystroke has been recorded during their studies. This revenue stream could offer great potential for MOOC providers going forward.

Possibly the most important future sources of revenue for MOOC providers in the future are the non-traditional streams. One of these is advertising and promotion, which has not often been an explicit source of revenue for educational institutions in the past. MOOC providers have been reluctant to move into this area for fear that the advertising would detract from the learning experience. However, at least one, ALISON, displays paid advertising on its site, and it shares the advertising revenue with the course provider. It also charges students a fee for the option of ad-free membership, which ranges from €30 to €70. Even though most MOOC providers do not allow advertising on their sites, the potential for advertising revenue may be one reason that they compete so intensely for the largest number of visitors to their websites.

In fact, one reason many top universities have been eager to partner with MOOC providers or become providers themselves is to enhance recruitment: the display-window effect for the home university of offering a course to tens of thousands of students around the world. The University of London, for instance, discovered that a high proportion of its online degree students said that they had been influenced to apply to the school´s degree program because of a University of London MOOC. The institution estimates that it recruited some 300 students who enrolled in one of its 14 MOOCs into a fee-paying program.[15] Once MOOCs have a long enough track record to compile these types of statistics, a different kind of advertising potential could induce many more universities to offer MOOCs or partner with MOOC providers.

Some companies are also using the MOOC model to promote the use of their products. One example of a company using this Enterprise MOOC model is the German software company SAP, whose openSAP platform provides free courses and certifications. As a company that creates and distributes enterprise software, SAP is using its openSAP MOOC platform to promote its products and to gain insight into how they are used, which will help it develop future versions of

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[15] http://www.london.ac.uk/5713.html

its software. Although it is difficult to measure the impact of these potential revenue sources, it is clear that this is a model with much room for development.

More important and less explored than advertising so far is the potential that MOOCs offer as a source of copious amounts of highly detailed data and diagnostics that could be relevant to understanding learning styles, teaching methods and success, and individual aptitudes, among others. If the use of this information were authorized for research, this could turn into a source of revenue in the future. MOOCs have abundant data on student learning styles, problems and successes that students, and possibly even professors and schools, might like to access. Data recorded from edX courses, for example, includes students' clickstreams (recordings of where and when users click on a page), their homework, lab and exam scores, comments made on discussion forums and responses to end-of-course surveys. Student analytics could be studied for research into teaching methodologies and avenues for successful learning. Some MOOC providers are already using some of this macro data in research.

One of the current strategies to universalize student data for subsequent use in studies is through the use of the open source development model. This is a technique born in the software industry, whose philosophy is that if there is a huge potential for growth in a sector, then universal access to product designs and blueprints benefits all by leading to faster growth. The key promoter of the open source development model in the MOOC industry is edX, which open sourced its platform in June 2013[16]. The original edX partners (Harvard and MIT) also created the xConsortium, in which partner universities share research papers with each other using data provided by the Open edX platform. Since all of the partners are using the Open edX platform for their classes, all of their data is standardized and can be used by any of the xConsortium members to perform research on effective teaching/learning methods[17]. The wider the pool of data, the

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[16] Statement from Open edX: "Open edX is the open source platform that powers edX courses. Through our commitment to the open source vision, edX code is freely available to the community. Institutions can host their own instances of Open edX and offer their own classes. Educators can extend the platform to build learning tools that precisely meet their needs. And developers can contribute new features to the Open edX platform. Our goal is to build a thriving worldwide community of educators and technologists who share innovative solutions to benefit students everywhere. We invite you to explore Open edX and participate in our growing movement."

[17] xConsortium members (edX) statement on research purposes is as follows: "By carefully assessing course data, from mouse clicks to time spent on tasks, to evaluating how students respond to various assessments, researchers hope to shed light on how learners access information and master materials, with the ultimate aim of improving course outcomes. We are not only expanding access to knowledge, but

stronger the research findings will be, and ultimately this could be used to create tailored lessons for students, a new model that traditional educational institutions could use as well. Established educational institutions might also use this data to increase passing rates with the blended course model. xConsortium membership has expanded to include companies (Google), NGOs, and even international organizations such as the International Monetary Fund (IMF)[18].

The same data could also be used to identify ideal candidates for academic programs or for jobs. Udacity, in fact, provides for a fee a database of student analytics to potential employers. Again, high volume adds potential to this future revenue stream. It should be noted that in each of the cases mentioned and in the others which may arise, consent would become an issue, and participants would need to be informed in advance of the research, the data to be collected and the use that would be made of it[19].

When the 13 MOOC providers included in this study are analyzed and their use of traditional and non-traditional sources of revenue is tabulated (i.e., how many of the MOOC providers are currently using each revenue source), it becomes clear that most of them ventured first into obtaining revenue from traditional sources: certification and tuition (6 and 4, respectively). See Table 5. However, there is a fair amount of experimentation with non-traditional sources of revenue such as leasing of the platform, advertising, and marketing data, surveys and educational data mining.

If instead of looking at how many providers use each source of revenue we tabulate how many sources of revenue each MOOC provider is experimenting with, we obtain the figure below. It becomes clear here that Udacity has been the most aggressive or experimental in exploring potential sources of income (6 different sources of revenue[20]), followed by edX and Coursera (3 each[21]). See Table 6.

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developing best practices to enhance the student experience and improve teaching and learning both on campus and online."

[18] https://www.edx.org/press/edx-announces-new-membership-structure

[19] Marshall, 2014

[20] Udacity uses tuition, custom courses, sponsored courses, recruiting and analytics, marketing of data, surveys or education data, peer assistance and tutoring and certification (both student and company) as sources of revenue.

[21] EdX uses tuition, data and certification as sources of revenue. Coursera obtains revenue from tuition, diagnostics and verified identity services and certification.

IMPLICATIONS OF NEW BUSINESS MODELS FOR TRADITIONAL UNIVERSITIES

The debate over MOOCs and their impact on the financing of higher education have sometimes centered on the potential for MOOC providers to undermine the economic foundations of some educational institutions. This fear arises from the concern that the traditional university model, based on exclusivity, will be superseded by free, universal access to the same type of courses that will eventually be incorporated into competing degrees. So far, there has been little movement in this direction. While MOOC providers charge for certificates of successful completion, traditional universities are free to decide whether or not to accept those courses for credit or to allow them to be used toward existing degrees. Analytics on students of MOOCs show that many of those who follow courses do so for enrichment or to "market" themselves to potential employers. This means that they have little interest in using the courses to obtain traditional degrees. However, the University of Illinois and Georgia Tech programs are important steps in that direction and could be "game changers" for higher education if the trend continues.

The pressure on traditional universities from MOOC providers could become more intense if universities or higher education institutions such as ECTS decide to begin accepting credit for free online courses, or if employers decide to give them an equal value to a university degree. Neither of these seems likely at the present time, but they could evolve in the future.

This short discussion of the potential sources of revenue from MOOCs that have emerged in recent months, however, uncovers a surprising possibility: that MOOC providers may end up seeking most of their revenue from different sources than traditional universities, which could allow the two models to peacefully coexist. While universities focus on traditional sources of income such as tuition and fees, MOOCs are either serving non-degree students or are moving into small, specialized degrees that are tightly linked to company needs, which universities are not currently providing as a core activity. If they continue exploiting this revenue source by developing programs tailored to companies or specific skills, they will not directly compete with universities for traditional degree students. If existing universities decide to expand their use of MOOCs as a magnet for future students, this should not reduce university revenues; it could even enhance them. If MOOC providers are able to eventually exploit and sell student analytics to researchers, institutions or potential employers, this should not pose a threat to traditional universities either, but it could help them to perform their tasks better.

A further possibility is that MOOCs may become a complement to traditional education, which could result in a welcome decline in costs for students and universities both. The example cited above of San Jose State University is illustrative in this regard. If the fundamental challenge to universities is to contain the cost of teaching more students using fewer resources, as one expert put it (Gerhard, 2014), MOOCs could become a welcome ally to control cost pressures and inflationary trends in higher education and the onerous burden of student debt.

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APPENDIX

Table 1 Some characteristics of leading MOOC providers included in this study

MOOC	Country of origin	Year founded	Number of users registered on site	Alexa Rank (based on web traffic)
ALISON	Ireland	2007	4m	11,149
Udemy	USA	2010	4m	899
Veduca	Brazil	2011	20,000	61,451
Schoo	Japan	2011	17,000	39,560
Coursera	USA	2012	10m	1,066
Udacity	USA	2012	1.6m	5,816
NovoEd	USA	2012	600,000	16,116
edX	USA	2012	3m	3,636
OpenLearning	Australia	2012	89,770	117,446
iversity	Germany	2013	220,000	42,879
Open2Study	Australia	2013	278,523+	48,555
Open Training Institute	Australia	2013		285,496
FutureLearn	UK	2013	500,000	15,865

Source: provider websites (linked in table), http://www.alexa.com/topsites.

Table 2 Sources of capital for various MOOC providers

MOOC provider	Sources of capital
edX ($61m)	$60m Harvard + MIT, $1m Bill and Melinda Gates Foundation
Coursera ($85M)	*Venture (Apr 2012)*: $16m New Enterprise Associates and Kleiner Perkins Caufield & Byers; *Series A (Jul 2012)*: $6m New Enterprise Associates and Kleiner Perkins Caufield & Byers; *Series B (Jul 2013)*: $43m GSV Capital, International Finance Corporation (IFC), World Bank, Laureate Education Inc., Learn Capital, Yuri Milner; *Series B (Nov 2013)*: $20m GSV Capital, Learn Capital[22]
Udacity ($55M)	*Series A (Jan 2012)*: $5m CRV; *Series B (Oct 2012)*: $15m Steve Blank, CRV and Andreessen Horowitz; *Series C (Sept. 2014)*: $35m Recruit Holdings, George Zachary, Peter Levine, CRV, Andreessen Horowitz, Cox Enterprises, Valor Capital Group, Bertelsmann, and Drive Capital[23]
NovoED (~$4.8M)	*Seed (Jan 2013)*: undisclosed amount Foundation Capital, Costanoa Venture Capital, Maveron, Learn Capital, Ulu Ventures, Kapor Capital; *Series A (Jun 2014)*: $4.8m Stanford University, Costanoa Ventures[24]
Iversity (>$5.6M)	*Seed (Jan 2010)*: $100,000; *Venture (Aug 2011)*: $1.1m; *Series A (Jan 2013)*: undisclosed amount WestTech Ventures and T-Venture; *Series B (Oct 2014)*: $4.4m WestTech Ventures, T-venture, BMP Media Investors[25]
Veduca ($1.3M)	*Seed (Feb 2013)*: $750,000 Bolt Ventures, Nicolas Gautier, Digital Education, 500 Startups; *Seed (Oct 2013)*: $500,000 Digital Education, 500 Startups, Bolt Ventures, Nicolas Gautiers, Macmillan Digital Education[26]
Schoo ($4.4M)	*Seed (Jul 2013)*: $1.5m Incubate Fund, ANRI, Anri Fund, Itochu Technology Ventures; *Seed (Feb 2015)*: $2.9m Incubate Fund, ANRI, Itochu Technology Ventures, Link and Motivation Inc., Dentsu Digital Holdings[27]
Udemy ($48M)	*Seed (Aug 2010)*: $1m Larry Braitman, Naval Ravikant, Signia Venture Partners, Jeremy Stoppelman, MHS Capital, Keith Rabois, Joshua Stylman, 500 Startups, Russ Fradin, Paul Martino, and Benjamin Ling; *Series A (Oct 2011)*: $3m Lightbank, 500 Startups and MHS Capital; *Series B (Dec 2012)*: $12m Lightbank, Insight Venture Partners, MHS Capital, and Learn Capital; *Series C (May 2014)*: $32m MHS Capital, Insight Venture Partners and Norwest Venture Partners[28]

Source: Crunchbase.com

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[22] https://www.crunchbase.com/organization/coursera

[23] https://www.crunchbase.com/organization/udacity

[24] https://www.crunchbase.com/organization/novoed

[25] https://www.crunchbase.com/organization/iversity

[26] https://www.crunchbase.com/organization/veduca

[27] https://www.crunchbase.com/organization/schoo

[28] https://www.crunchbase.com/organization/udemy

Table 3 Potential revenue sources for MOOC providers

Who pays?	Course content	Data and analytics	What are they paying for?	
			Platform activity (student labor)	Complementary services
States/govern-ments	State subsidies			
Students	Tuition Certification	Diagnostics Feedback	Peer assistance T.A.s	Testing Tutoring Support forums
Employers	Custom courses Continuing education	Recruiting, analytics		Certification
Sponsors	Sponsored courses		Problem-sponsored learning	Access to experts
Other platforms	Syndicated courses	Student recruiting services		

Source: Dellaroca and val Astyne (2013).

Table 4 Emerging revenue sources for MOOC providers

Traditional or reformulated	Less or non-traditional
Grants	"Premium" services:
Donations	● Fees for certification
Government subsidies	● Processing or testing fees
Tuition and fees	● Tutoring or T.A. fees
Academic degrees	Mini-degrees
Custom courses for companies	Course syndication
Company sponsorships of courses or programs	Recruiting services
	Marketing data
	Educational data mining
	Hosting, course creation and support services
	Advertising

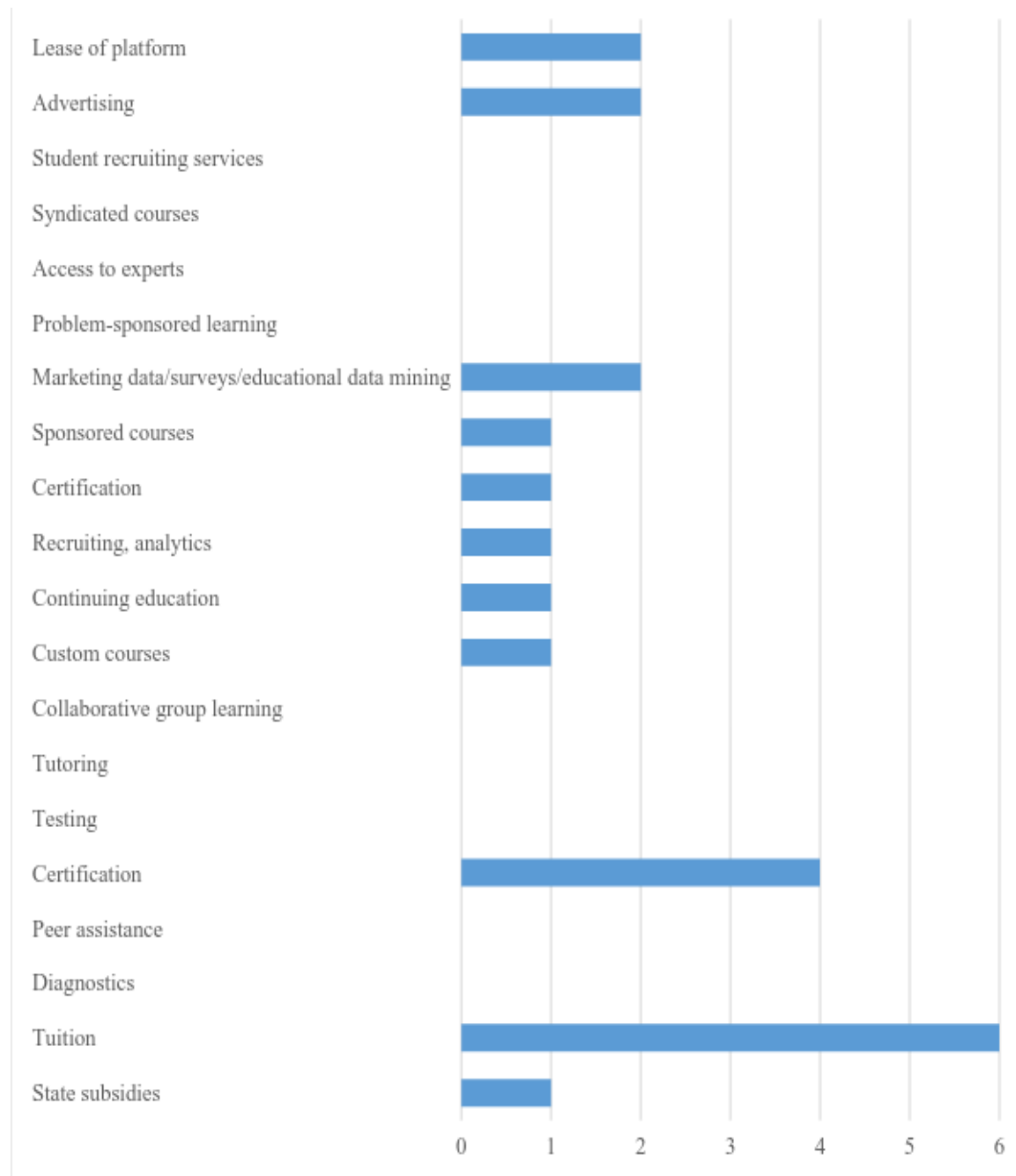*Table 5* Where are MOOC providers obtaining revenues?

Table 6 How many different streams of revenues each MOOC provider is currently using