Massive Open Online Courses (MOOCs) and how it will change higher education?

Muralee Thummarukudy

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“In fifty years, if not much sooner, half of the roughly 4,500 colleges and universities now operating in the United States will have ceased to exist. The technology driving this change is already at work, and nothing can stop it. The future looks like this: Access to college-level education will be free for everyone; the residential college campus will become largely obsolete; tens of thousands of professors will lose their jobs; the bachelor’s degree will become increasingly irrelevant; and ten years from now Harvard will enroll ten million students”

Nathan Harden
The End of the University As We Know It
Massive Open Online Courses (MOOCs)
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1.0 Introduction
Massive Open Online Courses (MOOCs) have become among the hottest topics in higher education in 2013. On one side are people like Nathan Hardan, quoted on the previous page of this document, who believes it will totally transform the landscape of higher education. Others are not so enthusiastic about its prospects of longevity, yet everybody is talking about it. MOOC is probably one of the most important developments in transnational education, with potential to do significant good and bad to the higher education scene in the developing world. It is therefore important these issues are discussed, understood and planned for by the academic community all over the world. This background paper provides the reader with a macro view of this phenomenon and its potential.

2.0 Massive Open Online Courses (MOOCs)
The term MOOC was coined in 2008 by Canadian researchers Dave Cormier of the University of Prince Edward Island in Canada and Senior Research Fellow Bryan Alexander of the National Institute for Technology (Canada) in Liberal Education in response to a course called Connectivism and Connective Knowledge (also known as CCK08). CCK08, which was led by George Siemens of Athabasca University (Canada) and Stephen Downes of the National Research Council (Canada), consisted of 25 tuition-paying students in Extended Education at the University of Manitoba, Canada, as well as over 2200 online students from the general public who paid nothing. MOOC was a logical outgrowth of the Open Educational Resources (OER) movement where many universities around the world put their teaching materials freely and openly in public domain for teaching, learning, educational, assessment and research purposes. MOOC moved on from this basic model to registering oneself as a student at a real or “virtual” university which offered this course with a possibility to get graded.

While there is no single or authentic definition of MOOC, the following are the key features that can be identified as characteristics of MOOC.

1. The academic content of the course is made available free to the student.
2. The course content is delivered online, and all formats of course materials (text books, videos, interactive forms) can be used.
3. There no limit to the number of people who can take the course, hence it could be massive.
4. While it is not necessary for a student of MOOC to be graded, most MOOC platforms offer that as an optional extra.
In what has since become legend in the higher education domain, a course in computer science, offered by Dr Sebastian Thrun from Stanford University was taken by 160,000 students from 92 countries. The experience so overwhelmed professor Thrun that he quit his job in Stanford and set up his own online university, called UDACITY, (pronounced YOU-DACITY, a play of words on You and Audacity) which is currently offering 25 courses with an academic enrolment of over 400,000. Since the Udacity experience, a number of new actors have come into the market and the most important ones are listed in Table below.

Table . Key Providers of Massive Open Online Courses

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Udacity</th>
<th>Coursera</th>
<th>iVERSITY</th>
<th>EdX</th>
<th>Future Learn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established in</td>
<td>2012</td>
<td>2012</td>
<td>2013</td>
<td>2012</td>
<td>2012</td>
</tr>
<tr>
<td>For profit</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Funding</td>
<td>Sebastian Thrun and Venture Capita</td>
<td>Partner Universities and Venture Capital</td>
<td>Venture Capitalists Foundations</td>
<td>30 Million Each for MIT and Harvard, 1 Million from Gates foundation + private partners</td>
<td>The Open University</td>
</tr>
<tr>
<td>Based in</td>
<td>United States</td>
<td>United States</td>
<td>Germany</td>
<td>United states</td>
<td>UK</td>
</tr>
<tr>
<td>Students from All most all countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Universities offering courses</td>
<td>None</td>
<td>107</td>
<td>29</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Subjects</td>
<td>Computer Science, Maths, Statistics and growing</td>
<td>Multidisciplinary, including medicine</td>
<td>Multidisciplinary</td>
<td>Artificial Intelligence, Computer Science and growing</td>
<td>Science, Arts and growing</td>
</tr>
<tr>
<td>Medium of Instruction</td>
<td>English</td>
<td>12 Languages, 80% in English, followed by Chinese, French and Russian</td>
<td>English, German, Russian, Italian</td>
<td>English</td>
<td>English</td>
</tr>
<tr>
<td>Number of courses offered</td>
<td>25</td>
<td>540</td>
<td>24</td>
<td>91</td>
<td>29</td>
</tr>
<tr>
<td>Total number of students registered</td>
<td>400,000</td>
<td>5,427,051</td>
<td>500,000</td>
<td>900,000</td>
<td>N/A</td>
</tr>
</tbody>
</table>

\(^2\)iVersity was originally established in 2008 but was re launched as a MOOC platform in October 2013.
2.2  **Tipping Point**

While MOOC is already happening, the tipping point in their role in revolutionising TNE will come when one or both of the following changes happen. These are accreditation of MOOC courses in the academic world and de-coupling between conventional academic degrees and jobs in the labour market. Things are already happening in this direction but what is needed is widespread acceptance of these practices in academic and real world.

Accreditation: One of the unresolved issues in the MOOC system is accreditation of the courses that are studied online. While conducting an exam at the end of the online course and awarding a degree have both become more or less standard practices of the MOOC system, universities around the world still have not accepted MOOC courses as equivalent to courses learnt in classrooms. However, a recent academic study conducted indicated that the learning outcome from an interactive online study and a course taken in a traditional formal are essentially the same when measured against pass rates and final scores (Bowen W.G et al, Ithaka S+R, 2012). The same study also did a speculative cost simulation and found that adopting hybrid models for instruction in large introductory courses have the potential to significantly reduce instructor compensation in the long run. As the evidence base of such studies increase proving both academic effectiveness and cost competitiveness, there will be increased acceptance of MOOC in the academic world and the labour market.

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**Georgia Tech Announces Massive Online Master’s Degree In Computer Science**

Institute teams with Udacity, AT&T to launch first-of-its-kind advanced degree program

ATLANTA – May 14, 2013 – The Georgia Institute of Technology College of Computing announced today that it will offer the first professional Online Master of Science degree in computer science (OMS CS) that can be earned completely through the “massive online” format. The degree will be provided in collaboration with online education leader Udacity Inc. and AT&T.

All OMS CS course content will be delivered via the massive open online course (MOOC) format, with enhanced support services for students enrolled in the degree program. Those students also will pay a fraction of the cost of traditional on-campus master’s programs; total tuition for the program is initially expected to be below $7,000. A pilot program, partly supported by a generous gift from AT&T, will begin in the next academic year. Initial enrollment will be limited to a few hundred students recruited from AT&T and Georgia Tech corporate affiliates. Enrollment is expected to expand gradually over the next three years.

“Georgia Tech’s vision is to define the technological research university of the 21st century. We will explore technologies and instructional approaches that will improve our role as a leading provider of the best and most effective education in the state of Georgia, the nation and the world,” said Rafael L. Bras, provost and executive vice president for academic affairs at Georgia Tech.

(From the Press release of Georgia Tech)
In most developed countries there are already systems for “equivalencies” for certifications provided by professional bodies with qualifications acquired by attending academic institutions. Therefore, systems to evaluate and incorporate MOOC obtained credits into mainstream academic programmes exist and the fact that it has not happened is more related to the very cautious nature of the traditional academic community than any conceptual difficulties with MOOC. A parallel development to the accreditation challenge is already emerging. Online universities are already offering certification of the online courses they offer. Online universities are already getting into partnership with private enterprises to accept their certification for employment as well as promoting the jobs obtained by their students on their websites. A combination of these forces will break the resistance from the academic community to create a seamless credit transfer between the “virtual world” and the “real world”.

Decoupling: Higher education, for most people, is an effort to improve their employability and increase their chances of getting better jobs. Universities have traditionally taken on the task of screening the students for higher studies, putting them through a series of courses and awarding them with a degree to recognise their achievements. The labour market, in turn, uses the type of degree and the prestige of the academic institutions as a proxy for the employability of the student.

“UDACITY introduce credentials built and recognized by industry with clear pathways to jobs. Together with AT&T and an initial funding from AT&T Aspire of more than $1.5 million, we are launching nanodegrees: compact, flexible, and job-focused credentials that are stackable throughout your career. And the nanodegree program is designed for efficiency: select hands-on courses by industry, a capstone project, and career guidance. Efficient enough that you can get a nanodegree as you need it and earn new ones throughout your career, even if you need to switch paths since a career isn’t always a straight line.”

Read more…

Nano Degrees:
Created and Accredited by the Employers
There is an increasing realisation by employers around the world that the academic world is failing in its duty to produce “employable” graduates. The academic rigidity of the university system teaches the students a range of courses and skills which does not correspond to the requirements of the real world. Also, while the requirements of the individual employer will vary, universities by their very nature can only have limited flexibility in their programmes which should prepare the student for a range of potential, unknown, jobs and employment. Consequently, on one hand the student has to learn a range of subjects he/she will never need in their future employment while the employer has to spend significant resources to retrain the new recruit to make them suitable for their organisation. Employers can specify the range of skills they wish to have in their recruits and the students can acquire them from the provider who offers the most appropriate course. The employer may require a graduate from a specific university, or somebody who has done selected courses from prescribed universities or have been certified by an independent agency for their skill levels. The potential employees have the option to pick and choose their academic backpack based on the type of employment they are seeking. A combination of technical, computing, management and cultural skills will become the mandatory items in the backpack of any aspiring employee in future.

2.3 Where is the Money in MOOC?

One of the basic premises of MOOC is that the basic course is “open”, meaning it is available free to the student. This, of course, is in line with the philosophy of the web where the basic product (be in search engines, social network sites or emails) are all given free to the consumer. The provider of such services then has to figure out how to recover their investments and make a profit.

In the traditional model of academics, it was the student who had to find the money to go to the prestigious university to learn a course. In the online world, it is now incumbent upon the university to develop and deliver the course online for free to the student. Naturally, the university need to find the money to sustain its efforts. Where will the money come from?

**Employer to pay for education**

“Starbucks Corp. is planning to foot part of the bill for an online degree for U.S. employees who work at least 20 hours a week in its cafes, corporate offices and roasting plants.

The coffee giant is teaming up with Arizona State University to provide tuition reimbursement and financial aid to U.S. employees who enroll in the school’s online bachelor’s degree program. Starbucks employees can choose among 40 areas of study, ranging from retail management to electrical engineering.”

From Starbucks Website
There are many business models for a new university. The most obvious one is that while the universities may continue to deliver the basic content free online, they could charge the students for examinations and the certification. This model is already practiced by Edx and Udacity. Because of the scale of the MOOC enrolment, in a course taken by 50,000 students (a very reasonable number for online courses), even if 10% of the students decide to get a certification paying USD 100, it can still bring in half a million US dollars in revenue. CEO of Udacity has reported that the overheads for a course with 160,000 students are covered by charging USD 1 per student. While the traditional academic model takes lot of money from very few students, the new universities can survive by taking a little money from a large number of students. (Reference: MOOCs and the disruptive innovation, the challenge to HE Business Models).

Coursera has identified 7 more possible sources of income in addition to certification which is the only current revenue stream. The additional possibilities identified are:
1. Secure assessments (students pay to have their examinations invigilated, which increase credibility of online course certification)
2. Employee recruitment (companies pay to have access to students’ performance records)
3. Applicant screening (employers/universities pay for access to records to screen applicants)
4. Human tutoring or assignment marking (for which students pay)
5. Selling the MOOC platform to enterprises to use their own training courses
6. Sponsorships (3rd party sponsors of courses)
7. Tuition fee

However, the revenue stream opportunities do not stop there. Courses taught online could have a set of reference documents in it and publishers can then be provided limited time online access to those study materials and the revenue thus obtained can be shared with the course provider. One can also imagine a range of other academic and non academic products and services sold to the student community through the platform bringing in revenue which is shared with the online course provider.

2.4 Winners and Losers

Like any new disruptive technology, there will be both winners and losers created by the higher education revolution. The biggest losers will be the hundreds of universities around the world which do not figure anywhere on the world university ranking indices. Once courses from the top ranking universities are available, free of cost, to students anywhere in the world, there is very little incentive for any student anywhere to enrol themselves in an unknown local university. Internet has already redefined the famous rule from Jack Welch when he advised GE to be number 1, number 2 or get out of the market in any sector. In the brave new world of facebook, there is no room even for number 2 and only number one will prevail. The question we should ask is “will this theory be translated to academics as well?” once learning goes massive, open and online. Which brands, of the existing universities will survive?. The top 500, 100, 10 or even a lesser number?
“MOOCs will disrupt different universities in different ways. Not all will suffer. Oxford and Harvard could benefit. Ambitious people will always want to go to the best universities to meet each other, and the digital economy tends to favour a few large operators. The big names will be able to sell their MOOCs around the world. But mediocre universities may suffer the fate of many newspapers. Were the market for higher education to perform in future as that for newspapers has done over the past decade or two, universities’ revenues would fall by more than half, employment in the industry would drop by nearly 30% and more than 700 institutions would shut their doors. The rest would need to reinvent themselves to survive.”

Higher Education: Creative Destruction, The Economist

The answer seems obvious. When your option is to study a course free from any university in the world, why would you opt for the second best and why would an employer opt for a student who has chosen only the second best? So the arrival of MOOC will change the landscape of universities and in another ten years one can imagine that there would be no more than a handful of recognisable university brands in the world. Let us for the sake of understanding call this the “facebook” university, as a reminder of how facebook trounced competition even from the second best rival orkut, supported by internet giant Google. A world in which only the top universities in engineering, medicine, law, music or commerce, will survive is very possible.

The Million Dollar Professors

In the current academic model every university offers similar courses and individual professors in all universities deliver the course to group of 50 or 100 students at a time. For example, foundation courses like geometrical drawing or engineering mathematics is being taught in every engineering university/college in the world. In India alone there are more than 3000 engineering colleges and hundreds of thousands of students who take this course every year. Assuming even 100 students per class, there are at least 1000, probably many times that, instructors teaching geometrical drawing alone. It is very easily conceivable that an outstanding professor in any of the universities in India, or outside, can put a fascinating series of lectures online and that will become the basic teaching material all over the country. While all the 1,000 teachers in India now get more or less the same wages, it is also very conceivable that this professor with world class pedagogical power will now be paid many times that by a company who arranges to sponsor his lecture and then charge a small fee from the hundreds of thousands of students who use his lectures.
A million teaching shops

Once we take out the captive students from the current universities to global brands and follow the lectures from the “super” professors, the question arises as to what will the thousands of universities and hundreds of thousands of colleges will do in future.

There are two reasons why physical “universities” and “colleges” will not become redundant. Firstly, there are a set of subjects, such as engineering and medicine, which need practical learning. Local engineering and medical schools can provide such facilities even when the curriculum is set and student achievement is evaluated by a global university. Secondly, the local institutions can become examination centres where integrity of the evaluation process can be verified by supervised evaluations. Thirdly, a majority of the students who study MOOCs will need to get some degree of tutorial support. This is similar to the tuition centres that mushroom around colleges. Local colleges can easily rebrand themselves as tutorial support centres for global universities.

A more important aspect will come from the non-academic aspects of university education. Universities were not only meant to be places where students learned academic topics but also where they developed their social and leadership skills. While some degree of networking skills can be learned online, the cultural aspect of growing up would mean that young people come together where they can chat, make friends, date and have fun. The physical space of the colleges and universities can still fulfil those services.

The current university set up will change in three ways in response to this transition. Firstly, there will be de-coupling from teaching and research. Traditionally, university professors conducted research, supervision and teaching concurrently and this will no more be needed as the high-end teaching gets taken over by the million-dollar professor and low-end tutoring by start-up lecturers. Research can be moved to research centres while teaching becomes tutoring. Secondly, the university space can become a centre for the microenterprise domain where individual tutors can deliver tutorial services. Such tutors need not be employed by the university as the “university” provides nothing but a physical space where the tutor and student can meet. Thirdly, students will be looking for maximum flexibility and better infrastructure in obtaining their tutorial support and therefore some degree of consolidation of the “teaching space” is inevitable. Successful “universities” in the third world, in future will be spaces that offer the maximum cultural experience to the students.

Re-birth of the Professional Bodies:

Widespread acceptance of MOOC at an administrative level could bring back a more prominent role for professional bodies, such as in the institution of engineers or bar councils. Historically, professions such as engineering, law and medicine only accepted a new candidate into their profession after the members have been put through an entry process which included technical training, practical apprenticeship and explicit commitment to professional ethics. However, mass production of engineers, doctors, lawyers and other professionals reduced the role of professional bodies to mere bystanders in professional education. A student could spend 4 years in an engineering college, obtain a degree in civil engineering and claim to be a civil engineer for life even though they have never undertaken any practical engineering at the entry to the profession of engineering or end of their careers. Professional bodies can once again set the entry criteria to professions which will include not only appropriate qualifications obtained through MOOC but also specify a duration of technical practice.
2. The Shape of Things to Come 2 (2013), The Evolution of Transnational Education, Research Highlights, British Council
4. The Maturing of the MOOC (2013), Literature Review of Massive Open Online Courses and Other Forms of Online Distance Learning, Department for Business Innovation and Skills
5. MOOCs and Disruptive Innovation, The Challenge to Higher Education Models (2012), The Observatory for Borderless Higher Education
Muralee Thummarukudy is currently the Chief of Disaster Risk Reduction at United Nations Environment Programme.

Muralee holds a PhD in Environmental Engineering from Indian Institute of Technology, Kanpur. He is an Alumnus of the International Leadership Academy (United Nations University) and a Beahrs’ fellow at the University of California, Berkeley.

Muralee has over 20 years of experience in Environment and Disaster Management around the world. Between 1995-2003, Muralee was Corporate Advisor to Shell operated oil companies in Middle East and South East Asia, dealing with oil industry related emergencies. Muralee joined the UN Environment Programme in 2003 and has undertaken post conflict and post disaster environmental assessment projects around the world.

Higher education continues to be an area of interest for Muralee. He is on the advisory committee of the Center for Natural Resources and Development (Cologne University of Applied Sciences, Germany) and Center for International Academics (University of Kerala, India).

Contact address: thummarukudy@gmail.com

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