



Australian Government  
Australian Trade Commission



Australia  
FutureUnlimited

# MORE THAN MOOCS:

Opportunities arising from  
disruptive technologies in education

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## Introduction

Education systems around the world are on the brink of major transformation. Many OECD countries<sup>1</sup> are concerned about the rising costs of education at a time when education is critical to building and enhancing national competitiveness and prosperity. But there is an inherent conflict between increasing access and maintaining or enhancing quality, while also keeping costs down. To increase participation rates, learning outcomes, graduation rates and employability, a strategic rethink of the current education model is required.

The education, corporate and technology sectors have initiated such a rethink. The degree of experimentation currently afoot is significant. It includes new models of teaching and learning, applying big data to improve learning outcomes, personalising the student experience and delivering free or low cost courses online. While the emergence in 2012 of Massive Open Online Courses (MOOCs) has attracted considerable media attention, the Australian Trade Commission (Austrade) believes it is the scale of experimentation across multiple segments of the education sector that is worth exploring.

Technology-based products and new models with the potential to cost-effectively scale education, while also enhancing student outcomes, may offer solutions to some of the current challenges. But what does technology-enhanced education mean for Australia's international education sector? And how can Australian education providers prepare and position themselves to take advantage of the opportunities and respond to the potential challenges that new online education models present?

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<sup>1</sup> OECD Education at a Glance, 2012. <http://www.oecd.org>

## Executive Summary

The *New York Times* termed 2012 the ‘Year of the MOOC’.<sup>2</sup> In January, Sebastian Thrun announced he was leaving a tenured position at Stanford University to found a company called Udacity, a MOOC platform. In April, Stanford University professors Daphne Koller and Andrew Ng founded Coursera and in May, Massachusetts Institute of Technology (MIT) and Harvard University announced the launch of the edX platform. The corporate sector also responded to the MOOC trend. In July, Apple’s iTunesU opened its platform to all players (not only existing partner universities), and in September, Google announced CourseBuilder, an open source platform for building MOOCs.

Beyond developments in providing free, online courses, institutions and companies are innovating around open educational resources, assessment practices, credentialing, research, and teaching and learning. While it is too early to predict which technological innovations will succeed or fail, the pace of innovation is tremendous as illustrated by the indicative timeline in Appendix B.

It appears that almost overnight, technology-based education models have become both credible and in-demand. While the merits of the different platforms and products that are being launched can be debated, they collectively signal an appetite for, and market shift towards, experimentation with new models of online education delivery that can potentially address some of the problems in the current education system. This report seeks to provide an explanation of the current US environment, the various emerging education models and experiments, and the potential opportunities and challenges for the Australian education sector.

Austrade has three strategic objectives for its role in promoting Australian international education:

- › To contribute to the growth in demand for Australian education;
- › To contribute to the repositioning of Australia as a provider of high quality education services to international students; and
- › To contribute to the building of a sustainable Australian international education sector.

In order to compete effectively for international students, education providers need to understand global demand, competitor strategies, the opportunities to recruit international students, and the challenges to competing on a global stage. Given that most of the public discussion has revolved around US education providers and technology companies, Austrade, through its network in North America, has researched these issues by speaking to a range of thought leaders, companies, universities, and non-profit organisations. (See Appendix A for the list of organisations consulted.)

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<sup>2</sup> New York Times, The Year of the MOOC, 2 November 2012.  
<http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html>

**Part 1** of this report aims to outline the drivers for change in the US education system and explain the appetite for considering technology-enabled approaches to educational delivery. These drivers are:

1. The reported crisis in US higher education;
2. The growing capital investment into new education initiatives;
3. The matching of available capacity (broadband Internet access, social media, smart phones) with consumer demand for technology in an education context; and
4. The strength of competition in the US education landscape.

The report states that the convergence of all of these factors increases the likelihood of a major disruption in education systems over the next decade.

**Part 2** presents a model of education where the functions are disaggregated, to demonstrate how education technology is already disrupting education systems. The new thinking and technologies that are challenging the status quo, with tangible, repeatable examples are illustrated across the following functions:

- › Marketing, recruitment and admissions
- › Teaching, learning and content creation
- › Research
- › Assessment and credentialing.

The report also reviews a number of recent initiatives that seek to disrupt current education business models by creating free or low-cost universities.

**Part 3** identifies some opportunities and challenges for Australia. Opportunities include targeting new segments of the student market, improving the student experience through personalised learning, using MOOCs as a marketing and recruitment tool, joining partnerships and consortia, contributing to educational research and debate, and marketing educational products and services in the US – one of the world's largest education markets. The main challenge to Australia is increased competition from both education and non-education players. There are also challenges around not identifying institutional risks and not developing a strategic response to them.

Finally, the report proposes a number of **steps to discuss and review** with the Australian education sector. These include workshops in Australia and the US in early 2013.

Reflecting Austrade's strategic objectives set out above, this report deliberately focuses on the implications that technological disruption may have on the potential future demand for Australian education, as well as the marketing and positioning opportunities and challenges it presents to the Australian education sector. These issues however, are only a part of what could become a significant policy issue; the other elements of this may need to be considered by other Australian agencies.

## Part 1 › Drivers of change

There are four main change drivers in US higher education that are pushing educators to innovate around new approaches to delivering education. They are crisis, competition, capital and convergence. Interest in, and funding of, technologies that support and enhance learning outcomes are being developed at a scale not seen since the early 2000s when a range of initiatives were launched, but proved unsustainable over time.<sup>3</sup> Each of today's change drivers is examined below.

### Crisis in US higher education

Many US educators believe there is a crisis in US higher education: not enough Americans are pursuing tertiary qualifications to maintain US economic competitiveness, many of those in higher education fail to learn things of relevance and substance or even achieve a qualification, and the ones that do graduate often find that their skills are not well-aligned to the needs of employers. Against this backdrop, government support for higher education has been declining (a trend that started even before the recession), and students, often heavily indebted in a poor job market, are questioning the value of a tertiary education. This crisis is exemplified by the following:

- ▶ President Obama has set a target to have America with the highest proportion of college graduates by 2020.<sup>4</sup> However according to the Secretary of Education, Arne Duncan, one third of students entering four-year institutions do not gain a qualification in six years, and two-thirds of all students at two-year colleges do not gain a qualification.<sup>5</sup>
- ▶ Given the low completion rates, it is estimated that in the US, 36 million people have 'some college, no credential'.<sup>6</sup>
- ▶ In *Academically Adrift: Limited Learning on College Campuses*,<sup>7</sup> the authors Richard Arum and Josipa Roksa found a lack of significant knowledge gain in the current college system:
  - 45 per cent of students "did not demonstrate any significant improvement in learning" during the first two years of college.

- 36 per cent of students "did not demonstrate any significant improvement in learning" over four years of college.

- ▶ Student loan debt stands at US\$1 trillion dollars.<sup>8</sup> The cost to attend a public four-year institution in 2011-12 in-state was US\$8244 per year, and the cost out-of-state was US\$20,770.<sup>9</sup> Tuition increased 8.3 per cent between 2010 and 2011<sup>10</sup> outpacing inflation. In California, which enrolls 10 per cent of all US students in higher education, tuition increased 37 per cent at two-year public colleges and 21 per cent at four-year public institutions.<sup>11</sup> The State Higher Education Executive Officers organisation reports that state and local support per student fell to US\$6290 in 2011, the lowest level in 25 years.<sup>12</sup>
- ▶ Private liberal arts colleges are subsidising their student cohorts through financial aid and need-blind admissions policies (i.e. admitting students who do not have the financial ability to pay tuition). Such policies are unsustainable.<sup>13</sup> The rate of return on university endowments must average 8-9 per cent just to meet existing costs, according to John Walda, CEO of the National Association of Colleges and Universities Business Officers.<sup>14</sup>
- ▶ Although US unemployment rates hover around eight per cent (or 12.3 million unemployed<sup>15</sup>), the Institute for a Competitive Workforce at the US Chamber of Commerce reports that there are some 3.2 million jobs that employers cannot fill.<sup>16</sup>
- ▶ According to the Center on Education and the Workforce, by 2018 more than 60 per cent of all jobs will require some sort of postsecondary training.<sup>17</sup>

8 Consumer Financial Protection Bureau: <http://www.consumerfinance.gov/pressreleases/consumer-financial-protection-bureau-and-u-s-department-of-education-joint-report-finds-a-cycle-of-boom-and-bust-in-private-student-loan-market/>

9 The College Board: [http://trends.collegeboard.org/sites/default/files/College\\_Pricing\\_2011.pdf](http://trends.collegeboard.org/sites/default/files/College_Pricing_2011.pdf)

10 The College Board: [http://trends.collegeboard.org/sites/default/files/College\\_Pricing\\_2011.pdf](http://trends.collegeboard.org/sites/default/files/College_Pricing_2011.pdf)

11 The College Board: [http://trends.collegeboard.org/sites/default/files/College\\_Pricing\\_2011.pdf](http://trends.collegeboard.org/sites/default/files/College_Pricing_2011.pdf)

12 State Higher Education Executive Officers: [http://www.sheeo.org/finance/shef/SHEF\\_FY11.pdf](http://www.sheeo.org/finance/shef/SHEF_FY11.pdf)

13 Inside Higher Ed: <http://www.insidehighered.com/news/2012/04/05/nacubo-study-discount-rates-finds-another-increase-and-drop-enrollment>

14 National Association of Colleges and Universities Business Officers: [http://www.nacubo.org/Documents/research/2011\\_NCSE\\_Press\\_Release\\_Final\\_Embargo\\_1\\_31\\_12.pdf](http://www.nacubo.org/Documents/research/2011_NCSE_Press_Release_Final_Embargo_1_31_12.pdf)

15 Bureau of Labor Statistics, October 2012: <http://www.bls.gov/news.release/empsit.nr0.htm>

16 Institute for Competitive Workforce/US Chamber of Commerce: <http://icw.uschamber.com/sites/default/files/HelpWanted%202012.pdf>

17 Gates Foundation: <http://www.whitehouse.gov/issues/education/higher-education>

3 John Daniels, "Making Sense of MOOCs: Musings in a Maze of Myth, Paradox and Possibility", September 2012.

4 White House: <http://www.whitehouse.gov/issues/education/higher-education>

5 Arne Duncan, "Help Wanted": <http://icw.uschamber.com/sites/default/files/HelpWanted%202012.pdf>

6 Mark Milliron, Chancellor, Western Governors University interview August 2012

7 Inside Higher Ed, [http://www.insidehighered.com/news/2011/01/18/study\\_finds\\_large\\_numbers\\_of\\_college\\_students\\_don\\_t\\_learn\\_much](http://www.insidehighered.com/news/2011/01/18/study_finds_large_numbers_of_college_students_don_t_learn_much)

## Capital

With every crisis comes opportunity, and this has not been missed by companies ranging from multinationals to start-ups to venture capitalists. Both funding for new education models that address the problems in higher education, and funding for technologies that purport to improve education, are at all-time highs. Capital as a change driver is exemplified by the following:

- › Financial support for Obama's education agenda comes from the Lumina Foundation for Education which has a similar goal of increasing the share of Americans with high-quality tertiary education to 60 per cent by 2025.<sup>18</sup> The Gates Foundation, along with the Ford Foundation and William and Flora Hewlett Foundation, have also identified college access and completion as funding priorities.<sup>19</sup>
- › According to the National Venture Capital Association, venture investments in education technology companies rose to US\$189 million in Q2 2012, up from US\$82 million in Q1 2010.<sup>20</sup> In 2011, investments in education technology reached almost US\$1 billion, up from about US\$150 million in 2006.<sup>21</sup> Venture capitalists investing in education initiatives include GSV Advisors, Signal Hill, Weld North, Sequoia Capital, and Benchmark Capital.

## Competition

The US education market is one of the largest education markets in the world. It is also a competitive market in terms of size, scale and diversity of organisations. There are nearly 5000 tertiary education providers in the US including four-year public institutions, four-year private non-profit institutions, two-year public institutions, two-year private non-profit institutions, and two- and four-year for-profit institutions. Education is also increasingly being delivered by non-education players including companies and start-up ventures (e.g. Udemy, Coursera, Saylor Foundation, iTunesU, Khan Academy). This competition has enabled institutions to specialise and target different segments of the student market. It has also allowed some types of institutions, such as Western Governors University, greater flexibility to innovate with online education. New competitors from outside the

higher education sector are also beginning to enter the market. Competition as a change driver is exemplified by the following:

- › The for-profit institutions were the forerunners in providing online education, focussing predominantly on the needs of the working adult segment of the market for flexibility and convenience. Its market share grew from two per cent in 1987 to 31 per cent in 2009, a growth rate of 2111 per cent. In comparison, public institutions grew by 12 per cent and private, non-profit institutions at 31 per cent during the same time period.<sup>22</sup> In the US, about 10 per cent of students attend a for-profit institution. By way of example, in 2010, the University of Phoenix enrolled more than 300,000 students in its online campus.<sup>23</sup>
- › Employers have become education providers by retraining workers, setting up their own universities, and offering professional development and vocational training. It is estimated that more than 2000 companies have developed their own universities and academies.<sup>24</sup> For example, Cisco offers training to students and professionals in ICT networking, problem-solving, critical thinking and collaboration through its network of 10,000 Cisco Network Academies in 165 countries.<sup>25</sup> KPMG offers nearly 2800 instructor-led training programs as well as e-learning events for its staff.<sup>26</sup>
- › The new model of education delivery is involving traditional players including universities and colleges (for-profit and non-profit), education services companies (e.g. Pearson), and new players such as education start-ups (e.g. 2U, Inc., Udacity), foundations (e.g. Saylor Foundation), publishers (e.g. Houghton Mifflin Harcourt), technology companies (e.g. Google, Apple) and telecommunication companies (e.g. Verizon's Thinkfinity education portal).

18 Lumina Foundation: <http://www.luminafoundation.org/>

19 Gates Foundation: <http://www.gatesfoundation.org/postsecondaryeducation/Pages/default.aspx>

20 National Venture Capital Association: [www.nvca.org](http://www.nvca.org)

21 Michael Moe, Founder and CEO, GSV Asset Management

22 Richard Garrett, Eduventures: "Online Higher Education (Draft October 2012)

23 National Center for Education Statistics, US Department of Education: <http://nces.ed.gov/fastfacts/display.asp?id=74>

24 International HR Forum: <http://internationalhr.wordpress.com/2011/05/02/from-training-departments-to-company-academies-part-1/>

25 Cisco: <http://www.cisco.com/web/learning/netacad/academy/index.html>

26 KPMG Careers: [http://www.kpmgcareers.com/whykpmg/innovative\\_tech.shtml](http://www.kpmgcareers.com/whykpmg/innovative_tech.shtml)

## Convergence of technology and consumer demand

Why did online education initiatives such as Columbia University's Fathom portal fail in 2003?<sup>27</sup> One often cited reason is the lack of consumer appetite for online education, as online education was seen as inferior to in-person, bricks and mortar models (and is still seen this way by 30 per cent of US university presidents).<sup>28</sup> However, the infrastructure to access the Internet has greatly improved since the late 1990s through broadband connections and mobile devices, and thus the transaction costs are virtually zero. At the same time, students globally are demanding the use of technology to make classroom time more effective. As technology now enables on-demand access to information and interactive online experiences, learners are also demanding on-demand and interactive learning experiences. This convergence is exemplified by the following:

- › In the US, broadband access at home has grown from eight million in 2000 to nearly 200 million in 2011.<sup>29</sup> In China, 450 million people have access to broadband networks and 66 per cent of Chinese access the Internet through their mobile devices.<sup>30</sup> Similarly in India, access to the Internet is more common through mobile devices than fixed line connections. In 2012, there were an estimated 900 million mobile subscribers in India alone, up from 10 million in 2002.<sup>31</sup>
- › According to the Pew Internet Center, 45 per cent of American adults own smartphones and that number increases to 66 per cent of those aged 18-29, and to 68 per cent of those living in households earning US\$75,000 or more.<sup>32</sup>

- › Alongside increases in broadband access, the use of online social media has become pervasive. Facebook boasts 850 million active users; Twitter 500 million users; Google+ has 90 million users; and LinkedIn has 150 million registered users.<sup>33</sup> People have become comfortable with developing and maintaining personal and professional relationships online and interacting through platforms and applications.
- › Eduventures estimates that more than 50 per cent of degree-granting institutions in the US currently offer at least one online degree or for-credit certificate program. Online programs also account for more than 60 per cent of all programs taken by students at four-year for-profit institutions.<sup>34</sup>
- › According to the Pew Internet Center, 23 per cent of college students report that they have taken a class online. However, the share doubles to 46 per cent among those who have graduated in the past ten years. Among all adults who have taken a class online, 39 per cent say the format's educational value is equal to that of a course taken in a classroom.<sup>35</sup>
- › A recent poll conducted by Northeastern University and FTI Consulting found that 49 per cent of all Americans, and 61 per cent of Americans aged 18-30, thought the quality of online education was comparable to traditional programs.<sup>36</sup>
- › Even for students taking an in-person class, there is an expectation that content will be available online for later use as a study tool. In some cases, students prefer to take classes where the lecture portion is recorded and available online. When Stanford professor and co-founder of Udacity, Sebastian Thrun, offered his Artificial Intelligence class online, students stopped attending the in-person lecture because they preferred to hear the lecture in their own time at their own pace of learning.<sup>37</sup> This meant they could fast-forward, rewind, stop and reflect as often as they wished.

27 MOOCs and disruptive innovation: The challenge to HE business models, The Observatory on Borderless Higher Education

28 The Digital Revolution and Online Education: <http://www.pewinternet.org/~media/Files/Reports/2011/PIP-Online-Learning.pdf>

29 Federal Communications Commission: <http://www.broadband.gov/plan/executive-summary/>

30 China Internet Watch: <http://www.chinainternetwork.com/whitepaper/china-internet-statistics/>

31 Budde Communications Pty Ltd: <https://www.budde.com.au/Research/India-Key-Statistics-Telecommunications-Market-and-Regulatory-Overview.html?r=51>

32 Pew Research Center: <http://pewinternet.org/Reports/2012/Smartphone-Update-Sept-2012.aspx>

33 Anson Alexander: <http://ansonalex.com/infographics/social-media-usage-statistics-2012-infographic/>

34 Richard Garrett, Eduventures: Online Higher Education, Draft Paper October 2012.

35 The Digital Revolution and Online Education: <http://www.pewinternet.org/~media/Files/Reports/2011/PIP-Online-Learning.pdf>

36 Northeastern University and FTI Consulting: Innovation in Higher Education Survey. <http://www.northeastern.edu/innovationsurvey/>

37 The Chronicle of Higher Education: <http://chronicle.com/article/Professor-Leaves-Teaching-Post/131102/>



## Part 2 › Technological disruptions

Disruption is occurring in US education. But which parts of the education system are more likely to be affected? Michael Staton, Founder of Ingral (a social app company based in Silicon Valley), suggests that higher education is a vertically integrated operation delivering a number of core functions<sup>38</sup> (see Figure 1). In this environment, educational institutions will not only compete and collaborate with other educational institutions, but also with a range of service providers that deliver one or more of these core functions. Pearson is a good example of a provider that offers services in content creation and dissemination (content loop), testing and certifying learning (access to opportunities), and coaching and performance feedback (meta-content and skills). It does not currently offer the functions included under transformative experience.

An unbundled model of higher education also creates opportunities for institutions to specialise as well as to potentially ‘rebundle’ their functions in new ways. MOOCs are an interesting example of how this could play out. Much of the discussion at the moment is how MOOCs are disrupting the *creation and dissemination of courses*, but they may also disrupt *teaching and learning* as new pedagogy is created around delivering education at massive scale. They could also disrupt how *assessment* is conducted by incorporating machine learning and peer-to-peer assessment models.

A company that is already ‘rebundling’ the functions of higher education is 2U Inc. (formerly known as 2tor).<sup>39</sup> 2U Inc. partners with universities, such as Georgetown University and University of Southern California, to design and create online courses. It also markets the courses for the partner universities and provides student support services. The university provides the *teaching, content and awards the credit*.

38 Staton, Michael, "Disaggregating the components of a college degree." Paper prepared for the American Enterprise Institute conference "Stretching the Higher Education Dollar," 2 August 2012.

39 2U Inc.: <http://2u.com/about/>

Figure 1: Disaggregating the Components of a College Degree



Below is a table that outlines the sectors or functions of education and some of the organisations operating in each sector.

Players Operating in the Unbundling of Education		
Sector	Description	Players
Recruitment and admissions	Companies are offering online platforms and services to assist students find education providers and vice versa.	Zinch, Hobsons, Hotcourses
Content	From traditional publishers, online education resources (OERs), through to entire online programs. These companies are becoming “outsourcing” providers. Some universities offer their own content, while others who are new to online/blended learning are forming partnerships with content vendors.	Pearson, McGraw-Hill, some MOOCs (edX, Khan Academy), 2U, Inc, Western Governors University, University of Phoenix, Grockit, Treehouse, OER, Codecademy, Creative Commons, <b>Seek Learning</b> , <b>Navitas</b>
Learning Management Systems (LMS)	An LMS is an online platforms that universities can use to develop and deliver their own teaching and learning models.	Blackboard, Desire2Learn, OpenClass, <b>Moodle</b>
Teaching/learning systems (platforms)	In addition to recorded lectures from university faculties, start-ups and some universities offer open tutorials for mastering “nugget-sized” learning needs and/or platforms for delivering entire online courses and online degree programs. (Some are free, some charge tuition.)	MIT OpenCourseWare, some MOOCs (Coursera, Udacity, Khan Academy), iTunesU, Google CourseBuilder, Class2Go, <b>OpenLearning</b> , <b>Learning Activity Management System (LAMs)</b>
Accreditation	Alternative modes of accreditation have been around for a while, but the growth of badges and other means of indicating learner competence have placed accreditation in the spotlight.	Smarterer, Treehouse, Mozilla Foundation, Degreed, Codecademy, MacArthur Foundation, Gates Foundation, Straighter Line
Testing/assessment	At the most basic, these companies help learners prepare for tests/admissions. Some are also starting to offer assessment services within existing universities and some MOOCs.	Pearson VUE, Kaplan, Grockit, ETS, Proctor University
Data and analytics	This sector is bringing business intelligence into all aspects of education: teaching, learning, research, and administration. There is particular focus on creating adaptive learning tools to create individualised learning paths for each student.	Knewton, Dreambox, Ellucian, Pearson, Carnegie Mellon Open Learning Initiative, Adaptive Curriculum, <b>Smart Sparrow</b>
New online universities	Education providers offering online courses, degrees and credentials for little or low cost. These are still seeking full accreditation in the US.	World Education University, University of the People, Peer2Peer University, Minerva Project
Multiple solutions and services	These service providers are providing almost all of the products and services of traditional universities. Pearson has content, platform, and virtual lab arrangements with Arizona State University. It does not seem like much of a reach for them to become their own university.	K12, Pearson

**Note:** Australian companies identified by **orange type**. Based on framework in George Siemens article, “Remaking education in the image of our desires,” April 2012: <http://www.elearnspace.org/blog/2012/04/19/remaking-education-in-the-image-of-our-desires/> and repurposed for this paper.

The following sections focus on four education functions with a high potential for technological disruptions and that offer opportunities for the Australian education and technology sectors:

- › Marketing, recruitment and admissions
- › Research
- › Teaching, learning and content creation
- › Assessment and credentialing.

Also discussed are US proposals that 'reimagine' current education models by establishing new universities that deliver high quality online credentials for free or low cost.

## Marketing, recruitment and admissions

New technologies and platforms create opportunities for institutions to extend their brands globally. These new technologies can also assist institutions in reaching both domestic and international students, increasing the quality of applicants and improving yield.

### Matching students to colleges (through data mining)

Many companies collect data on their customers to provide more relevant user experiences. Amazon uses its customers' previous purchases to recommend products. Netflix uses this same concept to suggest movies and TV programs that appeal to the customer based on previous selections. Search engines collect data on a user's search terms to suggest products or services paid for by advertisers. Companies know that a more personalised and targeted user experience will produce more sales. Can, and how is, this concept being applied to higher education? Below are two examples:

- › Arizona State University mines its student data, which is then fed back to students suggesting suitable majors and classes and even possible friends.<sup>40</sup>
- › Zinch is a social media platform that brings together students and universities. After completing an online profile, students are matched to prospective colleges and scholarships. It has 2.5 million members and 5000 university profiles.<sup>41</sup> It recently launched Zinch China which provides online student and university matching and pre-screens applicants for English-language ability and financial soundness.<sup>42</sup>

### 'Try before you buy'

The concept of freemium – to give something away for free but charge for premium services – is used in many industries, including the publishing industry. With the advent of e-books, the publishing industry is rethinking its business model by giving away basic content for free with the goal of upselling to either more premium, interactive content or to services such as tutoring or online assessments. For example:

- › Pearson has developed a portal for educators (called BlueSky) to search for learning materials from open educational resources (OER) as well as Pearson-created and curated content.<sup>43</sup> Educators may visit the portal for the free OER content and choose to pay for premium content if desired.
- › Cornell University is offering a free online course 'Marketing the Hospitality Brand Through New Media' and students will be steered towards a follow-up course for US\$1,200 and receive a professional certificate.<sup>44</sup>

The freemium concept can also be applied to the marketing and recruitment of students. With MOOCs, students can sample a university's courses at no risk or cost before deciding to apply. While data do not yet exist on how many students take a MOOC and go on to apply for admission, 'try before you buy' may become a part of the student recruitment process. As the accreditation community considers how to award credit for MOOCs in a similar way that credits are awarded for prior learning with the International Baccalaureate and Advanced Placement tests, students who have successfully completed the MOOC requirements may also become eligible for admission at some institutions.

40 Chronicle of Higher Education: <http://chronicle.com/article/College-Degrees-Designed-by/132945/>

41 Zinch Inc.: <http://www.zinch.com/history>

42 Zinch Inc.: <http://www.zinch.com/zinchchina>

43 Pearson: <http://www.pearsonlearningsolutions.com/pearson-bluesky/>

44 Chronicle of Higher Education: <http://chronical.com/blogs/wiredcampus/ecornell-to-offer-mooc-that-steers-to-for-credit-follow-up/41433>

# Teaching, learning and content creation

The traditional mode of learning – knowledge transmission through a lecture – is the mainstay of education and the classroom experience. However, experimentation with different kinds of pedagogy, from incorporating games to flipping the classroom, is increasingly being used by educators. Blended or hybrid models where part of the learning experience (usually the lecture) is delivered asynchronously online, are becoming more common. According to the Pew Internet Center, 60 per cent of academics agreed that by 2020, “there will be mass adoption of teleconferencing and distance learning to leverage expert resources ... a transition to ‘hybrid’ classes that combine online learning components with less-frequent on-campus, in-person class meetings.”<sup>45</sup>

The personalised learning experience can only be achieved cost-effectively, at scale, through technology. When students learn online, they can learn at their own pace. Data can be used to track and evaluate their experiences and interventions can be targeted to students who are struggling. Adaptive learning technologies enable education to be personalised to the individual student in ways never before possible.

## Competency-based learning

While in Australia, discussions around competency-based learning have evolved over the last 20 years, in the US, competency-based learning is still in the early stages of development and implementation. In the US version of competency-based learning, student learning is measured by assessments of specific concepts and skills, regardless of how long it might take to master them. The learning process uses a hybrid model of online study and assessment with support from mentors (tutors) as needed.

US higher education institutions generally use the amount of time students are in class—credit hours—to measure and identify what and how much they learn. In other words, requirements for completing a major or a course of study (i.e. graduating) are based on the number of credit hours a student accumulates. Competency-based learning breaks this reliance on the credit hour and instead recognises competency through assessing and understanding individual concepts and skills, making it easier to track what students do and do not know. Students’ prior learning is also taken into

account, enabling students to bypass coursework on subjects in which they are already proficient, resulting in shorter time to degree completion.

The US Department of Education is currently clarifying that its regulations do not prohibit the use of financial aid towards competency-based learning.<sup>46</sup> However, in practice almost all institutions access the federal financial aid system by using the credit hour as an indicator of learning.<sup>47</sup> Two US examples of competency-based learning where teaching and learning are delivered partly online are listed below.

- ▶ Western Governors University (WGU) is a non-profit online university founded in 1997 by 19 governors in the western United States (each participating state contributed funding to launch the operation). It offers bachelor’s and master’s degree programs in education, health, business and information technology. WGU’s programs are competency-based, but it continues to recognise learning according to credit hours (likely due to hesitancy from regulators and employers to fully accept competency-based systems).<sup>48</sup>
- ▶ Southern New Hampshire University, a private non-profit institution whose online programs serve about 22,000 students, may become the first institution to offer a completely competency-based degree (associate degree in general studies). It has received regional accreditor approval and awaits a decision from federal authorities. The university began accepting enrolments for its competency-based pilot in January 2013.<sup>49</sup>

## Flipping the classroom

Class time is traditionally devoted to instructors imparting knowledge via lectures, while students try to comprehend and further explore that knowledge afterwards in their own time (primarily via homework). The flipped model switches when and where those activities take place: students receive information in advance of class – usually in an online format – which frees up class time for exploration and comprehension in the form of reviewing homework (with an instructor present), conducting lab experiments or simulations, discussing material in small-groups or other interactive exercises.

<sup>45</sup> Pew Research Center: <http://pewinternet.org/Reports/2012/Future-of-Higher-Education.aspx>

<sup>46</sup> Karen Cator, Director Office of Technology Policy, Department of Education.

<sup>47</sup> Inside Higher Ed: <http://www.insidehighered.com/news/2012/10/01/competency-based-education-may-get-boost>

<sup>48</sup> Western Governors University: [http://www.wgu.edu/about\\_WGU/overview](http://www.wgu.edu/about_WGU/overview)

<sup>49</sup> Inside Higher Ed: <http://www.insidehighered.com/news/2012/10/01/competency-based-education-may-get-boost>

The flipped classroom uses technology products to achieve a more efficient use of faculty and student time. Lectures, which usually involve minimal student-teacher interaction, can be delivered asynchronously online. This benefits students because they can proceed through the lectures at their own pace, and benefits teachers by allowing them to focus on reviewing and discussing specific concepts and material.

There is strong support for this model from students and educators. However, it relies on the self-motivation of students and their ability to learn independently which may not be ideal for all types of learners. Administrators and faculty members are also concerned it may result in lower classroom (and campus) attendance. Two examples of flipping the classroom are listed below.

- › Researchers at Harvard University have launched the Peer Instruction (PI) Network ([www.peerinstruction.net](http://www.peerinstruction.net)), developed by Eric Mazur, Area Dean for Applied Physics and Balkanski Professor of Physics and Applied Physics at the Harvard School of Engineering and Applied Sciences. The PI technique relies on the ‘flipped classroom’: information transfer takes place in advance, typically through online lectures. In short, students study before rather than after class. As a result, the classroom becomes a place for active learning, questions and discussion. Instructors spend their time addressing students’ difficulties rather than lecturing. While originally developed for Mazur’s introductory physics courses, PI is now used across multiple disciplines, from the sciences to the humanities.<sup>50</sup>
- › A recent experiment reported by adaptive learning services provider Knewton showed improved student outcomes after flipping the classroom. In a traditional freshmen class, 50 per cent of students failed English and 44 per cent failed Math. In a flipped classroom, only 19 per cent of freshmen failed English and 14 per cent failed Math.<sup>51</sup>

50 Harvard University:  
<http://www.seas.harvard.edu/news-events/press-releases/peer-instruction>  
51 Knewton: <http://www.knewton.com/flipped-classroom/>

## Adaptive learning with data analytics

Adaptive learning uses computer-based tools to adapt learning paths to individual students based on learning needs. It can be used in online courses or to supplement classroom learning. Data can be used to track and evaluate their experiences, and interventions can be targeted to students who are struggling. Adaptive learning technologies enable education to be personalised to the individual student. In other words, the course adjusts to the student (instead of the other way around, as is the norm) on a continual basis, based on data collected as the student moves through the program. Adaptive learning is individualised, allowing for better comprehension of material because students spend as much time as they need on topics (until they master them) before moving on. For example:

- › In 2011, Arizona State University implemented the adaptive learning platform created by Knewton in introductory math classes. About 6800 students had access to the Knewton system during the 2011-12 academic year, which saw withdrawal rates drop and pass rates increase.<sup>52</sup> In September 2012, Knewton reached agreement with publisher Wiley to offer its math adaptive program in Australia and New Zealand.<sup>53</sup>
- › Carnegie Mellon University’s Open Learning Initiative and Pearson’s MyLabs offer similar learning tools.

## Massive open online courses (MOOCs)

The first MOOC, called ‘Connectivism and Connected Knowledge’, was launched in 2008 by Athabasca University Professor George Siemens and National Research Council (Canada) Researcher Stephen Downes. The 2300 participants included fee-paying students at the University of Manitoba (for whom the course was designed) and the wider public. The concept – using an online platform to deliver a course or single unit of study to anyone, anywhere for free – has since been adopted by a range of institutions, from research universities to community colleges, both in the US and globally. In 2011-12, online platforms launched to deliver MOOCs included Udacity, Coursera, Udemy, Class2Go, edX, Saylor Foundation, and Google CourseBuilder.

52 Chronicle of Higher Education:  
<http://chronicle.com/article/The-Rise-of-Teaching-Machines/127389/>  
53 Knewton: <http://www.knewton.com/press-releases/>

MOOCs are interesting for three reasons:

- › They highlight a global demand for knowledge and information from diverse learners of all ages, backgrounds and levels of expertise.
- › They offer an unprecedented scale – some courses have enrolments of more than 100,000, enabling teachers and researchers to aggregate data on learning pathways with the goal of improving student learning outcomes.
- › They challenge current credit transfer and accreditation systems and practices.

This innovation is still at an early stage of development and there are many concerns ranging from sustainability of business models to low course completion rates. That being said, US educators and policy-makers are interested in how MOOCs can be incorporated into accredited degrees to reduce costs for both students and institutions by shortening the time it takes to complete a degree. Key MOOC examples include the following:

- › Established in 2008, the Khan Academy offers online video tutorials on math, finance, science and history for a K-12 audience. Over 3,400 lessons are available at no charge.<sup>54</sup>
- › Coursera provides an online platform for students to take MOOCs. Course materials from 33 partner universities worldwide, including The University of Melbourne, are delivered on its system. Over 1.6 million students have enrolled in a course on Coursera since its launch in April 2012.<sup>55</sup>

<sup>54</sup> Khan Academy: <http://www.khanacademy.org/about>

<sup>55</sup> Coursera: <http://www.coursera.org>

- › University of Washington received an US\$884,000 grant from the Gates Foundation to design an undergraduate completion program using MOOCs from Coursera.<sup>56</sup>

## Open educational resources

Spearheaded by the Hewlett Foundation, the Open Educational Resources (OER) movement started in 2002-03. The OER concept is that materials are developed for free use and open to anyone to reuse and repurpose with the goal of continuous improvement. Authors have been able to licence their materials through Creative Commons licensing agreements, which provide different levels of access. Since OER is free and can be repurposed and repackaged, it offers flexibility to teachers who want to tailor the content to their students. On the downside, it is time-intensive to locate and curate OER, and there are concerns about quality and long-term sustainability. OER also creates opportunities for other industries to innovate and develop products and services around free and open resources. OER examples include the following:

- › The Learning Resource Metatagging Institute provides a way for educators and students to find education-related content. Content providers will metatag their content so that it will be searchable on Google, Bing and Yahoo.<sup>57</sup>
- › OER University (OERu) is a multi-stakeholder collaborative project designed to help students earn college credit for taking free, online courses based entirely on OER. In November 2012, the University of Southern Queensland began offering the first OER University prototype course.<sup>58</sup>

<sup>56</sup> Inside Higher Ed: <http://www.insidehighered.com/quicktakes/2012/10/18/educause-gates-unveil-grants-breakthrough-models>

<sup>57</sup> Visit <http://schema.org> for more information on the Learning Resource Metatagging Institute.

<sup>58</sup> OERu: [http://wikieducator.org/Australia%27s\\_University\\_of\\_Southern\\_Queensland\\_launches\\_the\\_first\\_OERu\\_prototype](http://wikieducator.org/Australia%27s_University_of_Southern_Queensland_launches_the_first_OERu_prototype)

## Research

OER has the potential to disrupt the publishing industry, in particular academic research. The current model of academic publishing involves the producer of the research (i.e. the academic) giving away the research for free to the academic journals that review and publish the research. The journal is then sold back to the university (at considerable cost) through a package of subscriptions. Essentially, the journals act as 'middle men' between the producers (researchers) and consumers (other researchers and students). OER offer new ways of thinking around publishing of academic research. For example:

- ▶ Harvard University announced that it would cancel its subscription with Elsevier<sup>59</sup>, the world's largest publisher of academic journals, and publish its articles to open journals instead.
- ▶ More generally, the US and UK<sup>60</sup> are shifting their policies towards open access of publicly-funded research. The Australian Research Council announced its Open Access Policy affecting ARC-funded research from 1 January 2013.<sup>61</sup>

59 The Guardian: <http://www.guardian.co.uk/science/2012/apr/24/harvard-university-journal-publishers-prices>

60 The Guardian: <http://www.guardian.co.uk/science/2012/jul/15/free-access-british-scientific-research?newsfeed=true>

61 Department of Industry, Innovation, Science, Research and Tertiary Education, [http://www.arc.gov.au/applicants/open\\_access.htm](http://www.arc.gov.au/applicants/open_access.htm)

- ▶ OER and open journals will impact on how researchers around the world publish their findings, with a potential knock-on effect on institutional rankings. In South Korea's national rankings system, 'openness' has been embraced and is now used as a criterion.<sup>62</sup>

Of course, technology has the potential to further assist researchers with international collaborations. This is seen in the two examples below:

- ▶ Technology platforms are helping researchers to work together on common issues. Two German start-up companies – ResearchGate and Mendelay – provide online platforms for researchers around the world to collaborate on global problems outside of their current academic structures.<sup>63</sup>
- ▶ The Society of Learning Analytics Research is setting up a distributed online research lab (STORM) for PhD students around the world studying the field of learning analytics. It was set up by Athabasca University in Canada and Open University UK.<sup>64</sup>

62 Mary Lou Forward, OpenCourseWare Consortium

63 Gigaom:

<http://gigaom.com/europe/can-researchgate-really-be-the-facebook-of-science/>

64 Society for Learning Analytics Research: <http://www.solaresearch.org/storm/>

## Assessment and credentialing

By far the most cited challenge among those that Austrade spoke to was around how to credential informal and competency-based learning, and ultimately, how employers will view skills gained through these new delivery models. Learning approaches that focus on outcomes or whose scale precludes traditional evaluation methods (in massive education, a teacher cannot possibly grade every submitted assignment in a class of 100,000) have necessitated the development of new assessment processes. The emerging field of machine learning and use of peer-to-peer assessments provide two possible solutions although authentication of learners remains an issue. Below are examples of how the assessment and credentialing issues are being addressed by institutions, government, companies and employers.

- ▶ Western Governors University monitors students through webcams during assessments to reduce cheating and fraud. If a student leaves the online assessment before completion, the system automatically shuts down.
- ▶ In June 2012, Udacity formed a partnership with Pearson VUE for testing and certifying learning so students who want to receive a certificate can sit an in-person examination.<sup>65</sup> edX has signed a similar deal with Pearson.<sup>66</sup>
- ▶ In September 2012, Colorado State University became the first US institution to accept the Stanford University Artificial Intelligence course taken through Udacity for credit.<sup>67</sup>
- ▶ In October 2012, Antioch University entered into a licensing agreement with Coursera to use courses from Duke University and University of Pennsylvania in its curriculum. Students will receive Antioch credit for the courses.<sup>68</sup>
- ▶ The American Council of Education (the peak body of university presidents) is currently reviewing 5-10 courses from Coursera for inclusion on its College Credit Recommendation Service. This service certifies training courses for credit offered outside of traditional higher education providers.<sup>69</sup>
- ▶ Start-up, StraighterLine, offers online courses direct to students on a monthly subscription basis (US\$99 per month plus US\$49 per course) which are transferable for credit to any of its 21 accredited partner institutions.<sup>70</sup>
- ▶ The Mozilla Foundation (Mozilla Firefox) has developed an infrastructure that enables organisations to create badges based on the skills and competencies that learners gain. It is piloting the School of Webcraft with Peer 2 Peer University, where learners earn skill badges (e.g. Javascript, PHP), value badges (e.g. Accessibility), and peer-to-peer badges (e.g. Good Teammate, Peer Mentor).<sup>71</sup>
- ▶ The MacArthur Foundation funded a competition on the use of badges to recognise skills, competencies and lifelong learning. 2012 winners include University of California Davis' Agricultural Sustainability Institute (ASI), which will develop a model platform for validating experiential learning within formal institutional contexts at the undergraduate level. ASI will establish a new model for bridging learning in and out of the classroom, and enable learners to better communicate their skills and competencies to a broad audience.<sup>72</sup>
- ▶ Start-up company, Degreed, has developed a credit points system to assess informal learning which will then be transferred into a formal learning credential.<sup>73</sup>
- ▶ The Codecademy, a start-up company with US\$10 million in venture capital funding, offers free coding courses and tutorials and has reached five million users. It also plans to offer a job search service.<sup>74</sup> In October 2012, it entered into a partnership with New York University's Steinhardt Department of Media, Culture, and Communication to teach New York University (NYU) students how to code.<sup>75</sup>

65 Udacity:

<http://blog.udacity.com/2012/06/udacity-in-partnership-with-pearson-vue.html>

66 Inside Higher Ed: <http://www.insidehighered.com/news/2012/10/16/u-texas-aims-use-moocs-reduce-costs-increase-completion>

67 Chronicle of Higher Education: <http://chronicle.com/article/A-First-for-Udacity-Transfer/134162/>

68 Inside Higher Ed: <http://www.insidehighered.com/news/2012/10/29/coursera-strikes-mooc-licensing-deal-antioch-university>

69 Chronicle of Higher Education: <http://chronicle.com/article/MOOCs-Take-a-Major-Step/135750/>

70 Straighterline: <http://www.straighterline.com/>

71 Mozilla Foundation: [https://wiki.mozilla.org/Badges/Pilot\\_programs](https://wiki.mozilla.org/Badges/Pilot_programs)

72 Digital Media and Learning Competition: <http://dmlcompetition.net/Competition/4/winners.php>

73 David Baker, co-founder Degreed, 28 September 2012

74 Codecademy: <http://www.codecademy.com/>

75 NYU: <http://www.nyu.edu/about/news-publications/news/2012/09/24/nyu-teams-up-with-codecademy-to-promote-digital-literacy.html>



- › The 22 anchor partner institutions in OER University will recognise credits from each other's courses. However, the degree will be awarded by the university or college where the student is matriculated. Tuition fees will on average be 20 per cent of what on-campus students pay.<sup>76</sup>
- › The Council for Adult and Experiential Learning has formed the Energy Providers Coalition for Education (EPCE), a group of industry representatives that develops, sponsors and promotes industry-driven, standardised, quality online learning programs to meet the workforce needs of the energy industry. In direct response to employer feedback, each boot camp program at Wisconsin's Gateway Technical College awards students certifications based on national industry standards.<sup>77</sup>
- › National Association for Manufacturing/Manufacturing Institute is deploying a new industry certification system with four community college partners in Ohio, Texas, North Carolina, and Washington.<sup>78</sup> The stackable credentials called the Skills Certification System are grounded on the National Career Readiness Certificate (NCRC). The

NCRC, issued by ACT (a non-profit testing and credential assessment organisation), is a portable, evidence-based credential that measures essential workplace skills and is a reliable predictor of workplace success.<sup>79</sup>

- › Many of the people Austrade spoke to mentioned the importance of employers in recognising non-formal learning and alternative forms of assessment and credentialing. The IT industry was largely seen as favouring competency or skills-based learning, especially for jobs requiring software coding. However, according to the National Association of Colleges and Employers, in a recent employer benchmarking survey only 4.7 per cent of employers reported recruiting students with online degrees.<sup>80</sup> The survey did not ask employers about how they viewed degrees where some components were delivered online, which is the more common model.
- › In a 2012 survey, 68 per cent of Americans aged 18-30 believed an online degree will be equally recognised by employers as a traditional degree in the next five to seven years.<sup>81</sup>

<sup>76</sup> Wayne MackIntosh, Director OER Foundation

<sup>77</sup> Workforce Strategy Center: Employers, Low-Income Young Adults, and Postsecondary Credentials October 2009.

<sup>78</sup> Bill and Melinda Gates Foundation:  
<http://www.gatesfoundation.org/postsecondaryeducation/Pages/education-and-the-workplace.aspx>

<sup>79</sup> National Association of Manufacturers: [http://www.themanufacturinginstitute.org/~media/8FF9BD4F9136436EABE0CD814D94D5D4/Stackable\\_Credentials.pdf](http://www.themanufacturinginstitute.org/~media/8FF9BD4F9136436EABE0CD814D94D5D4/Stackable_Credentials.pdf)

<sup>80</sup> National Association of Colleges and Employers: Recruiting and Benchmarking Survey 2012

<sup>81</sup> Northeastern University and FTI Consulting, Innovation in Higher Education Survey: <http://www.northeastern.edu/innovationsurvey/pdfs/survey-results.pdf>

## Online-only free, or low cost, universities

Several organisations are addressing the cost crisis in US higher education by developing new online-only models of education delivery where students pay no, or low, tuition fees. This approach to education delivery challenges current business models of higher education by offering quality programs at little to no cost to the student and without any government support.

Currently, these organisations are not offering accredited programs, however many claim that they will have US accreditation in place within the next year. Some media have criticised the model, questioning whether a free online education provider can provide 'quality' and 'elite' education. There is also concern over reputation in the marketplace of qualifications gained, and the sustainability of business models.<sup>82</sup> Nevertheless, these organisations offer an affordable alternative to the current system. Examples of online-only free, or low cost, universities are listed below.

- ▶ University of the People is a non-profit (unaccredited) institution offering online undergraduate degree programs in business and computer science. It is tuition-free but charges small fees for registration and exam processing. Over 1500 students have been accepted since launching in 2009.<sup>83</sup>

- ▶ Minerva Project intends to be an accessible 'elite university', focussing on rigorous, advanced analytical courses in a liberal arts tradition. Its goal is to attract the 'best and brightest' students from around the world to study with a teacher and peer group of 15-20 students.<sup>84</sup> Minerva does plan to charge tuition, although it will be less than private university tuition fees. While all classes will be online, students will reside in living-learning communities hosted by the world's economic and cultural capitals. Minerva raised US\$25 million in venture capital funding in 2012; it plans to begin offering courses in 2015.<sup>85</sup>
- ▶ World Education University (WEU) is a free, online university that aims to become a comprehensive, degree-granting institution primarily focussed on delivering education to underserved populations. WEU is a for-profit entity and states on its website that it has developed 30 different methodologies for generating revenue.<sup>86</sup>

82 Inside Higher Ed: <http://www.insidehighered.com/news/2012/08/17/world-education-university-looks-ride-mooc-wave-despite-skeptics>

83 University of the People: <http://www.uopeople.org/groups/tuition-free-education>

84 Ben Nelson, Founder, The Minerva Project

85 VentureBeat: <http://venturebeat.com/2012/04/03/minerva-project-seed-funding>

86 World Education University: <http://www.theweue.com>

## Part 3 › Opportunities and challenges

Drawing from US developments in this new world of education technology, Austrade has identified a number of opportunities for the Australian education sector.

### Student market segmentation

#### 1. Education as experience

Australia has traditionally focussed its recruitment efforts on international students who study onshore and come to Australia for both a recognised qualification as well as access to the Australian jobs market. Because of the importance of the 'experience' of living in Australia, this segment is subject to the least disruption from technology. Nevertheless, it will continue to be hotly contested among traditional players (US, Canada, UK) and emerging competitors (China, Singapore). The opportunity and challenge for Australia will be to continue to provide a high quality and holistic educational experience. Education technology platforms and data mining techniques are ways to deliver a richer experience for students.

#### 2. Skills and job training

There is an unmet global demand for education, especially in gaining skills that provide better employment prospects. According to UNESCO the demand for higher education will expand from 97 million students in 2000 to more than 262 million students by 2025, and a major new university would need to be created each week to address the anticipated demand.<sup>87</sup> Learners in this segment of the market are accessing tertiary education to gain a better job and improve their competitiveness in the job market. They may not be able to study onshore, so opportunities to study an Australian qualification through their employer, a local education institution or online, will be needed. There are opportunities to offer both formal and informal education qualifications for this market segment.

#### 3. Lifelong learning

The knowledge economy requires that workers are lifelong learners. This market segment is attracted to education for a variety of reasons including: learning for learning's sake or intellectual curiosity, trialling a course before committing, demonstrating mastery for university or college admissions, and/or wanting a credential that has value in the marketplace. Lifelong learners are all ages, at every level of learning and want to access informal and formal learning opportunities on-demand. The model of delivery needs to be highly flexible

and accessible from anywhere. This has not traditionally been a focus of the education export model and viable business models will need to be explored.

### Improving quality

- › Applying data analytics to learning offers an opportunity to greatly improve the teaching and learning experience of both domestic and international students at Australian institutions. Students may begin to 'shop around' for providers and programs that can demonstrate excellence in graduate and employment outcomes, as well as in the student experience.
- › Data analytics from thousands of learners could be aggregated and published to demonstrate learning outcomes. This transparency of quality may reshape conversations around which are the 'best' institutions.

### MOOC as a marketing and recruitment tool

- › While there is a high degree of media focus on the subject, participating in a MOOC with high quality US and international universities raises the profile of an institution globally. It may also lead to increased enrolments and applications from students who want to 'try before they buy' although more data is needed to understand MOOC learners. Successful completion of a MOOC could also be used as an admissions tool.
- › Pre-university and foundation courses could also be offered through a MOOC, enabling students to arrive in Australia for their university courses better prepared. Similarly, pathway programs could be delivered through online platforms while the student is offshore.
- › Australian education providers could use MOOCs to showcase their 'best' courses and lecturers. This may lead to specialisation, at least in terms of marketing and promotion.

<sup>87</sup> OERu: [http://wikieducator.org/images/c/c2/Report\\_OERU-Final-version.pdf](http://wikieducator.org/images/c/c2/Report_OERU-Final-version.pdf)

## Joining consortia and partnerships

- › Joining a consortium of similar institutions to deliver some parts of a qualification online would provide cost-savings and efficiencies, as well as the potential opportunity to license course content. This model is being explored by the American Association of Public Land-Grant Universities, a consortium of 80 US universities that is considering offering a first year subject taught online by one academic across the consortium, for which the other institutions would give credit. University of California's UC Online initiative is a similar experiment. The University of Texas System is exploring how offering 'bridge' subjects through the edX platform could reduce the time (and cost) it takes students to complete a degree.<sup>88</sup>
- › Participating in a consortium to market online education courses (which could use a concept similar to Open Universities Australia), would reduce student recruitment costs and minimise the risk of launching a new product offering.
- › Entering into a private-public-partnership would be a cost-effective way to use an existing technology or service provider rather than creating a new product from scratch. Education technology companies and non-profit entities are looking for Australian partners for online course delivery and adaptive learning technologies. The National Broadband Network makes Australia particularly attractive to US partners.
- › Australia's Qualifications Framework is built on accreditation, robust quality assurance safeguards and the ability to award credentials. At this point, these are Australia's biggest assets in providing international education services. There is an opportunity for Australian education providers to partner with international learning providers and organisations, for programs that would not be able to achieve Australian accreditation on their own.
- › As employer recognition of online credentials will be essential, it will be important to develop relationships with employers and industry associations for both delivery of customised training and to improve recognition of credentials achieved in non-traditional ways.

<sup>88</sup> Inside Higher Ed: <http://www.insidehighered.com/news/2012/10/16/u-texas-aims-use-moocs-reduce-costs-increase-completion>

## Contributing to research and online learning pedagogy

- › US researchers want to collaborate with Australian researchers on pedagogy, best practices in delivering online education, as well as thinking about assessments and evaluation techniques.
- › Learnings gained from student learning analytics mining could be used to understand global student needs, demands and interests.
- › Online platforms create opportunities for researchers around the world to connect with each other to solve global problems. As knowledge becomes distributed, researchers are no longer bound by their institution, geography and discipline.<sup>89</sup>

## US as market for education products and services

- › In the US, approximately US\$40 billion of annual K-12 expenditures are allocated to third-party goods and services providers.<sup>90</sup> There will be opportunities for Australian companies to sell their education technology products and services. Areas of growth include curating and repackaging digital content, education services and applications that build off existing platforms and providers.
- › Australian companies and institutions could apply the concept of 'freemium' – giving something away for free but providing value-added services (for a fee) such as tutoring, assessment and credentialing – when selling educational products and services domestically and in the US.
- › The US education sector is one of the largest producers of data. According to McKinsey Global Institute's most recent numbers, the education sector is one of the US economy's top 10 sectors in terms of storing the largest amount of data.<sup>91</sup> There is potential to access, mine and contribute to this data for both commercial and non-commercial outcomes.

<sup>89</sup> Educause review: <http://www.educause.edu/ero/article/changing-landscape-higher-education>

<sup>90</sup> BMO Capital Markets estimate

<sup>91</sup> 1105 Media Inc.: <http://campustechnology.com/articles/2012/10/09/big-data-on-the-college-campus.aspx?#CT21>

# Challenges

The emergence of online education and a multitude of new players also poses challenges to Australia's education sector. These challenges, summarised below, are based on information from interviews with Australian and US education providers. Austrade is keen to test these assumptions with the wider education sector. What other challenges are education providers facing?

## Competition

- › A wide variety of institutions, companies, foundations and non-profits are delivering educational content and competing for students on a global scale. Australia will face increasing competition from education and non-education providers for both domestic and international students.
- › Middle or lower tier institutions may find it difficult to compete with free or low cost options delivered by higher quality institutions unless they have a clear value proposition aligned to specific segments of the market (e.g. adult student segment).
- › The impact of education technology is already starting to play out in Asia, Australia's major market for international students (see Appendix C for a listing of international online education innovations). Many countries are experimenting with new, online delivery models to increase domestic educational capacity. For example:
  - Opensource Opencourseware Prototype System (OOPS) was developed by Chinese millionaire Lucifer Chu, who is known for translating fantasy novels such as *Lord of the Rings* into Chinese. With thousands of volunteer translators, 178 of MIT's OpenCourseWare courses are now available in Mandarin.<sup>92</sup> OOPS ([www.myoops.org](http://www.myoops.org)) has also translated TED talks and lectures from Harvard University and Yale University.<sup>93</sup>
  - Peking University and Tsinghua University have joined a Chinese MOOCs consortium (20 online courses from 19 institutions).
  - Hong Kong University of Science and Technology joined Coursera in September 2012 making it the first university in Greater China to offer a MOOC. Three courses will go online in 2013.<sup>94</sup>

92 MIT – The Tech: <http://tech.mit.edu/V127/N15/ocw.html>

93 OOPS: <http://www.myoops.org/main.php>

94 Hong Kong University of Science and Technology: [http://www.ust.hk/eng/news/press\\_20120919-978.html](http://www.ust.hk/eng/news/press_20120919-978.html)

- Indian Institutes of Technology (IIT) joined the MIT OpenCourseWare Consortium in January 2012 enabling free access to its engineering courses. The IIT lectures can also be accessed through Apple's iTunes platforms and will eventually be available on YouTube.<sup>95</sup>
- In May 2012, publisher Houghton Mifflin Harcourt (HMH), and SK Telecom, signed a partnership agreement to create an education platform for South Korean and global markets. The alliance combines HMH's English-language education content with SKT's T-Smart Learning platform to deliver anytime, anywhere instruction and practice opportunities to students through their mobile devices. HMH will provide content from more than 1000 of its acclaimed titles including *Destination Math*, *SkillsTutor* and *ScienceFusion*, while SK Telecom will develop the viewers, apps, billing systems, certification systems, synchronisation functions and other platform functions required for content delivery. Content will be accessed initially via Samsung Android tablets and will be sold to both consumers and institutions.<sup>96</sup>
- Established in 2001, Kyung Hee Cyber University uses online video lectures of renowned professors and online education experts. It recently launched a Mobile Campus where students can listen to lectures through their mobile phones.<sup>97</sup>

## Complacency

- › Unlike the US, the Australian higher education sector is not experiencing a 'crisis' to the same degree. While the current crisis has pushed US policy-makers, institutions and the private sector to innovate, it is possible that without a crisis, there will be little appetite in Australia to adapt to a changing higher education market.
- › Institutions who are able to be innovators (e.g. MIT, Stanford University) or early adopters (e.g. Georgia Institute of Technology) have a distinct advantage over those who wait for mass adoption or lag behind. They can help to shape the education agenda as well as benefit from the positive perception that they are leaders in the online space. Taking an active role in the thinking (if not the application) minimises the likelihood of getting left behind.
- › Equally, if online developments fail to meet their promises, will the traditional model continue to underpin the success of an Australian education?

95 The Chronicle of Higher Education: <http://chronicle.com/blogs/global/indian-institutes-of-technology-to-join-mits-opencourseware-effort/31752>

96 Houghton Mifflin Harcourt: <http://www.hmhc.com/content/houghton-mifflin-harcourt-and-sk-telecom-partner-create-education-platform-korean-and-global>

97 Kyung Hee Cyber University: <http://khcu.ac.kr/en/life/mobile.jsp>

## Part 4 › Next steps

This paper is meant to be a conversation starter. Austrade welcomes the opportunity to discuss issues around Australia's competitiveness in the international student market and how to position Australia in this emerging environment. Austrade has proposed a number of next steps:

1. The paper will be distributed to Australian universities, peak bodies, state education bodies and to the wider education sector through Austrade's Market Information Package in January 2013.
2. Austrade will undertake Phase II research to be released in or around March 2013 on:
  - a. the views of employers and employer groups in the US in recognising non-formal learning and alternative forms of assessments and credentialing; and
  - b. the impact of new and emerging education technologies in Australia's top 10 source markets: China, India, Republic of Korea, Malaysia, Vietnam, Thailand, Indonesia, Brazil, Nepal and Saudi Arabia.
3. Austrade proposes to facilitate workshops that bring together US thought leaders and Australian stakeholders. The objective of these workshops would be to identify possible scenarios for the Australian education sector and likely responses. Workshops are proposed in February 2013 at the Association of International Education Administrators conference in New Orleans and in March 2013 to coincide with the timing of the Universities Australia Conference.
4. Austrade will consider the marketing messages and implications of, and for, the Future Unlimited brand, with particular consideration of how the brand could be used to target new segments of learners and promote Australia's expertise in online delivery models.
5. Austrade welcomes all feedback on this paper from the Australian education and education technology.
  - a. What are the questions and concerns from the sector?
  - b. What further research or information is needed to address those issues?
  - c. How are institutions responding to emerging education delivery models?

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# Appendix A

## Acknowledgements

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### In North America

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## Appendix B

### Selected events in the development of online learning technology

Date	Online Learning Event
1994	<p>University of Phoenix, for-profit higher education provider, becomes publicly traded company on NASDAQ</p> <ul style="list-style-type: none"><li>› one of first adopters of online learning for higher education, began offering online courses in 1989</li><li>› in fiscal year 2011, parent company Apollo Group earned over US\$4 billion in revenue with over 380,000 enrolled students (online and physical campuses)<sup>98</sup></li></ul>
1998	<p>NYU launches for-profit online learning system NYUonline</p> <ul style="list-style-type: none"><li>› institution invests US\$25 million in development</li><li>› difficulty attracting users, operating within university bureaucracy</li><li>› ceases operations in 2001</li></ul> <p>Penn State World Campus debuts (fully online degree programs, university accredited, tuition charged on cost-per-credit basis)</p> <ul style="list-style-type: none"><li>› still in operation today with over 80 online degree and certificate programs, scholarships and financial aid available<sup>99</sup></li></ul> <p> DeVry, for-profit higher education provider founded in 1931, offers its first online course</p>
2000	<p>Columbia initiates Fathom online learning portal</p> <ul style="list-style-type: none"><li>› Columbia partnered with many high-profile groups including the University of Chicago, University of Michigan, New York Public Library, and American Film Institute</li><li>› operated on low-cost (not free) model; US\$45 charge for typical online seminar</li><li>› institution invests US\$25 million in for-profit venture</li><li>› shut down in 2003 due to insufficient revenue generation<sup>100</sup></li></ul>
2000	<p>UK experiment with online learning portal</p> <ul style="list-style-type: none"><li>› intended to deliver and develop online courses</li><li>› goal to recruit international students to pursue UK university degrees online</li><li>› public investment of £35 million, difficulty securing private funding</li><li>› abandoned in 2004 after failing to reach user targets<sup>101</sup></li></ul>
2001	<p>University of Maryland University College and Temple University close down their for-profit online efforts</p>

98 <http://investors.apollogrp.edu/phoenix.zhtml?c=79624&p=iro1-newsArticle&ID=1618736&highlight=>

99 <http://www.worldcampus.psu.edu/about-us/why-penn-state-world-campus>

100 NYU and Columbia information: Observatory on Borderless Higher Education report, and <http://chronicle.com/article/After-Losing-Millions/6818/>

101 Observatory on Borderless Higher Education report, and <http://chronicle.com/article/Britain-Dismantles-a-Virtual/4199/>



Date	Online Learning Event
2002	<p><b>MIT OpenCourseWare puts class materials online</b></p> <ul style="list-style-type: none"> <li>› online repository for MIT course content, primarily in text form (i.e. syllabi and lecture notes); when launched content of 32 classes available online</li> <li>› as of November 2011 over 2,000 courses available online; 46 included complete set of video lectures</li> <li>› in 2005 joined OpenCourseWare Consortium, linking MIT content to that of other institutions worldwide with similar online projects</li> <li>› OpenCourseWare only provides free access to course materials: no accreditation, no evaluation of tests/ assignments, no certification of course completion, no access or interaction with faculty</li> <li>› still operating today with annual operating budget of US\$3.5 million, half supplied by MIT</li> <li>› MIT projects inability to support OpenCourseWare system in 2014 fiscal year without additional funding sources<sup>102</sup></li> </ul> <p><b>Hewlett Foundation's Education Program begins supporting Open Education Resources (OER) initiatives</b></p> <ul style="list-style-type: none"> <li>› OER consists of teaching, learning and research resources that are publicly available and accessible for free on the Internet</li> <li>› to date Hewlett Foundation has contributed US\$40 million to advancing OER, including support of MIT OpenCourseWare (and similar programs at Yale University, Carnegie Mellon University and the University of California System) and Creative Commons<sup>103</sup></li> </ul>
2006	<p><b>AllLearn – non profit online collaboration by Yale University, University of Oxford, Stanford University that charged tuition fee for non-credit courses – shuts down</b></p> <p><b>Khan Academy debuts video lessons</b></p> <ul style="list-style-type: none"> <li>› geared toward K-12 students, features short video lessons designed for viewing online in math, science, finance and history</li> <li>› not-for-profit, no fees; over 3,400 video lessons now available<sup>104</sup></li> </ul>
2007	<p><b>Creative Commons begins work to make online educational materials free and publicly available</b></p> <ul style="list-style-type: none"> <li>› founded in 2001, Creative Commons offers tools to make any kind of creative content – from songs to videos to academic research – freely available and reusable (subject to copyright conditions of the creator's choosing)</li> <li>› Khan Academy, MIT OpenCourseWare, Hewlett Foundation among hundreds of organisations that use Creative Commons services</li> <li>› as of the end of 2011, over 500 million items had been made publicly available using a Creative Commons license<sup>105</sup></li> </ul>
2008	<p><b>Stephen Downes and George Siemens conduct first massive open online course (MOOC) in cooperation with University of Manitoba; 2,200 sign up for free non-credit course</b></p>
2009	<p><b>Peer2Peer University launches tuition-free, peer-guided courses.</b></p> <p><b>YouTube brings together college-submitted content as YouTube EDU</b></p> <ul style="list-style-type: none"> <li>› YouTube EDU section of the video-sharing service contains only material provided directly by higher learning institutions</li> <li>› features complete set of video lectures for over 200 courses<sup>106</sup></li> </ul>

102 Wikipedia entry on MIT OpenCourseWare, and <http://ocw.mit.edu/donate/why-donate/>

103 <http://www.hewlett.org/programs/education-program/open-educational-resources> and <http://chronicle.com/article/How-4-Colleges-Support-Free/48780/>

104 Observatory and <http://www.khanacademy.org/about>

105 <http://creativecommons.org/weblog/entry/30891>, <http://creativecommons.org/education>, <http://creativecommons.org/about>

106 <http://chronicle.com/blogs/wiredcampus/youtube-creates-new-section-to-highlight-college-content/4598>

Date	Online Learning Event
	<p><b>University of the People: Tuition-free education</b></p> <ul style="list-style-type: none"> <li>› unaccredited online undergraduate programs in business administration and computer science</li> <li>› non-profit model, no charge for tuition but small fees for registration and exam processing (need-based scholarships available)</li> <li>› affiliations with UN, Clinton Global Initiative, NYU, Yale Law School, Hewlett-Packard (with funding from Gates Foundation)</li> <li>› accepted over 1,500 students from 132 countries<sup>107</sup></li> </ul> <p><b>Southern New Hampshire University Online (non-profit, tuition-charging), catering to older learners, earns \$22 million in revenue; expected to double as of 2013<sup>108</sup>; expects online enrolments of 22,000 in 2012<sup>109</sup></b></p>
2010	<p><b>U.S. Department of Education publishes National Technology Education Plan</b></p> <ul style="list-style-type: none"> <li>› 21st Century technology should be integrated into all aspects of education – learning, teaching, assessment – with focus on making technology accessible and productive<sup>110</sup></li> </ul>
2011	<p><b>Eduventures estimates 50% of US higher education providers offer online degrees or certificates. Enrolments in online learning in Europe fell by 15-20% in 2011 according to degree search engine StudyPortals.</b></p> <p><b>Western Governors University (WGU), online degree provider, creates WGU Texas brand</b></p> <ul style="list-style-type: none"> <li>› accredited, non-profit online institution (charges flat rate per term for tuition)</li> <li>› difference from most higher education providers: learning structure is competency-based, progressing in terms of what students know and their scores on assessments; allows for individualised, self-paced learning</li> <li>› additional brands in Indiana and Washington to increase marketing reach</li> <li>› 15 years in operation, over 16,000 graduates<sup>111</sup></li> </ul> <p><b>Bill and Melinda Gates Foundation gives US\$12 million in grants to Next Generation Learning Challenges, seeking innovations that apply technology to personalise students' learning experiences</b></p> <p><b>MacArthur Foundation sponsors contest to develop learning badge system</b></p> <ul style="list-style-type: none"> <li>› Students receive badges as proof of mastery of segments of course content or skills; also referred to as alternative credentials</li> <li>› MacArthur gives US\$2 million in grants to contest winners, announced in 2012<sup>112</sup></li> </ul> <p><b>US investments in education technology surpass US\$1 billion, up from US\$150 million in 2006.</b></p>
2012	
January	<p><b>Sebastian Thrun leaves tenured position at Stanford University to develop MOOC platform Udacity</b></p> <ul style="list-style-type: none"> <li>› for-profit venture with funding from Thrun and Charles River Ventures</li> <li>› free access to courses offered by individual teachers, not universities</li> <li>› students can authorise Udacity to give their resume to select group of technology companies; free for students, companies pay for access<sup>113</sup></li> </ul>

107 Observatory and <http://www.uopeople.org/groups/tuition-free-education>

108 <http://www.insidehighered.com/news/2010/07/23/online>

109 <http://www.insidehighered.com/news/2012/10/01/competency-based-education-may-get-boost>

110 <http://www.ed.gov/technology/netp-2010/executive-summary>

111 <http://chronicle.com/blogs/wiredcampus/western-governors-university-gets-a-new-spinoff-in-texas/32678> and [http://www.wgu.edu/about\\_WGU/overview](http://www.wgu.edu/about_WGU/overview)

112 <http://chronicle.com/article/Badges-Earned-Online-Pose/130241/>, and <http://dmlccompetition.net/Competition/4/badges-timeline.php>

113 Observatory report

Date	Online Learning Event
April	<p>Second online course provider using MOOC methodology emerges from Stanford University: Coursera</p> <ul style="list-style-type: none"> <li>› US\$16 million in venture funding, US\$6 million investment from university partners</li> <li>› for-profit model, but no charges of any kind for students</li> <li>› over 1.5 million students have registered for a course</li> <li>› Four universities offer courses to start: Stanford University, Princeton University, University of Michigan, University of Pennsylvania<sup>114</sup></li> </ul>
May	<p>Harvard University, MIT debut high-profile MOOC platform: edX</p> <ul style="list-style-type: none"> <li>› distinct from MIT OpenCourseWare: designed to be taken online with full course capabilities, including interactive and self-paced learning, assessments, access to instructor</li> <li>› not-for-profit model, free access (planning to charge modest fee for certificate of completion in future), no admissions requirements; seven courses available in Fall 2012</li> <li>› key difference from other MOOC systems: course designing tool will be open-source, open to all developers with no copyrights or fees</li> <li>› Harvard University, MIT each contribute US\$30 million in seed funding<sup>115</sup></li> </ul>
June	<p>Udacity MOOC provider partners with Pearson to offer invigilated exams</p> <ul style="list-style-type: none"> <li>› for an US\$80 fee, students can take an invigilated final exam at any of Pearson's 4,500 testing centres and receive appropriate certificate (can also get certificate from Udacity at course completion for free)<sup>116</sup></li> </ul> <p>Gates Foundation gives US\$1 million gift to edX<sup>117</sup></p>
July	<p>Apple opens iTunesU to all providers</p> <ul style="list-style-type: none"> <li>› service launched in 2008; accepts course content in form of lecture notes and other text documents, audio and video clips for college courses</li> <li>› previously posted material had to come from institution with established partnership with iTunesU</li> <li>› with change any iTunes user can distribute content for up to 12 courses, though unaffiliated courses must be private and capped at 50 students each</li> <li>› over 1,000 colleges around the world have posted to iTunesU, but not all content is publicly available<sup>118</sup></li> </ul> <p>University of California-Berkeley becomes third institution to offer courses on edX MOOC platform</p> <p>Coursera adds 12 institutions offering courses on its MOOC system, secures additional funding from California Institute of Technology, University of Pennsylvania, venture capitalists<sup>119</sup></p> <p>European Union and UK government will require any research it funds to be published in an open access format beginning in 2014; Australian Research Council considers similar provision</p>
August	<p>US Senate committee criticises for-profit education companies for overcharging students, having high drop-out and low graduation rates<sup>120</sup></p> <p>Udacity cancels math course that did not meet its quality standards (20,000 students had registered)</p>

114 Observatory and <https://www.coursera.org/>

115 Observatory and <https://www.edx.org/faq>

116 Observatory and <http://chronicle.com/blognetwork/castingoutnines/2012/06/02/udacity-to-partner-with-pearson-for-testing-what-does-this-mean/>

117 <http://chronicle.com/blogs/wiredcampus/gates-foundation-gives-9-million-in-grants-to-support-breakthrough-business-models/37037>

118 Observatory and <http://chronicle.com/blogs/wiredcampus/new-policy-lets-anyone-post-materials-on-itunesu/38201>

119 [http://s3.amazonaws.com/coursera/media/Coursera\\_New\\_Partners\\_July\\_17\\_2012.pdf](http://s3.amazonaws.com/coursera/media/Coursera_New_Partners_July_17_2012.pdf)

120 <http://www.forbes.com/sites/jamesmarshallcrotty/2012/08/02/for-profit-colleges-thrashed-in-congressional-report/>

Date	Online Learning Event
September	<p>15 for-profit providers fail to meet Department of Education regulations on revenue sources<sup>121</sup></p> <p>Elsevier, publishing company, gives edX students free online access to course textbook</p> <p>Google unveils Course Builder, open source online course development tool</p> <p>Colorado State University-Global Campus becomes first US institution to accept transfer credit for one Udacity course (Introduction to Computer Science)</p> <ul style="list-style-type: none"> <li>▶ students must show proof of completion from Udacity and pass invigilated exam at a Pearson VUE testing centre<sup>122</sup></li> </ul> <p>Enrolments in online learning in Europe grew by 15-20 per cent in 2011 according to degree search engine StudyPortals</p> <ul style="list-style-type: none"> <li>▶ number of institutions offering distance learning (of which online is a major component) increased 40 per cent last year</li> <li>▶ StudyPortals projects online learning to become more popular than traditional education by 2015<sup>123</sup></li> </ul> <p>17 institutions join Coursera, including University of Melbourne; 33 providers now have courses on the platform</p> <p>University of Queensland pledges to offer 12 online courses in MOOC format within two years</p> <ul style="list-style-type: none"> <li>▶ exploring collaborations with MIT, Stanford</li> <li>▶ may join Coursera platform, or develop own using Google Course Builder<sup>124</sup></li> </ul> <p>Udacity enrolls over 112,000 “active” students according to website</p> <p>Gates Foundation offers grants of US\$50,000 for development of MOOC-format introductory courses specifically tailored to low-income students</p>

121 <http://chronicle.com/article/3-Institutions-Lose/134696/?cid=at>

122 <http://chronicle.com/article/A-First-for-Udacity-Transfer/134162/>

123 <http://thepienews.com/news/eu-enrolment-on-distance-courses-up-15-20/>

124 [http://theconversation.edu.au/uq-joins-moocs-movement-9770?utm\\_medium=email&utm\\_campaign=Latest+from+The+Conversation+for+25+September+2012&utm\\_content=Latest+from+The+Conversation+for+25+September+2012+CID\\_9358c4ac73c01c3ba6dec677dde5cf65&utm\\_source=campaign\\_monitor&utm\\_term=UQ%20joins%20MOOCs%20movement](http://theconversation.edu.au/uq-joins-moocs-movement-9770?utm_medium=email&utm_campaign=Latest+from+The+Conversation+for+25+September+2012&utm_content=Latest+from+The+Conversation+for+25+September+2012+CID_9358c4ac73c01c3ba6dec677dde5cf65&utm_source=campaign_monitor&utm_term=UQ%20joins%20MOOCs%20movement)

Date	Online Learning Event
October	<p>Antioch University is the first US university to license Coursera-delivered material for inclusion in its undergraduate degree program.</p> <p>Australian company OpenLearning debuts online platform to deliver MOOCs. The first course will be on computer science and engineering from University of New South Wales.</p> <p>Southern New Hampshire University preparing fully competency-based online associate degree</p> <ul style="list-style-type: none"> <li>› if approved, would become first higher education degree to award credit based solely on direct assessment of student competency, as opposed to credit hours</li> <li>› institution has received support of regional accrediting body, submitted plan for federal approval</li> <li>› WGU, despite focus on competency-based model, continues to identify student progress by credit hours<sup>125</sup></li> </ul> <p>Saylor Foundation provides 267 free online courses based on OER material</p> <ul style="list-style-type: none"> <li>› students can complete equivalent of an undergraduate major in 13 disciplines</li> <li>› non-profit business model; courses are self-paced and automated (i.e. no access to faculty)</li> <li>› course content comes from OER sources vetted and organised into a structured online course package by hired faculty</li> <li>› not accredited, but provides certificates of completion which can be applied toward credit at Excelsior College (non-profit college with online courses) and StraighterLine (for-profit provider of online courses)</li> <li>› in September 2012 agreed to develop courses using Google's Course Builder MOOC platform<sup>126</sup></li> </ul> <p>OERu launches first open course, 'Regional Relations in Asia and the Pacific' delivered by University of Southern Queensland</p> <p>The University of Texas System joins the edX platform.</p> <p>University of Western Australia announces it will provide online courses on Class2Go, open-source MOOC platform developed by Stanford University</p> <p>With funding from the Gates Foundation, edX begins developing MOOCs specifically aimed at community college students.</p>

125 <http://www.insidehighered.com/news/2012/10/01/competency-based-education-may-get-boost>

126 <http://www.saylor.org/about/>, <http://www.insidehighered.com/news/2012/08/15/saylor-foundations-free-courses-offer-path-credit>, and <http://www.insidehighered.com/quicktakes/2012/09/24/saylor-teams-googles-mooc>

# Appendix C

## Education technology innovations in Asia

### Greater China

- › Opensource OpenCourseWare Prototype System (OOPS) was developed by Chinese millionaire Lucifer Chu who is known for translating fantasy novels such as *Lord of the Rings* into Chinese. With thousands of volunteer translators, 178 of MIT's OpenCourseWare courses are now available in Mandarin.<sup>127</sup> OOPS ([www.myoops.org](http://www.myoops.org)) has also translated TED talks and lectures from Harvard and Yale Universities.<sup>128</sup>
- › Hong Kong University of Science and Technology joined Coursera in September 2012 making it the first university in Greater China to offer a MOOC. Three courses will go online in 2013.<sup>129</sup>
- › Open University of Hong Kong was established in 1989. It uses an online open platform where students can access free lectures on video and track their progress through an e-Portfolio platform.<sup>130</sup>
- › Peking University and Tsinghua University have joined Chinese MOOCs consortium (20 online courses from 19 institutions).

### India

- › In 2010, India released a report on open and distance education called, "Report of the Committee to Suggest Measures to Regulate the Standards of Education Being Imparted through Distance Mode." According to the report, there are currently 3.6 million learners in the open and distance learning system (compared to 13.6 million in traditional programs). Open and distance learning constitutes about 22 per cent of total enrolment in the conventional education system. It is more common in undergraduate programs than postgraduate programs.<sup>131</sup> In 2009-10, there were 14 Open Universities in India and 186 Distance Education institutions with most of the growth occurring in the last 10 years.<sup>132</sup> One of the main problems with open and distance learning institutions in India is ensuring quality due to the lack of an effective regulatory system.<sup>133</sup>
- › The Indira Gandhi National Open University boasts enrolments of 1.8 million students<sup>134</sup> and is the second largest university by enrolments in the world.
- › University of Delhi's Institute of Lifelong Learning (ILL) provides OER courses in English, Hindi, humanities, Sanskrit, Punjabi, history, mathematics and interdisciplinary subjects. Its focus is to Train the Trainer, developing learning materials and delivery systems, courses and interactive content.<sup>135</sup> University of Delhi was India's first university to offer open and distance learning dating back to 1962.<sup>136</sup>
- › Indian Institutes of Technology (IIT) joined the MIT OpenCourseWare Consortium in January 2012 enabling free access to its engineering courses. The IIT lectures can also be accessed through Apple's iTunes platforms and will eventually be available on YouTube.<sup>137</sup>

127 MIT – The Tech: <http://tech.mit.edu/V127/N15/ocw.html>

128 OOPS: <http://www.myoops.org/main.php>

129 Hong Kong University of Science and Technology: [http://www.ust.hk/eng/news/press\\_20120919-978.html](http://www.ust.hk/eng/news/press_20120919-978.html)

130 Open University Hong Kong: <http://openlearn.ouhk.hk/about-us>

131 Government of India Ministry of Human Resources Development: [http://learnos.files.wordpress.com/2012/04/madhava\\_menon\\_committee\\_on\\_odl.pdf](http://learnos.files.wordpress.com/2012/04/madhava_menon_committee_on_odl.pdf)

132 DEC Database as reported in [http://learnos.files.wordpress.com/2012/04/madhava\\_menon\\_committee\\_on\\_odl.pdf](http://learnos.files.wordpress.com/2012/04/madhava_menon_committee_on_odl.pdf)

133 Government of India Ministry of Human Resources Development: [http://learnos.files.wordpress.com/2012/04/madhava\\_menon\\_committee\\_on\\_odl.pdf](http://learnos.files.wordpress.com/2012/04/madhava_menon_committee_on_odl.pdf)

134 UNESCO World Conference on Higher Education: <http://unesdoc.unesco.org/images/0018/001831/183168e.pdf>

135 University of Delhi: <http://vle.du.ac.in/>

136 Government of India Ministry of Human Resources Development: [http://learnos.files.wordpress.com/2012/04/madhava\\_menon\\_committee\\_on\\_odl.pdf](http://learnos.files.wordpress.com/2012/04/madhava_menon_committee_on_odl.pdf)

137 The Chronicle of Higher Education: <http://chronicle.com/blogs/global/indian-institutes-of-technology-to-join-mits-opencourseware-effort/31752>

## Pakistan

- › Allama Iqbal Open University, a public university in Islamabad, has enrolments of 1.9 million students – the largest university by enrolments in the world.<sup>138</sup> It was established in 1974 and was the first open university in Asia.<sup>139</sup>
- › Public institution Virtual University of Pakistan was established in 2002 to provide extremely affordable world class education to aspiring students all over the country through free-to-air satellite television broadcasts and the Internet. Its model identifies the top professors in the country who agree to develop the courses, which it delivers to students at both the Virtual University and all other universities in Pakistan. The Virtual University of Pakistan holds a Federal Charter, making its degrees recognised and accepted all over the country as well as overseas.<sup>140</sup>

## South Korea

- › In May 2012, publisher Houghton Mifflin Harcourt (HMH), and SK Telecom, signed a partnership agreement to create an education platform for South Korean and global markets. The alliance combines HMH's English-language education content with SKT's T-Smart Learning platform to deliver anytime, anywhere instruction and practice opportunities to students through their mobile devices. HMH will provide content from more than 1,000 of its acclaimed titles including *Destination Math*, *SkillsTutor* and *ScienceFusion*, while SK Telecom will develop the viewers, apps, billing systems, certification systems, synchronisation functions and other platform functions required for content delivery. Content will be accessed initially via Samsung Android tablets and will be sold to both consumers and institutions.<sup>141</sup>
- › Established in 2001, Kyung Hee Cyber University uses online video lectures of renowned professors and online education experts. It recently launched a Mobile Campus where students can listen to lectures through their mobile phones.<sup>142</sup>
- › Korea National Open University is the first distance and lifelong educational institution of South Korea and the largest educational institution in the country by enrolment. It has operated for more than 40 years.<sup>143</sup>

138 UNESCO Statistics, National Education Departments

139 Allama Iqbal Open University: <http://www.aiou.edu.pk/Aboutus.asp>

140 Virtual University of Pakistan: <http://www.vu.edu.pk/>

141 Houghton Mifflin Harcourt: <http://www.hmhco.com/content/houghton-mifflin-harcourt-and-sk-telecom-partner-create-education-platform-korean-and-global>

142 Kyung Hee Cyber University: <http://khcu.ac.kr/en/life/mobile.jsp>

143 Wikipedia- Korea National Open University: [http://en.wikipedia.org/wiki/Korea\\_National\\_Open\\_University](http://en.wikipedia.org/wiki/Korea_National_Open_University)

# Appendix D

## Suggested resources and further reading

Austrade has compiled a list of resources on education technology and the impact on the education sector.

### Overall Market Analysis

- › Ambient Insight, *2012 Learning Technology Research Taxonomy*. August 2012, analysis of market opportunities related to educational technology.
- › BMO Capital Markets, *K-12 Education: Innovators Wanted*. October 2012, covers challenges facing education sector, investment trends and overview of technological innovations.
- › College Board Advocacy and Policy Center, *Trends in College Pricing*. 2011, presents data and source information relating to tuition, financial aid, affordability, enrolment and other finances for US universities.
- › Dell, *Innovation in Education: Public opinion poll of parents, teachers and students*. 2012, focuses on how technology is being integrated into education and which areas need most improvement.
- › Diana G. Oblinger (ed.), *Game Changers: Education and IT*, Educause. 2012, short essays and case studies on how different technologies are changing higher education.
- › GSV EDU, *Education Sector Factbook 2012*. Review of market data in education sector (traditional and online) in the US and worldwide, including major companies in the field.
- › Institute for Competitive Workforce, *College 2.0: Transforming Higher Education through Greater Innovation and Smarter Regulation*. May 2011, comprehensive examination of how private sector innovations can support and improve higher education, and challenges to implementation.
- › Institute for Competitive Workforce, *Help Wanted 2012: Addressing the Skills Gap*. September 2012, collection of articles on how education can best support the American workforce.
- › Maureen Bozell and Melissa Goldberg, *Employers, Low-income Young Adults, and Postsecondary Credentials*, Workforce Strategy Center. October 2009, education and training programs supported by employers.
- › Michael Moe, *Presentation at EdNet Conference*, GSV Asset Management. October 2012, covers challenges facing the education sector, investment trends and overview of technological innovations.
- › Michael Staton, *Disaggregating the Components of a College Degree*, American Enterprise Institute. August 2012, theorising on the future of higher education as individualised components rather than traditional bundle of services.
- › Observatory on Borderless Higher Education, *MOOCs and disruptive innovation: The challenge to HE business models*, August 2012.
- › Robert Hogan, [Transnational Distance Learning: An Evolutionary Leap](#), IGI Global Blog. 16 February 2012, talks about the causes and effects of transnational education.
- › UNESCO, *Trends in Global Higher Education: Tracking an Academic Revolution*, 2009 World Conference on Higher Education. 2009, how higher education is reacting to different aspects of global change.
- › U.S. Department of Education Office of Educational Technology, *Enhancing Teaching and Learning Through Educational Data Mining and Learning Analytics*. October 2012, reviews the concept of educational data mining and how can be utilised by learning institutions.



## Online education policies and practices

- › Amanda Ripley, [College is Dead. Long Live College!](#) Time Magazine. 18 October 2012, cover story that provides an introduction to the MOOC concept, its potential and challenges, and comparison to face-to-face learning.
- › Angela Chen, [Online Degree Program Lets Students Test Out of What They Already Know](#), Chronicle of Higher Education. 20 June 2012, explains how University of Wisconsin plans to allow “competency tests” so students are awarded credit based on what they already know – possibly from MOOCs.
- › Babson Survey Research Group and Inside Higher Ed, *Conflicted: Faculty and Online Education*. June 2012, survey of faculty and university administrators on attitudes and practices related to multiple aspects of online education.
- › Ben Wildavsky, *Classes for the Masses: The Evolving Efforts of Three Institutions to Create High-quality, Large-scale, Low-cost Online Courses*, American Enterprise Institute. August 2012, case studies examining operations of three online course providers: two traditional universities (Universities of Maryland, California) and one start-up (Udacity).
- › Chris Ross, *Are the Sleeping Giants Awake? Non-profit Universities Enter Online Education at Scale*, Parthenon Group. September 2012, insights into how non-profit universities pose significant competitive threat to for-profit companies for online students.
- › Chronicle of Higher Education, [What you need to know about MOOCs](#). 2012, overview of MOOCs technology with definitions, review of major players and key developments/ events (with links to original articles).
- › Jon Becker, [You either love a good dichotomy or you don't](#), Educational Insanity (blog). 2 July 2012, discusses the differences in MOOCs offered by universities such as Stanford and those created by Downes, Siemens, and other MOOC pioneers.
- › The Conversation, [Future of higher education](#). Autumn 2012, series of articles from The Conversation website on how technology will shape and impact learning at universities.
- › Daphne Koller, [What we're learning from online education](#), TED talk. June 2012, creator of Coursera on the benefits of MOOCs, including gaining a better understanding of how people learn.
- › David Cormier, [What is a MOOC?](#) 8 December 2010, explains the basics of a MOOC (YouTube video).
- › Erica St. Angel, [Massive list of MOOC resources](#), World of Webcast blog. June 2012, MOOC articles and resources with links to original content.
- › George Siemens, [eLearnSpace](#) (blog). Co-creator of the first MOOC.
- › Ithaka S&R, *Interactive Learning Online at Public Universities: Evidence from Randomized Trials*. 22 May 2012, extensive research on online vs. face-to-face learning outcomes.
- › Jeffrey R. Young, [4 Professors Discuss Teaching Free Online Courses for Thousands of Students](#), Chronicle of Higher Education. 11 June 2012, presents four interviews with professors teaching online courses.
- › (Sir) John Daniel, *Making Sense of MOOCs: Musings in a Maze of Myth, Paradox and Possibility*. September 2012, history and context of MOOCs in terms of evolution of educational technology.
- › Marc Bousquet, [Good MOOCs. Bad MOOCs](#), Chronicle of Higher Education. 25 June 2012, explains the different motives behind different MOOCs.
- › Mediasite, *Comparison of MOOCs and MOOC-like initiatives*. June 2012, 1-page table comparing aspects of organisations in MOOC space. Tied to Massive list of MOOC resources listed in “Further resources” section.
- › Nikki Harper, [A Milestone in Online Education? New Survey is Encouraging](#), Online Degree Directory (no date). Discusses the results of a recent survey regarding opinions on online education and its outcomes.
- › Online Course, *Current/Future State of Higher Education*. Already complete but access to the resources should still be available.
- › Online Course, [MOOC MOOC](#). Already complete, but access to the resources should still be available.

- › Paul Fain, [Making It Count](#), Inside Higher Ed. 15 June 2012, explains how universities may add MOOCs to a prior learning portfolio so students will get credit when they enrol in traditional degree programs.
- › Paul Leblanc, *Making Sense of Disruptive Technologies and Higher Education*, American Enterprise Institute. August 2012, overview and evaluations of learning technologies.
- › Salman Khan, [Let's use video to reinvent education](#), TED talk. March 2011, creator of Khan Academy on how and why he created the Khan Academy and the value of online education.
- › Stephen Downes, [OLDaily](#) (blog). Co-creator of the first MOOC.
- › Stephen Downes, [The MOOC Guide](#) (website). Highlights key events in the MOOC movement.
- › Steve Kolowich, [Open CourseWare 2.0](#), Inside Higher Ed. 13 December 2011, describes OpenCourseWare's far reach and the beginning of MOOCs.
- › Steve Kolowich, [Who Takes MOOCs?](#), Inside Higher Ed. 5 June 2012, talks about early findings on the typical MOOC audience.
- › Steve Kolowich, [Online Learning and Liberal Arts Colleges](#), Inside Higher Ed. 29 June 2012, talks about the integration of online content into a new environment – small liberal arts colleges.
- › Tamar Lewin, [Beyond the College Degree, Online Educational Badges](#), New York Times. 4 March 2012, addresses the problem of cheating on MOOC assessments on the validity of online credentials.
- › U.S. Department of Education Office of Planning, *Evaluation, and Policy Development, Evaluation of Evidence-Based Practices in Online Learning*. September 2010, compares student learning outcomes from online instruction to face-to-face based on nearly 100 studies.
- › U.S. Department of Education Office of Education Technology, *International Experiences with Technology in Education: Final Report*. August 2012, research on how international government efforts to integrate technology into education.

## International Impact

- › Dr. Rahul Choudaha, [Could MOOCs revolutionize international student recruitment and transnational education?](#), DrEducation (blog). 24 June 2012, outlines opportunities MOOCs present to potential international students.
- › Elizabeth Gibney, [Open Access Push From Brussels](#), Inside Higher Ed. 17 May 2012, discusses open access publishing in the European Union.
- › Karine Joly, [Can free online courses be the next marketing and branding vehicles for #highered?](#), collegewebeditor.com. 31 May 2012, reports her thoughts on open courses from a marketing perspective.
- › Madhava Menon, *Report of the Committee to Suggest Measures to Regulate the Standards of Education Being Imparted through Distance Mode*, India Ministry of Human Resource Development. 2011, on history, statistics and regulations of distance learning in India.
- › Michael Cotey Morgan, [An online opportunity for Canadian universities](#), The Globe and Mail. 22 May 2012, discusses the importance of Canada adopting open online learning initiatives.
- › [Now, classroom content of IITs can be accessed by MIT students](#), The Times of India. 2 January 2012, talks about the impact of the Indian Institute of Technology (IIT) joining OpenCourseWare.
- › [ODL in BRIC nations – ICDE session at European conference](#), International Council for Open and Distance Education. 8 December 2011, hosted a special session at the recent Online Educa Berlin conference and described present trends and challenges in open and distance learning in their respective countries.
- › [Online university courses present opportunities, challenges for Chinese education](#), English News in China. 2 December 2011, discusses the impact of online courses on the Chinese education sector.

## Australian Response

- › Amanda Dunn and Katie Cincotta, [Free courses from world's top unis a swipe away in online revolution](#), The Age. 12 August 2012, discuss the impact of online courses on Australian universities.
- › Deloitte, *Digital Disruption: short fuse, big bang?* 2012, research and statistics on how disruptive digital technologies will impact the direction of Australia's economy.
- › Honorable Andrew Robb AO MP, *Online Education in the Asian Century: The Australian Opportunity*. 17 October 2012, speech transcript on opportunities for Australian universities in international markets in terms of online higher education.
- › Jennifer Bennett, [Education in the digital blender](#), Campus Review. 5 March 2012, talks about the changes in higher education in Australia that will likely to occur in the new age of education technology.
- › Jennifer Bennett, [US award for Australian online learning site](#), Campus Review. 16 April 2012, discusses the work of two educators from UNSW who have been awarded for advances they have made in online learning.
- › New Media Consortium, [The Technology Outlook for Australian Tertiary Education 2012-2017](#). Collaborative project with Griffith University to create a report on the technology outlook for Australian education in the next five years.
- › Sarah Hoosen, [Survey on Governments' Open Educational Resources \(OER\) Policies](#), Commonwealth of Learning. June 2012, provides an overview of the findings of the Commonwealth of Learning/UNESCO survey on OER policies and activity across all countries of the world, and puts forward some suggestions for promoting the use and development of OER and overcoming current obstacles to its implementation.
- › The Conversation, [Massive Open Online Courses](#). November 2012. Series exploring how MOOCs could play out in Australia.

The Australian Trade Commission – Austrade – is the Australian Government’s trade, investment and education promotion agency.

Through a global network of offices, Austrade assists Australian companies to grow their international business, attracts productive foreign direct investment into Australia and promotes Australia’s education sector internationally.

Austrade’s Framework for international Marketing and Promotion of Australian Education and Training comprises three strategic objectives: to contribute to the growth in demand for Australian education; to contribute to the repositioning of Australia as a provider of high quality education services to international students; and, to contribute to the building of a sustainable Australian international education sector. In North America, we contribute to these objectives by leveraging connections with US and Canadian institutions and established commercial networks to identify and report on emerging cross sectoral trends and competitor activity and present tangible research and partnership opportunities to Australian institutions and providers.

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