

April 2013

The online evolution: when technology meets tradition in higher education

Andrew Norton



Grattan Institute Support

Founding members



Australian Government



Program support

Higher Education Program



Affiliate Partners

National Australia Bank

Senior Affiliates

Wesfarmers

Stockland

GE Australia and New Zealand

Google

Affiliates

Arup

Urbis

The Scanlon Foundation

Lend Lease

Origin Foundation

Sinclair Knight Merz

Ernst & Young

Grattan Institute Report No. 2013-3, April 2013

This report was written by Andrew Norton, Grattan Institute Higher Education Program Director, and Grattan Associates Julie Sonnemann and Cassie McGannon. Grattan Associate Amélie Hunter and Grattan interns Shan-Verne Liew, Andy Lynch and Cameron Knott made substantial contributions to the report.

We would like to thank David Christie, Shirley Alexander and members of Grattan Institute's Higher Education Reference Group for their helpful comments.

The opinions in this report are those of the authors and do not necessarily represent the views of Grattan Institute's founding members, affiliates, individual board members or reference group members. Any remaining errors or omissions are the responsibility of the authors.

Grattan Institute is an independent think-tank focused on Australian public policy. Our work is independent, practical and rigorous. We aim to improve policy outcomes by engaging with both decision-makers and the community.

Data from the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE) is copyright, Commonwealth of Australia, reproduced by permission.

For further information on the Institute's programs, or to join our mailing list, please go to: <http://www.grattan.edu.au/>

This report may be cited as:

Norton, A., Sonnemann, J., McGannon, C. 2013, *The online evolution: when technology meets tradition in higher education*, Grattan Institute

ISBN 978-1-925015-29-4

Material published or otherwise created by Grattan Institute is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License. Data sourced from other organisations can only be reproduced subject to their copyright arrangements.

Overview

Online higher education is not new, but in 2012 it caught popular attention. Hundreds of media stories about 'MOOCs' – massive open online courses – drove a surge in enrolments. By March this year more than three million people around the world had enrolled in Coursera, the largest MOOC provider. High-profile universities, including the University of Melbourne, rushed to make their course materials available via MOOCs. *Time* magazine published a cover story on online technology 'reinventing college', asking if it could make higher education better and cheaper.

Despite the hype around purely online education, the big question is not whether online courses will replace classrooms, but whether technology will drive the re-design of teaching and learning. Will traditional lectures be replaced with 'flipped classrooms', in which students view video lectures before coming to class to work on specific problems with the lecturer or tutor? Will computer game technology become a common educational tool? Will new data mining techniques be widely used to show what students don't understand and tailor personalised learning pathways for them?

Nobody knows what will happen over the long term as technology and tradition mix in higher education. This report takes stock of what we know now, and what it suggests about how higher education in Australia will evolve over the medium-term future.

Technology will affect student choices between education providers. Students will expect good technology at university, as they do when shopping, socialising and being entertained. On-

campus universities will compete against each other and online universities by blending technology and classroom teaching.

In the foreseeable future, young people especially will still want to meet and mix with each other as part of their higher education. Strong university brands will still be a signal of value to employers and others. These factors will favour existing on-campus universities. But universities may increase their purchase of course content and education technologies from other organisations.

How should government respond to new online education technologies and business models? It should not pick winners, but it should do more to open the door to new education providers.

Purely online institutions should not have to provide student welfare services, but should be allowed to accept all students through open access admissions policies. These changes would help keep costs down, providing scope for lower fees.

Tuition subsidies should be extended beyond public universities, so that government is neutral between education providers.

Barriers to foreign colleges and universities setting up in Australia should be lowered. Accreditation recognition agreements between Australia and other countries with high education standards would remove an obstacle to trade in education. Such agreements would give Australian universities more opportunities overseas, and Australian students more higher education choice at home.

Table of contents

Overview	1
1. The producers of online education	5
2. The higher education market.....	11
3. How good is online learning?	20
4. Online education and employment.....	31
5. The cost of online higher education.....	34
6. The future of on-campus universities	39
7. Policies for online higher education.....	42
8. Conclusion	51
9. Glossary	53
Appendix A: Empirical evidence	55
10. References	56

Figures

Figure 1: Off-campus students by university, 2011	10
Figure 2: Student higher education outcomes	12
Figure 3: Year 12 student impressions of university, 2008	13
Figure 4: Models of online education	15
Figure 5: Enrolment trends by place of study.....	16
Figure 6: Enrolment in at least one off-campus unit, by age and level of higher education 2011.....	17
Figure 7: Off-campus enrolment by study time commitment, 2011 ..	18
Figure 8: Off-campus enrolment share by field of study, 2011.....	18
Figure 9: Student higher education outcomes	20
Figure 10: Offline and online methods	21
Figure 11: Example of blended learning on-campus.....	21
Figure 12: Factors positively impacting on student learning	22
Figure 13: Student higher education outcomes	31
Figure 14: US employer perceptions on desirability of graduates from types of colleges / universities, 2012.....	32
Figure 15: Which outcomes can be achieved online?.....	40
Figure 16: A blended subject becoming more online intensive	41
Figure 17: Process for getting access to Australia's higher education market.....	48

Boxes

Box 1: Major MOOC providers	6
Box 2: Australian free online courses.....	7
Box 3: Case studies	14
Box 4 Technology and demand for online education	19
Box 5: Engaging digital natives: learning with technology?.....	23
Box 6: Flipped classroom case-studies.....	24
Box 7: Adaptive e-learning platforms	25
Box 8: Assessing inquiry skills in virtual environments, Harvard University	27
Box 9: Virtual reality ear survey simulation, The University of Melbourne	28
Box 10: Lecturer feedback live-to-camera	28
Box 11: What are student attitudes toward campus life?	40
Box 12: What is a university?	49

Tables

Table 1: Australian employer selection criteria for graduates	32
Table 2: Higher education cost drivers.....	35
Table 3: Open Universities Australia, inferred costs 2011	37
Table 4: Summary of policy recommendations	50

1. The producers of online education

In higher education, 2012 was the year of the MOOC – the massive open online course. At the year's end, several million students had enrolled in education providers started during the year. The big MOOC providers – Coursera, edX and Udacity – were the fastest-moving start-ups in higher education history.

The popularity of MOOCs led many people to ask if this was the end of on-campus education. The MOOC providers combined famous university brand associations such as Harvard and Princeton, and zero or trivial fees to students. Few people believe that MOOC providers are the future of higher education on their own. But they are part of a wave of innovation in higher education, affecting both educational technology and the way education providers are organised.

This chapter looks at developments overseas including MOOC providers, American online universities, and several other higher education start-ups that are using online technology to re-think how higher education can be delivered. It finishes by examining the major Australia providers of online education. Chapter 7 discusses policy issues affecting producers of online education.

1.1 MOOC providers

MOOCs are online subjects, usually offered for free using course materials developed by established academics. MOOC providers are platforms bringing together multiple MOOCs, aggregating content from many different sources. See box 1 for descriptions of leading MOOC providers and box 2 for details of Australian free

online initiatives. Though MOOC providers are sometimes seen as competitors with both on-campus and online universities, at this point they differ in several important respects.

MOOC providers, unlike universities, do not offer degrees. They have no power to award credentials such as bachelor or masters degrees, and in most cases lack the sequences of subjects that make up degrees. Though in theory MOOC providers could be authorised to award credentials, many of the big providers such as Coursera and edX are unlikely to do so. They rely on partner universities to provide course content and brand association. These partners are unlikely to support direct MOOC competition.

MOOC providers and universities have very different financial models. To be free or very cheap, MOOC providers must keep costs down (see chapter 5 for more on costs). MOOCs offer little personal assistance from paid academic staff. Assessment tasks are automated or carried out by other students. Reports from MOOC providers suggest that student peer review is surprisingly successful, but it cannot fully replace professional academic assessment.

MOOC providers generally have open admissions. Instead of admission requirements, they typically have admission advice. Their subject descriptions contain 'recommended background' knowledge or ratings such as beginner, intermediate or advanced. For a free service, MOOC providers cannot afford to spend money selecting students. MOOC drop-out rates are high,

reflecting a system in which student selection occurs after rather than before admission.

MOOC providers are looking for a business model. There are various ideas. They all sell add-ons to the basic free courses, such as certificates for course completion. In some subjects, students can pay for assessment, sitting exams supervised by the commercial invigilation companies Pearson VUE and ProctorU. For some subjects, students can receive academic credit which can be put towards degrees at other institutions. The American Council on Education has approved some Coursera courses for its credit recommendation service.

Coursera and Udacity offer employment services connecting students with employers looking for their skills. Udacity is reported to have 350 partner employers who pay to be put in touch with Udacity students.

All MOOC providers sell their course materials to other universities. Coursera has a deal with Antioch University in Los Angeles to use Coursera subjects. Antioch offer students academic support and a credential, but charges them less for a Coursera-based subject than a traditional on-campus subject. San Jose State University in northern California uses course materials provided through Udacity and edX.¹

The MOOC provider business models are all based on 'unbundling' higher education services. Rather than packaging education services together with one price, the traditional university business model, the MOOC providers are selling them

separately. Unbundling is a vital change to the way universities operate. It can be done without online technology, but it is online start-ups in search of revenue that are driving it. A future Grattan report will look in more detail at the Australian policy implications of unbundling Australian higher education services.

Box 1: Major MOOC providers

Coursera is a for-profit company launched in 2012. It has raised US\$22 million in venture capital.² As of early 2013 it has signed up over 60 top-tier universities from around the world and enrolled more than three million students in 330 courses.

edX is a not-for-profit organisation founded by Harvard University and the Massachusetts Institute of Technology (MIT) in 2012 with a \$60 million investment. It has dual goals: to offer online courses and to research how students learn.³ As of early 2013 it has 12 partner universities and enrolled 675,000 students in 27 courses.

Udacity is a for-profit company started by three scientists from Stanford University in 2011. Since then, it has raised over \$21 million in venture capital.⁴ It has over twenty courses, mainly in computer science but also entrepreneurship and maths.

¹ See Kolowich (2013) for details of edX's licensing arrangements.

² Crunch Base (2013)

³ DeSantis (2012)

⁴ Sloan (2012)

Box 2: Australian free online courses

Two Australian universities have partnered with the major American MOOC providers. The first of ten courses the University of Melbourne will offer via Coursera began in late March. This macroeconomics course attracted more than 40,000 of the 159,000 University of Melbourne Coursera enrolments by March 2013. The Australian National University has announced that it is joining edX, with classes to begin in 2014.

In December 2012 the University of New South Wales started a free first-year computer programming course using their own OpenLearning platform, which they say is “social like Facebook, collaborative like Wikipedia and available to anyone in the world.” The University of Southern Queensland uses the Open Educational Resource platform to offer a subject on regional relations in the South Pacific. The University of New England has established UNE Open, which will allow students to take some UNE subjects for free. Open Universities Australia has launched Open2Study, offering free vocational and higher education course materials. The University of Western Australia is offering three courses in 2013 in conjunction with Stanford via its Class2Go software

Australian universities say that they face stronger copyright restrictions than universities in the United States, limiting what they can make available to the general public through MOOCs.⁵

⁵ UA (2012)

1.2 American online higher education

Before MOOCs, online education was already growing rapidly in the United States. The number of students taking at least one online subject increased from 1.6 million in 2002 to 6.7 million in 2011. As a share of total enrolments, this is significantly higher than in Australia.⁶ The proportion of American higher education institutions offering complete online programs increased from a third to more than 60 per cent.⁷ This section cannot comprehensively analyse online education in the US. Instead, it examines a few interesting examples.

The for-profit University of Phoenix is the biggest degree-granting provider of online education in the US. In 2010, it had more than 300,000 online students,⁸ though total Phoenix enrolments have declined substantially since then. A leading consultant on online education, Richard Garrett, argues that for-profits such as Phoenix give online education enrolment scale. Phoenix standardises curriculum and instruction methods to achieve consistent quality and lower its per student costs. In non-profit universities, online education is often driven by individual academics or departments, not the institution as a whole.⁹ We can see a similar pattern in the many Australian universities with small off-campus enrolments (section 0).

Phoenix provides student advisers on a range of study-related subjects online or by phone, including 24/7 technical support. It

⁶ Though collected in slightly different ways, 32% taking at least one online unit in the US, compared to 23% external or multi-modal studies in Australia.

⁷ Allen and Seaman (2013), p. 17, 20

⁸ NCES (2012). Phoenix is also an on-campus provider.

⁹ Garrett (2012)

abandoned the traditional academic year, with courses starting nearly every week. Phoenix does not offer the extra-curricular activities of a traditional university campus. But it provides 'Phoenix Connect' academic social network for students and alumni to "take advantage of student support communities, get advice from faculty members and enjoy a true sense of community that can be customized to your area of study, personal interests and career goals." Social networking technologies allowed online education providers to replicate aspects of the campus experience that traditional distance education methods could not.

Western Governors University is an online university established in the 1990s by 19 US state governors to provide affordable online education. Like Phoenix, WGU does not use a standard academic year. It took this idea further by not having courses of fixed length, as is common in most universities including Phoenix (the 'credit hour' approach). Instead, it requires students to demonstrate competency. They receive a degree when they pass all the necessary assessment exercises. Fees are for six months at a time, with students able to take as many subjects as they can in that time period. Students who work hard or who already understand the material, perhaps through work experience or previous study, can complete more quickly. Students are given 'personal mentors' to help them with their academic work.

ASU Online is part of Arizona State University (ASU). Arizona State is unusual for being a large research university with residential colleges that also has big ambitions for its online education division. To achieve this, it makes extensive use of third-party provision of technological services. The global education firm Pearson Education provides the platform for ASU

Online's courses. Knewton's Adaptive Learning Platform provides detailed analysis of each student's learning activities (see chapter3). ProctorU provides online supervision of exams for ASU Online students, using webcams to check identification and monitor students taking exams online from their homes. This use of firms supplying multiple higher education providers could be an important structural change. It brings new expertise and economies of scale to higher education.

1.2.1 American start-ups

StraighterLine is a new American higher education provider that lacks MOOC brand power, but has a clearer way to make money. It offers online introductory college subjects, on a monthly subscription of \$99 with additional fees per subject. These per subject fees are as low as \$49, though students can pay more for 'professor led' versions of the subjects, priced by the academics taking the course (usually \$50 to \$100 more). The course materials come from existing organisations and companies, such as the publisher McGraw-Hill. StraighterLine does not offer full courses or credentials, but has credit transfer arrangements with many colleges and universities, including the University of Phoenix and Western Governors University.

MOOC2Degree is run by Academic Partnerships, an online technology provider to many universities. MOOC2Degree offers free online subjects from these universities, with the possibility of academic credit towards full courses. The initial courses are 'loss leaders' that can bring additional students into paid programs at the provider universities.

The Minerva Project, backed by former Harvard president Larry Summers among others, is a re-thinking of on-campus education based on online technology. Due to start in 2015, Minerva plans to move its students between residential locations in seven countries, receiving their tuition via live-streamed seminars. Minerva's founder believes it can serve the many high-quality students and academics locked-out of Ivy League universities, which have remained around the same size despite massive increases in demand.¹⁰ Minerva will not be cheap by StraighterLine standards, but expects to charge around half as much as the Ivy League.

1.3 Australian providers of off-campus education

Australia's national education statistics do not have online as a category. The statistics do record off-campus and mixes of on-and-off-campus enrolments (often called 'multi-modal'). Online is now the dominant form of off-campus delivery. Most universities have some online enrolments, but regional universities are the major off-campus providers.

Higher education providers with the largest off-campus enrolments are shown in figure 1. Charles Sturt University is the largest distance education provider, with about 29,000 off-campus students. Six regional universities – Charles Sturt, Southern Queensland, Southern Cross, Charles Darwin, Central Queensland and New England – teach more than three-quarters of their students off-campus. Their emphasis on off-campus education reflects a historical mission to serve regional Australia and limited local recruitment possibilities.

¹⁰ Nisen (2013)

In recent years, the most prominent player in online education has been Open Universities Australia (OUA). Established in the early 1990s to promote access to higher education, OUA is now a for-profit company owned by seven universities. It sells online courses offered by its shareholders and another 14 higher or vocational education providers. Through intensive marketing it has grown rapidly. Student numbers have increased five-fold since 2004, to almost 55,000 in 2011.¹¹ Many of its undergraduate subjects have no admission requirements, allowing OUA to tap into markets not directly served by public universities.

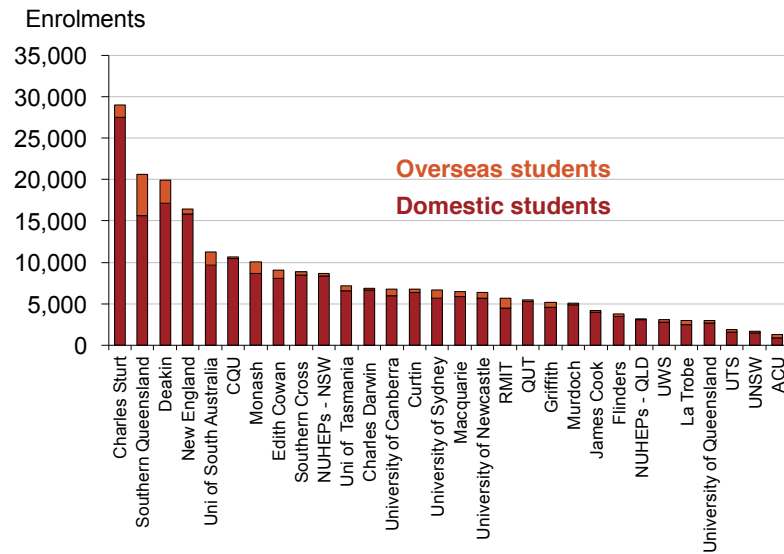
Until recently, Australian public universities blurred the distinction between online or distance and on-campus education. Students studied in the same departments for the same qualifications. Now universities are providing distinctly branded online courses. Swinburne University has joined with SEEK Ltd to form Swinburne Online. Its promotional materials claim a distinction between online learning and traditional distance education. The latter can be "isolating", in contrast to Swinburne Online's "vibrant and engaging learning community". Curtin University has created Curtin Online, which it says is 'engaging, interactive and convenient'.

Swinburne and Curtin's online ventures partly reflect a government policy change. For public universities, the Commonwealth government has largely removed previous enrolment caps on Commonwealth-supported students. The caps created conservatism in university practices. Internal university politics made it hard to move Commonwealth-supported places to online education, as no on-campus teaching department wanted

¹¹ DIISRTE (2012d)

to lose funding. The lifting of caps removed this political problem: universities could have both on-campus and online education.

Figure 1: Off-campus students by university, 2011



Note: NUHEPs are non-university higher education providers. These figures include both external and multi-modal students. Only universities with 1,000 or more off-campus enrolments are shown.

Source: DIISRTE (2013a)

2. The higher education market

Like Steve Jobs, online education entrepreneurs take the view that people don't know what they want until they see it. New higher education services may change the nature of student demand. But analysis of where the higher education industry might go needs to be grounded in what we already know about student demand. Online education itself is not new, and the strength of demand for on-campus education tells us something about what students want from their higher education experience. This chapter looks first at the different outcomes students seek, and then at what evidence we have on their relative importance.

2.1 What outcomes are students seeking?

When students enrol in a degree, they are likely seeking a number of different outcomes – preparation for a job, an improved understanding of the world, a prestigious entry on their CV, exposure to new knowledge, a lifestyle, a new group of friends.

Different students, with different career goals and at different life stages, will prioritise these things very differently. A school leaver may be most interested in the breadth of new knowledge they will gain, and the overall student experience they will have, and be less concerned about the specific technical skills they will acquire. A person who is already working full-time in their chosen occupation, and is undertaking a degree to help them climb the career ladder, might be more focused on improving their specific knowledge and making new contacts, and less worried about the improved social status a degree can grant.

Each student's choice of institution, course and mode of course delivery will be guided by what they prioritise. To understand the higher education market from the student's perspective, we need to think about what they are 'buying' when they enrol in a degree. This may involve trade-offs between different objectives, given that not every course or university provides all these outcomes to the same extent. Financial cost is also likely to be an influence. Students can choose whether to pay a premium for a comprehensive package, or be more selective about the outcomes they care about.

The 'higher education product' that a student buys can be unbundled into at least eleven different sub-products, across three categories, as shown in figure 2. Online education is not well-suited to providing them all, as later parts of this chapter and chapter 6 will explain.

Figure 2: Student higher education outcomes

I want to learn new things	Specific vocational knowledge	Generic professional skills	Practical training	Knowledge for its own sake
I want to improve my employment prospects	Formal credential	Quality signal to employer	Evidence of achievement	
I want to go to uni for the broader opportunities	Networking opportunity	Student lifestyle	Migration rights	Social signal

2.1.1 I want to learn new things

The content knowledge and skills gained through higher education are the most obvious product that students are purchasing, and align closely with the traditional purpose of higher education. Within this category, we can identify at least four types of knowledge that a student may wish to acquire:

- Many students seek the **specific vocational knowledge** required for a particular profession, such as a civil engineer, a lawyer, or an economist.

- Higher education also gives students the opportunity to acquire **generic professional skills**, such as critical thinking and written communication.
- Acquisition of **practical training**, such as the placements undertaken by teaching and nursing students.
- Acquisition of **knowledge for its own sake** in a field of interest.

2.1.2 I want to improve my employment prospects

Many students enrol in higher education to improve their employment prospects, in their current job or in their future career (see figure 3). Higher education institutions do not just give students relevant knowledge, they also provide evidence that this knowledge has been acquired. Within this category, there are a variety of formal and informal products that students may be seeking:

- Many professions require, either legally or de facto, a **formal credential** (a degree or diploma) for entry to that profession that can only be achieved via enrolment in higher education. For example, Australian engineers must hold an accredited engineering degree, as well as meet other criteria, to be recognised as a professional engineer by Engineers Australia.
- Holding a degree is a **quality signal** to an employer that the student is a person with the skills and capacity to be admitted to, and complete, a higher education qualification. This is particularly relevant in fields where formal professional

qualifications and a deep technical knowledge base are not prioritised.

- Students may seek **evidence of achievement** in their studies, such as transcripts showing completion of particular subjects. These are a signal to potential employers, and an indication to themselves, of their level of mastery of a particular body of knowledge.

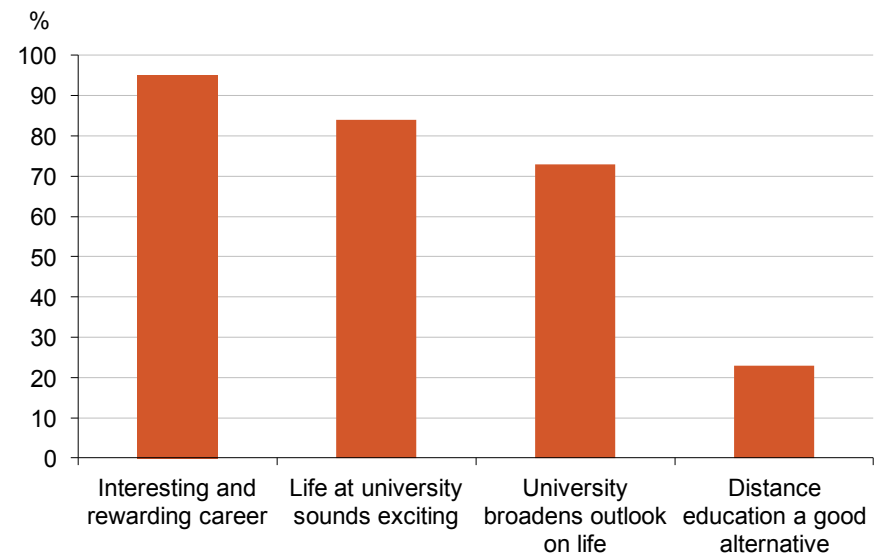
2.1.3 I want to go to uni for the broader opportunities

The third group of higher education outcomes are not strictly academic. Higher education provides an opportunity for meeting people and enjoying other experiences:

- A **networking opportunity** to make contacts in their field that will be useful to their future career. Particularly for postgraduates, the contacts made while studying may be a major reason for enrolment (for example, prestigious MBA programs).
- A **student lifestyle** that enables them to make new friends and participate in campus life. For many undergraduates who have just finished high school, this remains an important aspect of higher education. It is one reason why distance education does not appeal to this group (figure 3).
- For many international students, the **migration rights** made accessible by completing a degree in Australia are a major reason they choose to study here.

- A degree can also act as a **social signal** that a student belongs to a particular class or group in society that can gain access to that institution, and has the financial and human capital to complete the degree.

Figure 3: Year 12 student impressions of university, 2008



Note: Respondents preferring university only
Source: Roy Morgan Research (2009)

Box 3: Case studies

On-campus? Sam is eighteen and has just finished Year 12. He isn't sure what career he wants, but he thinks he'll probably get a better job if he has a degree from a good university. He thinks he'll probably do a general degree like Commerce that will give him lots of options in the future. Like his friends, he's looking forward to being a uni student. He isn't too worried about the cost of uni – it's all going on HECS-HELP and he figures he'll pay it back eventually.

Partly online? Ittima works as a lawyer for a large firm. She did her law degree straight after she left school. Five years on, she has decided that knowing more about economics will help her to do her job better, and improve her chances of getting a promotion at another firm. She doesn't have time to hang around on campus, but she thinks she might meet some classmates who could be helpful professionally. Her main interest is the knowledge and skills she will gain, but she also wants a masters degree as a signal to future employers. She's prepared to pay for good teaching and a good reputation, but isn't interested in paying for things she won't use.

Partly online? Lucy got a job as a child-care worker straight after she left school, and never did any more formal study. She's in her thirties, and now her children are a bit older she wants to work as a teacher, so she needs a qualification. She isn't really interested in spending time socialising with other students, and between work and her family commitments she doesn't have time anyway. She knows that the teaching course will have intensive practical training at times, but overall she wants to be able to balance her family commitments as best she can while studying.

Learn new things	Specific knowledge	Generic skills	Practical training	Knowledge for own sake
Employment prospects	Formal credential	Quality signal to employer		Evidence of achievement
Broader opportunities	Networks	Student lifestyle	Migration rights	Social signal

Learn new things	Specific knowledge	Generic skills	Practical training	Knowledge for own sake
Employment prospects	Formal credential	Quality signal to employer		Evidence of achievement
Broader opportunities	Networks	Student lifestyle	Migration rights	Social signal

Learn new things	Specific knowledge	Generic skills	Practical training	Knowledge for own sake
Employment prospects	Formal credential	Quality signal to employer		Evidence of achievement
Broader opportunities	Networks	Student lifestyle	Migration rights	Social signal

2.2 Enrolment evidence on student demand

Enrolment trends can reveal the trade-offs students make between their different higher education goals. For example, a student might prefer on-campus study, but choose the convenience or lower cost of off-campus. Or a student may prefer the convenience of off-campus study, but take an on-campus course because employers perceive these to be of higher quality.

In Australia, enrolment patterns are a rough guide to these trade-offs. For domestic undergraduates, the government controlled student numbers until 2012. This muted student demand as an influence on what universities offer. International students in Australia must take at least three-quarters of their subjects on-campus.¹² As a result, the underlying study preferences of international students may not be fully displayed in the market.

2.2.1 Defining online education

Public discussion of online education often contrasts online and on-campus study. In reality, virtually every student uses online technologies.¹³ Most course administration is through learning management systems, from which students can find readings, download recordings of lectures, communicate with their teachers and other students, take tests, and submit assignments. University libraries have large quantities of online material, which students supplement with their own online research. A significant minority of students who classify themselves as ‘on-campus’

report doing at least half their study online.¹⁴ Online technology is changing both distance education (by correspondence and TV in the 1990s) and on-campus education. Figure 4 distinguishes different levels of campus engagement, from purely online to a mix of online and off-campus.

Figure 4: Models of online education

	Purely online courses	Multi-modal courses	On-campus courses
	All units purely online	Mix of pure online units and on-campus units	Units involve on-campus contact
On-campus presence	None	Low - high	Low - high

¹² DEEWR (2007), p. 20

¹³ James, *et al.* (2010), p. 44-47; ACER (2012)

¹⁴ Coates (2008), p. 2

2.2.2 Overall enrolment trends

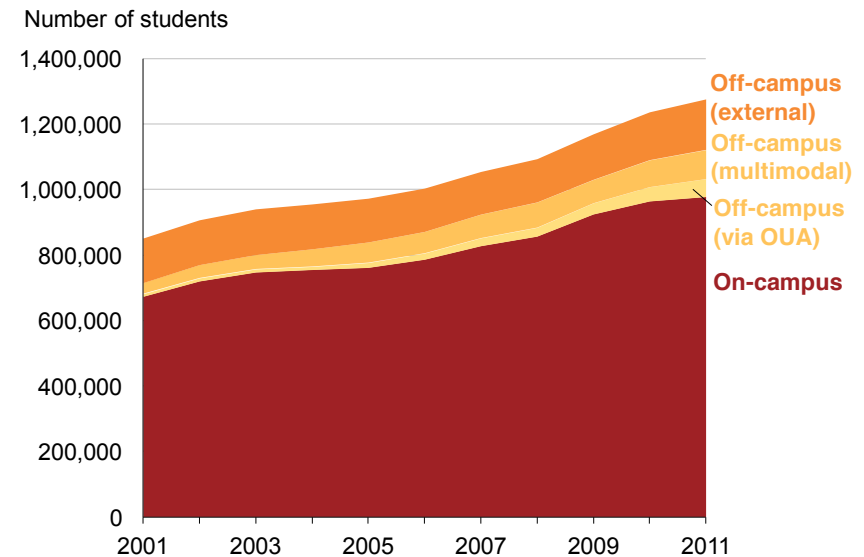
Over the last decade the number of students studying at least partly off-campus has grown in Australia. Figure 5 shows the overall trends. Off-campus student numbers have increased in domestic postgraduate courses, ‘multi-modal’ courses, and in Open Universities Australia (OUA). Off-campus enrolments directly in public universities have not increased for domestic undergraduates, and have decreased for international students. The overall proportion of students studying off-campus was stable at about 20 per cent over the decade if OUA is excluded. With OUA included, the proportion increased to 23 per cent. For domestic students, the proportion studying off-campus increased from 21 per cent to 25 per cent over the decade, or 29 per cent if OUA is included.¹⁵

2.2.3 Off-campus education by age

Figure 6 shows the proportion of students taking at least one unit of study (or subject) off-campus by age. This shows an expected pattern of interest in off-campus education increasing with age. Only about 10 per cent of school-leaver undergraduates, aged 21 years or less, are enrolled in any off-campus study. This matches the high level of interest shown by young people in campus life (figure 3). Older students are less likely to want campus life, or to have time to take advantage of it if they do. Despite this, older postgraduates are more likely to be enrolled on-campus than undergraduates in the same age group.

¹⁵ OUA numbers are reported separately in the DIISRTE statistics. There may be some double-counting of students who enrol in both OUA and a university during a year.

Figure 5: Enrolment trends by place of study

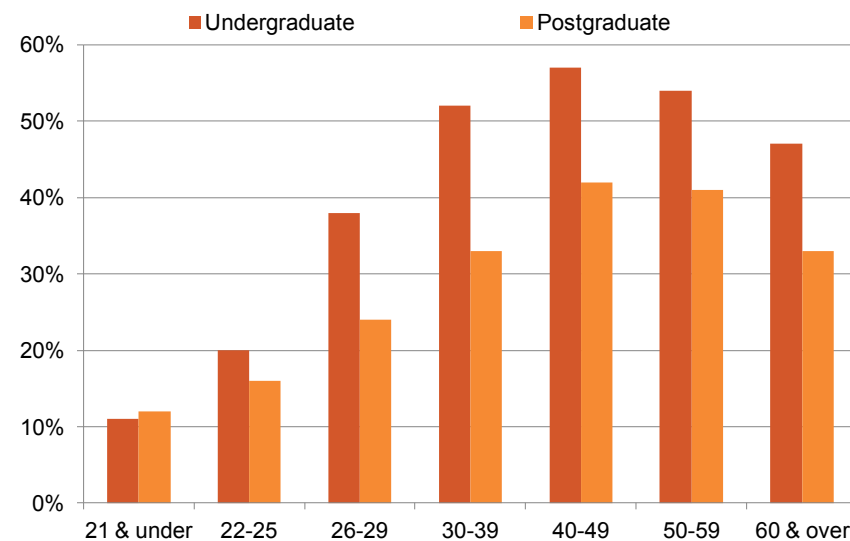


Notes: On-campus – students are required to attend campus on a regular basis
 Off-campus (external)– students are not required to attend campus and can complete the course online or via distance education. OUA counted separately in statistical collection.
 Multimodal – a combination of on-campus and on-campus delivery of the course

Source: DIISRTE (2013a)

This is partly because most research students are enrolled as on-campus students, even if their attendance on campus is irregular. Among coursework postgraduate students, just over 40 per cent are primarily enrolled off-campus. This has been trending down in recent years, perhaps partly reflecting the influence of masters-level initial professional entry qualifications. For example, the University of Melbourne now only teaches initial professional entry qualifications in law, medicine and engineering at postgraduate level.

Figure 6: Enrolment in at least one off-campus unit, by age and level of higher education 2011



Note: Includes Open Universities Australia but not multi-modal units of study
Source: Grattan special data request, DIISRTE data.

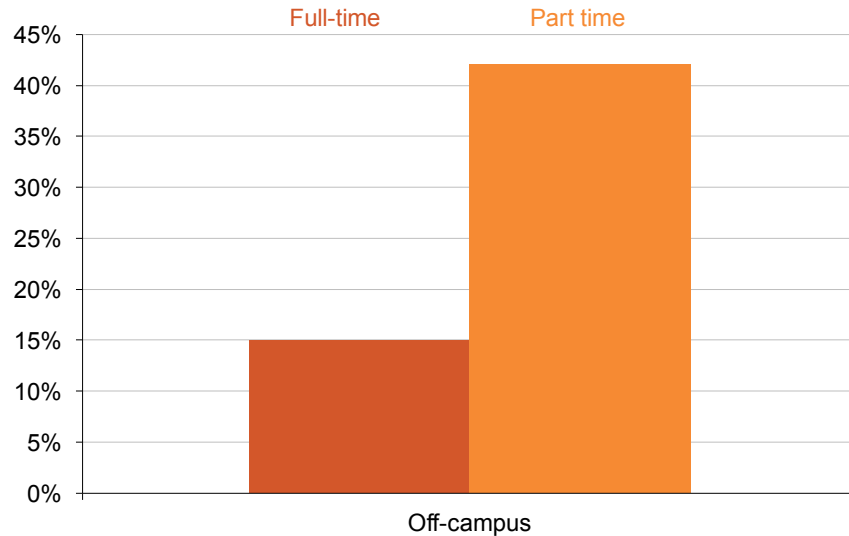
Postgraduate coursework has increased its share of total enrolments over the last 25 years, reflecting workers upgrading their qualifications.¹⁶ This trend is likely to continue over the long term, generating more demand from mature-age students for convenient methods of education delivery. Changes in the labour market are therefore likely to favour online education, independently of any improvements in technology.

2.2.4 Off-campus education by full-time/part-time attendance

Part-time students are much more likely than full-time students to take at least some of their course off-campus. In 2011, 42 per cent of part-time students were enrolled in courses that were taught at least partly off-campus, compared to only 15 per cent of full-time students. Part-time students are more likely to have work, family or other time commitments. They are therefore attracted to the convenience of off-campus study.

¹⁶ Norton (2013), p. 27; ABS (2010)

Figure 7: Off-campus enrolment by study time commitment, 2011



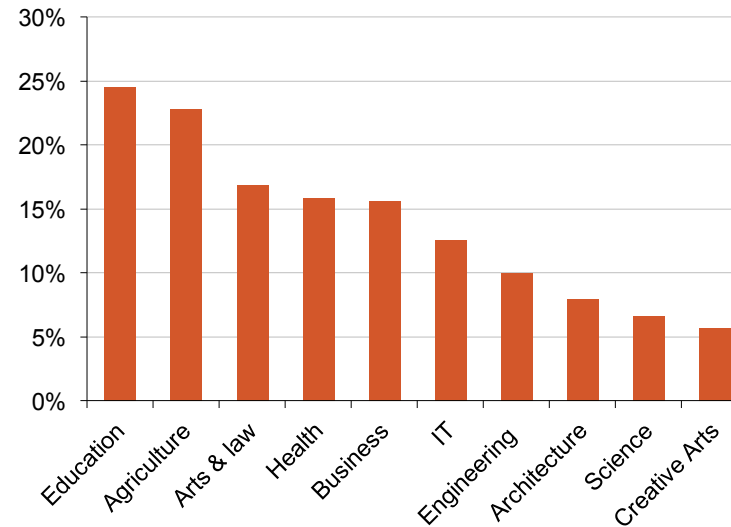
Note: 'Full-time' means the student is enrolled in subjects equal to or greater than 75 per cent of the full annual course load. Part-time means less than 75 per cent. The numbers include off-campus and multi-modal external students, but not OUA students. Source: DIISRTE (2013a)

2.2.5 Off-campus education by field of study

Using 2011 enrolment data, in theory about 60 per cent of students are in courses that could be taught entirely online. Online simulations have increased what can be studied at home, but courses with laboratory, studio or clinical components still typically require special facilities. Architecture, science, engineering and

creative arts are the fields of study where off-campus enrolment is least common (figure 8). Perhaps surprisingly, education courses make greater use of off-campus study than most other disciplines. This in part reflects high rates of off-campus postgraduate study. Fields such as business and IT with few technological obstacles to online study in fact have only mid-range levels of off-campus enrolment.

Figure 8: Off-campus enrolment share by field of study, 2011



Note: Domestic students only, not including OUA. This figure reports the proportion of all course enrolments that are entirely off-campus. Source: DIISRTE (2013a)

Box 4: Technology and demand for online education

Most current online learning tools do not require major advances in bandwidth – they are possible using what we have today. But faster internet may well have benefits. Watching standard video online uses around 0.5 megabits per second (Mbps); high-definition tutorial streaming requires around 4 Mbps. Three-quarters of Australian internet subscriptions have advertised download speeds of between 1.5 and 24 Mbps. As the National Broadband Network is rolled out, more households will have access to very high speed broadband – up to 100 Mbps. This technology is likely to facilitate access to online education in three ways:

- Access – there will be higher speeds in regional areas. Many regional and rural areas of Australia only have access to dial-up at the moment, which has speeds of less than 0.05 Mbps.
- Ubiquity – more and more households will have ‘always-on’ high speed connections that enable multiple high-bandwidth users at once.

- Upload speeds – effective two-way communication technologies (such as interactive tutorials) require lots of data to be sent and received by both parties, but many current connections have upload speeds of less than 1 Mbps. NBN plans will offer uploads at up to 40 Mbps, which makes real-time high quality videoconferencing possible.

More difficult to predict are the cultural shifts that the NBN, and the spread of the internet more generally, may bring. Younger generations are likely to be increasingly ‘digital natives’ for whom the idea of interacting with others online for study, work or play is routine, rather than a novelty.

It’s possible that many households may not be able to afford the cost of the highest-capacity NBN plans, and will continue to make do with lower speeds. But given current technologies, this is unlikely to put a significant brake on the uptake of online higher.

3. How good is online learning?

Figure 9: Student higher education outcomes

I want to learn new things	Specific vocational knowledge	Generic professional skills	Practical training	Knowledge for its own sake
I want to improve my employment prospects	Formal credential	Quality signal to employer	Evidence of achievement	
I want to go to uni for the broader opportunities	Networking opportunity	Student lifestyle	Migration rights	Social signal

Do students make trade-offs to quality in choosing an online degree? Are blended learning formats (a combination of online and face-to-face approaches) superior to wholly online courses? Given learning is a core reason why students go to university, these issues are critical.

While there is limited empirical evidence to conclusively answer these questions, certain aspects about online learning are clear. An engaging use of technology – beyond the simple transfer of traditional teaching methods online – is essential.

Importantly, it is not the medium of delivery that determines quality. Both online education and traditional formats have the capacity to be done poorly or well. Low cost, low quality online products can diminish the student’s learning experience, but so can poorly trained teachers with heavy workloads and limited time.

What matters is the way technology is *used* for learning.

Simply capitalising on new technology is not enough; the new models must use these tools and services to engage students on a deeper level.¹⁷

When done well, online approaches can actively engage and challenge students. Technology can now provide immediate, nuanced feedback on student progress, drill down in areas of misunderstanding, tailor curriculum to personal needs, and create new ways for students to interact with their peers and teachers – all factors known to drive learning effectiveness. The technology is new, but the pedagogical goals are old.

¹⁷ Johnson, *et al.* (2013)

3.1 What does online learning look like?

Online learning encompasses many technologies, ranging from taped lectures uploaded online, to interactive digital modules with in-built assessment, e-simulations and virtual worlds. New technologies are constantly emerging affecting how instruction, assessment and content are designed and delivered. Figure 10 below gives a snap-shot of various methods offline and online.

Figure 10: Offline and online methods

	Offline		Online methods		
Instruction	Lectures	Tutorials	Online lectures	Online tutorials	Virtual link-up to experts
	Practical training (e.g. lab)	Instructor feedback / advice	Virtual simulation	Adaptive learning platforms	Computer generated feedback
Assessment	Paper exams, quizzes	Feedback via grades	Online exams, quizzes	Online Assessment	Feedback via web-cam
Content delivery	Paper readings	Lectures	Online modules	Online personal curriculum	Laptops, tablets, mobiles
Peer learning	Group project	Group discussion	Group project (virtually)	Group discussion (virtually)	Interactive game with peers

3.1.1 Blended learning on-campus

‘Online learning’ is not only an alternative to on-campus education. Online learning often complements face-to-face instruction in standard courses. It would be difficult to find a classroom today that did not use technology. Today’s blended classroom typically involves online discussions, forums, simulation and interactive software that complements face-to-face classes, seen figure 11.

Figure 11: Example of blended learning on-campus

	Offline	Online
Instruction	Online lectures	Tutorials face-to-face
	Adaptive learning platform	Virtual simulation
Assessment	Paper final exam	Online assessment
Content delivery	Paper readings	
Peer learning	Tutorials face-to-face	Group project face-to-face

3.2 What drives effective learning at the tertiary level?

While a vast amount of research exists on online education, only a handful of empirical studies are rigorous in design (see Appendix 1). The limited amount of hard data means it is difficult to draw firm conclusions on the effectiveness of learning online compared to traditional formats. It is also difficult to generalise about the quality of 'online education' given the wide variety of technologies and mixed formats it encompasses. New technologies are constantly developing, and the evidence base is always catching-up. Given these limitations, this section goes back to the first principles of effective learning in higher education, and how technology can support it.

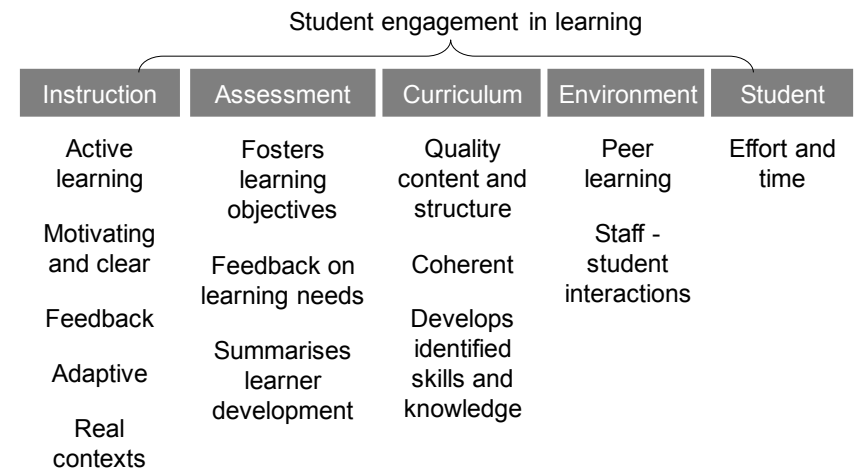
3.2.1 First principles of effective learning

Student engagement is central to effective practice at the tertiary level. Importantly, it is not only what the student does to actively engage in learning, but what is done to entice this. Where students are not academically inclined, instruction must strive to engage them.¹⁸

Decades of empirical evidence identify the following key factors as positively influencing student engagement: the quality of teaching instruction, curriculum and assessment, interactions with peers and staff, and the time and effort a student devotes, as seen in figure 12.¹⁹

First and foremost, instruction should focus on the student. Students should be engaged in deep forms of learning, where they are active in questioning new concepts and using higher order cognitive processes.²⁰ The more that students practice applying what they know, the better they should become. The more they get feedback on their writing and analytical approaches, the more they understand how to improve.²¹

Figure 12: Factors positively impacting on student learning



Source: Grattan Institute analysis based on Biggs (2012), Kuh (2009), Pascarella and Terenzini (2005), Devlin and Samarawickrema (2010)

¹⁸ Kuh (2009)

¹⁹ Biggs (2012), Kuh (2009), Pascarella and Terenzini (2005), Devlin and Samarawickrema (2010)

²⁰ Biggs (2012)

²¹ Kuh, et al. (2004)

For effective instruction, students should perceive high expectations that motivate and challenge them to learn.²² Theory should be linked to practice and real world contexts.²³ Intermittent assessments should give teachers feedback on student learning progress, so that they can adapt instruction to address individual student needs.

Box 5: Engaging digital natives: learning with technology?

The current “net generation” of students are significantly different to students of the past. So how can educational practice effectively engage them? This generation is wired, with high level digital skills, having grown up using mobile phones, email, instant messaging, and many other digital toys and devices. Arguably, learning with technology can excite and motivate today’s students more so than generations before. Recent surveys show that Australian students like learning with technology. Over 80% of tertiary graduates report that where technology was used, it was used effectively for learning.²⁴

²² Pascarella and Terenzini (2005); Devlin and Samarawickrema (2010)

²³ Devlin and Samarawickrema (2010)

²⁴ Graduate Careers Australia (2011), p. 7

3.3 Potential benefits of learning with technology

This section discusses how, from a first principles perspective, technology can be harnessed to support effective learning. It frames the discussion within the factors known to affect student engagement, shown in figure 12. Many examples involve blended learning approaches, where technology is mixed with face-to-face methods on-campus.

Technology can re-design the typical lecture experience so students spend more time in active learning

A large body of evidence shows that passive learners do not learn as effectively as active ones.²⁵ Yet what usually happens when students go to lectures? A typical experience will be to take notes through a one-way communication format, with limited time for question and answers.

A notion gaining popularity is the flipped classroom. In this model, students can view the lecture online before they arrive in the classroom so they are ready to immediately discuss the topic and begin face-to-face work with the lecturer. This model is called the flipped class because what used to be class work (the ‘lecture’) is done at home via videos or the internet, and what used to be ‘homework’ (assigned problems) is now done in class. This novel model makes increased classroom time for lecturers and tutors to discuss content more deeply and to interact more with students. It can also reduce teacher time spent answering basic and similar questions in repeat lectures. Students can review the lecture content later on a difficult concept if needed.

²⁵ Biggs (2012), Pascarella and Terenzini (2005)

Box 6: Flipped classroom case studies

University of Queensland (UQ), Australia

UQ is a leader in embracing the flipped classroom model. In the psychology subject *The Science of Everyday Thinking*, online lectures are viewed as homework, and class time is for discussion, problem-solving, designing experiments and challenging students analytically. Students have more time in the classroom to debate issues and exchange ideas, and to receive individual feedback from the lecturer. The lecturer says that “instead of teaching by telling, I have created a set of conditions that inspire students to learn independently.”²⁶

San Jose State University (SJSU), US

SJSU is described as a “living laboratory”, having recently incorporated a MOOC within a flipped classroom.²⁷ In 2012, a MOOC was adapted and used for a third year course on engineering and electronic circuits. Almost half the students did the new MOOC flipped classroom model, which included virtual laboratories and game-like simulations. The online students then undertook two weekly 75 minute sessions of group work. The results were impressive. The average failure rate for the course was 40 per cent, but only 9 per cent for those doing the MOOC model (although these results are still being investigated given students were not randomly allocated). Eleven other campuses across the California State University system are now considering using the same model.

²⁶ The University of Queensland (2012)

²⁷ Dodd (2013)

Interactive digital platforms can engage and motivate students

Interactivity is a key advantage of online learning. Opportunities for students to manipulate elements of the content can have positive effects. Several empirical studies find that online approaches with greater interactivity are more effective than other online models, although the evidence is somewhat mixed.²⁸ A number of studies show that an ability to fast-forward, re-order and re-watch lectures, or access highly interactive tools, leads to higher learning outcomes.²⁹

Games and ‘gamification’ are predicted to grow in higher education in the medium term.³⁰ Games can create a flow of learning, with difficulty increasing as students learning progresses. Students feel like they are making headway, which motivates them to continue to learn.

Learning analytics opens doors in understanding student behaviour and targeting at-risk students

Learning analytics applies techniques commonly used in business to better understand student behaviour and learning. Broadly, it analyses enormous sets of student-related data (known as ‘big data’) to decipher which forms of instruction work best, and how to effectively target segments of the student population.

²⁸ Cavus, *et al.* (2007); Dinov, *et al.* (2008); Gao and Lehman (2003); Zhang (2005)

²⁹ Dinov, *et al.* (2008), Zhang (2005)

³⁰ Johnson, *et al.* (2013)

Large data sets are now being used to identify at-risk students early on. There are now advanced predictive analytics data techniques to analyse what student behaviours are predictors of students dropping out. Systems can deeply analyse behaviour and reasons why a student is performing at a certain level, and help identify students at risk early on. The University of Technology, Sydney uses analytics to better target first year students at risk of dropping out. Attrition rates of students they telephone based on analytics data are half those of students who are not contacted.³¹

Learning analytics software can help answer the question: what do students need to master first, in order to help them go on to master other material? Software can now show that a student who is struggling with physics problems because of difficulties with reading comprehension. Large amounts of student input data can be mined to determine the most effective package of content for each individual student.

Learning analytics provides new streams of information on what works

Digital learning opens up a new approach to evidence that is continuous and non-linear. A recent report by the US Department of Education (2013) emphasises that while traditional forms of first-class evidence have their place, new streams of information available through learning analytics can also be powerful.³²

³¹ Personal communication from Professor Shirley Alexander, Deputy Vice-Chancellor (Teaching, Learning and Equity), UTS

³² U.S. Department of Education Office of Educational Technology (2013)

Box 7: Adaptive e-learning platforms

Knewton Adaptive Learning at ASU Online, US

“The future is online and adaptive learning” says Philip Regier, the ASU Online dean. ASU Online is a university leader in using technology, which drove it to initiate a full deployment of the Knewton Adaptive Learning System in 2011. The new adaptive learning system creates individual learning pathways by continually assessing proficiency and then adjusting pathways accordingly. The platform lessons consist of videos, online textbook selections and lesson quizzes for both online and blended courses. In the first month the university put 5,000 first-year students into remedial math courses powered by Knewton. Early efficacy reports show that after one semester of use with remedial students, withdrawal rates dropped by 50 per cent.³³

Smart Sparrow Adaptive e-Learning Platform, Australia

Smart Sparrow has pioneered the development of an adaptive e-learning platform for mechanics in engineering, now used across seven Australian universities. Smart Sparrow’s platform helped create ‘adaptive tutorials’ that teach key concepts for first and second year mechanics. Failure rates of up to 50 per cent are common in introductory engineering mechanics given conceptual difficulties with course content. The adaptive tutorials are highly interactive and tailor instruction to students’ levels of understanding. The tutorials have been trialled with over twelve hundred students over three years, with reduced failure rates.

³³ Knewton (2013)

In the past, student data has largely been static, based on student demographic characteristics, test scores and so on. Randomised control trials have been relied on to test the effectiveness of certain interventions and what works. Now, student data is more dynamic and nuanced, capturing how students engage, respond, interact with others, and retain concepts over time. It provides new information on the process of learning, rather than only the outcomes of learning. The provision of timely, specific information to lecturers can help solve local issues on a daily basis as they arise. Teachers can incorporate new information constantly for improvement.

Using analytics, instructors are able to experiment with different teaching approaches and examine the immediate impacts of their methods. Further, advanced modelling techniques can drill-down on factors impacting on student outcomes following an intervention.

However, not everyone is likely to embrace learning analytics enthusiastically. Students may not like the idea of institutions playing big brother in tracking their every move. Some students may be nervous about data records being used for other purposes, such as prospective employers wanting to see their learning profile.

Digital platforms with inbuilt assessment provides immediate feedback to students and teachers

University tests often occur at the end of semester, or mid-term, meaning that students tend to get little regular feedback along the way. Online assessments – built into digital learning modules and

e-textbooks – provide continuous feedback and help identify areas of weakness for improvement.

Digital platforms can respond dynamically to student input and drill down on areas of misunderstanding.³⁴ For example, web-based homework tools can provide an immediate correct/incorrect response for every problem. If students give an incorrect answer, they can do a comparable problem multiple times until they get it right. A significant body of empirical work shows that online assessments with features for self-reflection can have positive effects on student motivation and learning.³⁵ In addition, reduced manual grading can free up teachers' time.

Importantly, online assessments not only enable more frequent testing, but can also give teachers more nuanced information on how the student is progressing. Online data can be gleaned about how students think and approach the problem, and how quickly they move through tasks, not only on whether the answer is right or wrong (see Box 8 for an example of advanced online assessment in a virtual environment).

Traditional test item formats and measurement theory are more suited to capturing discrete bits of subject matter knowledge than to capturing the multistep, multifaceted complex performances that demonstrate deeper learning.³⁶

³⁴ Grant and Courtoreille (2007); Nguyen (2007)

³⁵ In the US DoE meta-study (2010), nine empirical studies examined the degree to which promoting aspects of learner reflection in a Web-based environment improved learning outcomes.

³⁶ U.S. Department of Education Office of Educational Technology (2013)

While online assessment has much potential, many express concerns about its use. Low-cost online methods (e.g. true/false) may limit use of higher-level thinking and provide limited feedback to the instructor on learning progress. As with all assessment, digital assessment should facilitate the learning outcomes desired.

Box 8: Assessing inquiry skills in virtual environments, Harvard University

The Harvard University Graduate School of Education is studying the feasibility of using simulation environments to assess science inquiry skills. The virtual world involves the re-creation of a river city in the 19th century when scientists were exploring bacteria and why residents were falling ill. An avatar is allocated to each student, who work in teams of three, moving through the river city to collect data and run tests. The student teams form and test hypotheses, analyse data, and document their findings. The development of inquiry skills is assessed by analysing the research reports, the choice of hypothesis and methodology, and interactions in the virtual environment. By analysing student movements and behaviour in the virtual world, researchers developed measures of their science inquiry skills, sense of efficacy as a scientist, and science concept knowledge.³⁷

³⁷ Ibid.

Technology can immerse students in real contexts and authentic learning experiences

It is well established that learning through real-life contexts positively impacts on cognitive development.³⁸ Online education can immerse students in realistic scenarios that connect coursework to real life. For example, some online courses now include collections of expert commentary online, where students can access short videos or podcasts and come up to speed on the latest thinking in their field.

In particular, simulations can engage students in learning by doing, and give them tasks that are as complex and ill-defined as they are in the real world. This is useful in fields such as medicine, nursing, pilot or military training, where practising skills before starting work is critical. Simulations are also used in professions such as law and business to help learners develop soft skills and judgement before starting in the workplace. While simulations have a strong theoretical basis, evidence appears mixed.³⁹ However the field of simulations is constantly developing, and is increasingly being used for practical components in courses.

³⁸ Collins (1989), Arum and Roksa (2011), Chickering and Gamson (1987)

³⁹ Of three empirical studies examined in the US DoE meta-study 2010, two show positive results from the incorporation of simulations: Castaneda (2008) and Hibelink (2007).

Box 9: Virtual reality ear survey simulation, The University of Melbourne

A surgery simulator, invented by the University of Melbourne and CSIRO, gives students realistic practice at operations. The simulator allows students to 'feel' the bone and flesh under their virtual drill using force-feedback pens. Students can train for procedures, such as the insertion of assisted hearing devices like the cochlear implant. It is an immersive 3D simulation that allows an instructor to work with a student in close proximity or a remote location. An experienced surgeon can guide a novice through the procedure. Students learn through curriculum integrated into the simulator, textbook learning, clinical expertise and experiencing real life surgical scenarios.

New connections with peers

Technology opens up new forms of communication for learning from others. Most recently, MOOCs have pioneered peer networked models on a grand scale, where a key focus is on students sharing knowledge with peers. In addition, technology enables lecturers to group specific students into virtual communities. For example, teachers can put together students who are working on the same material, or whose abilities complement each other.

Technology also helps facilitate online peer assessment – where students assess the work of their peers, as well as their own work. While peer assessment can be delivered offline, ICT enables easier management of large numbers of students in the process when multiple assessment tools are involved. Technology can

also help improve the reliability and validity of peer assessment tools, a key issue in this area.⁴⁰

Increased feedback between staff and students

Staff feedback to students (and vice-versa) is a key factor driving good learning outcomes.⁴¹ Students need feedback to understand where they are at with their learning progress. Staff can use student feedback to improve their teaching for all students.

With technology, students and staff can interact through discussion forums, live chat sessions and recorded video feedback. Students can provide staff with immediate feedback during live lectures, responding using their mobile phones and web-based learning systems. Student responses can be visually displayed immediately to the lecturer and the class.

Box 10: Lecturer feedback live-to-camera

Lecturers at Cardiff Metropolitan University, US, are using screen capture technology to give students targeted feedback on their assignments. Lecturers can bring up images of student work, and use the mouse cursor to highlight on screen areas being assessed, and explain where errors have been made. The recording is then uploaded to a learning management system or emailed to students. An advantage of recorded feedback is that students can replay the recording many times to cover any points they did not understand. Lecturers may also be able to give more feedback orally than in writing within a given amount of time.

⁴⁰ Bouzidi and Jaillet (2009)

⁴¹ Pascarella and Terenzini (2005); Kuh and Hu (2001)

3.4 Challenges in online education

Poor retention rates

Drop-out rates are usually much higher in purely online courses than traditional formats. This can be due to low levels of personal interaction and support, and less-motivated students may struggle to engage. Online courses should strive to retain students as best as possible, building in features for interactivity, motivation and support.

While course design matters, other factors beyond the university control are also influential. Family support, employer support, and the relevance of the course to the individual's job or life are all key influences on retention.⁴² Institutions cannot control all retention risks, but identifying and assisting struggling students early can reduce attrition.⁴³ Learning analytics software that helps to identify struggling students early on can help universities achieve retention goals.

Developing interpersonal, communication and practical skills

With limited opportunities for face-to-face interaction, students in purely online courses may not adequately develop interpersonal, communication and teamwork skills – all core professional qualities. Employers are known to highly value such skills in recruitment decisions, as discussed in section 4.1.1.

On the other hand, online technologies can encourage new forms of interactions with others and ways of sharing knowledge (discussed above in section 3.3). The elaborate peer networks pioneered through MOOCs, where thousands of learners share understanding with others, is a case in-point. If the on-campus course simply involves students turning up to class and working largely alone, then the online alternative could be better.

Practical training is a key skills area that many online courses cannot provide. While simulation technology can help students practise in virtual environments before they get to the workplace, it is not widespread at present. Further, simulations are not always an adequate substitute for face-to-face training or workplace experiences.

ICT training and support

Training staff to use technology effectively is a large undertaking. It requires significant time and resources. Without it, capital investments in technology will be wasted.

One key area for training (and new recruitment) will be around data analytics. In particular, staff with scientific skills will be needed to analyse and interpret educational data and adjust software design. The University of Technology, Sydney recently established the Advanced Analytics Institute to support the next generation of analytics graduates across Australia.

In addition to staff, students also need sufficient support for technical issues when studying online. This issue can influence the success or failure of online approaches. Student support is required around internet connections, computer hardware and

⁴² Park and Choi (2009)

⁴³ Spies (2011).

educational software. Frustration with technical issues can demotivate students and lead to attrition. Low SES students especially need extra support for online study, such as gaining easy access to digital devices.

Technical issues and security risks

Technical issues cannot be understated as a major challenge in online education. Compatibility issues between internet browsers and operating systems, processing power and screen resolution must be adequately considered. Some students may lack bandwidth to participate in an interactive or virtual simulation. In Australia, this issue may diminish with time with the roll-out of the National Broadband Network.

Cyber security is also a real risk. Given the large number of enrolments in online courses, hackers and trolls can cause significant problems. Further, the rise of learning analytics and big data means that data privacy and security are serious issues. Damage can be done if large collections of student data fall into the wrong hands.

Another risk is that tech savvy students may cheat and game online systems. This is increasingly a risk as more institutions embrace online learning and try out new technologies for the first time. Arguably, it is how the course and assessment are designed that influences whether cheating or fraud occurs. For example, online examinations can be undertaken at test centres at physical locations which are supervised by a proctor. Off-site exams can use advanced identification-verification techniques. In the US, special web-cams are used to identify students through fingerprints, and show a 360 degree view of the room so that

proctors can view students remotely.⁴⁴ In future, Coursera plans to issue verified certificates using keyboard biometrics, where student typing patterns are analysed to automatically identify individuals.⁴⁵

⁴⁴ Young (2012)

⁴⁵ Young (2013)

4. Online education and employment

Figure 13: Student higher education outcomes

I want to learn new things	Specific vocational knowledge	Generic professional skills	Practical training	Knowledge for its own sake
I want to improve my employment prospects	Formal credential	Quality signal to employer	Evidence of achievement	
I want to go to uni for the broader opportunities	Networking opportunity	Student lifestyle	Migration rights	Social signal

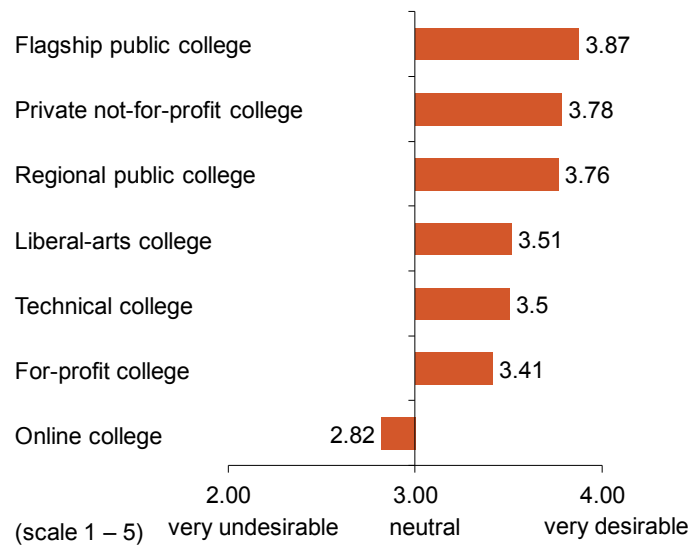
Students want their time at university to improve their employment potential. The skills and competencies they develop, the formal credentials they are awarded, the reputation of the institution, and the grades they receive are all signals of their quality in the labour market.

But do employers value online degrees as a formal qualification? And do employer views differ between undergraduate and postgraduate degrees? What about the softer skills students develop from on-campus life, and through interactions with peers and group-work?

Little is known about employer attitudes toward online degrees in Australia. In the US, a recent 2012 survey shows that employers rate online colleges as undesirable compared to other higher education institutions, as seen in figure 14. This finding is reflected in a 2009 US-based literature review which found largely negative employer perceptions. The vast majority of employers from general industry preferred a student with a traditional rather than an online bachelor degree for an entry-level position.⁴⁶ It seems there are differences in staff views within companies, with human resource staff generally more positive toward online degrees than managers or executives.

⁴⁶ Columbaro and Monaghan (2009) and the literature it cites.

Figure 14: US employer perceptions on desirability of graduates from types of colleges / universities, 2012



Note: Survey question: "How desirable would it be for you to hire a recent graduate with a bachelor's degree from each of the following types of colleges and universities?"
Source: The Chronicle of Higher Education (2012)

4.1.1 Employer concerns around online degrees

Research shows that employers are often concerned about online degrees in terms of the brand and reputation institution, the development of softer skills, such as interpersonal, communication and teamwork skills, as well as practical skills.⁴⁷

⁴⁷ Bailey and Flegle (2012), Adams and DeFleur (2006), SHRM (2010)

When recruiting new graduates, Australian-based surveys show that the most important selection criteria are consistently interpersonal, oral and writing skills, drive and attitude, critical reasoning skills and work experience. Table 1 shows the top ten selection criteria of over 500 surveyed employers in 2011.⁴⁸

Table 1: Australian employer selection criteria for graduates

1. Interpersonal / communication skills (written and oral)
2. Knowledge of industry/Drive/Commitment/Attitude
3. Critical reasoning and analytical skills
4. Calibre of academic results
5. Work experience
6. Cultural alignment / Values fit
7. Teamwork skills
8. Emotional intelligence (e.g. self-awareness, motivation)
9. Leadership skills
10. Activities (including extracurricular)

Source: GCA (2012)

It is possible that employer perceptions of online courses are likely to be less of an issue for postgraduate students. Many

⁴⁸ GCA (2012)

postgraduates are improving their skills for jobs they already hold.⁴⁹ Their employers do not need to use proxies such as mode of study to assess their employees' attributes and skills. They can directly observe employee qualities. They may also believe that online study interferes less with work responsibilities.

⁴⁹ ABS (2010), table 5

5. The cost of online higher education

In the United States, there is widespread concern that higher education fees are increasing without evidence of improved learning or completion rates.⁵⁰ Online education is attracting attention partly as a way to reduce costs. In education as in other industries, there is potential to save money online through lower infrastructure costs and automation of tasks. But prices are set in markets rather than simply reflecting costs. To date students are generally not saving money on tuition fees by going online.

5.1 Production costs in online education

To deliver lower prices to students, online technologies must reduce one or more higher education production costs. Table 2 lists how online technologies can reduce costs compared to on-campus education. Some savings come from lowering capital costs per student. Computers take less space per student than classrooms, use space intensively (compared to the current academic year, which leaves classrooms empty most of the time), and can be located in areas with low real estate costs.

Only limited published information exists on comparative capital costs. It is indicative rather than definitive. In July 2012, the largest MOOC provider, Coursera, had nearly 700,000 current enrolments on a capital base of US\$22 million. This investment finances its delivery platforms, with course materials provided by Coursera's affiliate universities. It averages \$31 for each student. We don't know how much Australian universities have invested in

their on-campus 'delivery platforms', of their \$35.7 billion worth of property, plant and equipment.⁵¹ It would certainly be well in excess of \$31 per student.

Online technologies can reduce academic labour costs, a major driver of long-term increases in university fees.⁵² Course materials can be developed once rather than many times by academics at different universities, lectures can be recorded once rather than given hundreds or thousands of times on different campuses and different times, frequently asked questions can be responded to once online rather than numerous times to individual students, and many assessment tasks can be automated. Online technology can also reduce non-academic labour costs, by automating enrolment and other administrative tasks.

Initial set-up costs for a good online course are likely to be high. For small classes, average per student costs online could easily exceed on-campus delivery. The economic key to online delivery is that marginal costs – the costs of an additional student – are low. Once the course materials and assessment exercises are put online, they can be used by more students at very low additional cost. Installing extra IT infrastructure, for example, is cheap compared to constructing new campus buildings when enrolments increase. Extra bandwidth to cope with more students using a course platform is inexpensive compared with adding more academic staff.

⁵⁰ College Board (2012); Wildavasky (2012)

⁵¹ DIISRTE (2012b)

⁵² Archibold and Feldman (2011)

Table 2: Higher education cost drivers

Higher education cost	Purely online higher education cost reduction
Course development	High initial costs, but spread over a larger number of students
Student admissions	Students enrol themselves online without a selection process or with an automated selection process (such as previous units studied).
Course delivery – infrastructure	Replace campus buildings with student-provided space and IT
Course delivery –staff	Replace lecturers with online videos, simulations, etc
Student academic advice	Replace lecturers and tutors with adaptive technologies, FAQs, student forums
Assessment	Replace marking by academics with automated assessment tasks or peer review by students

Third party technology and other service providers can help spread low marginal costs through the higher education sector. Typical university enrolment levels mean small customer bases by corporate standards, particularly at the course level. Third party providers such as Pearson Education or Academic Partnerships (see chapter 1) serving multiple higher education clients can bring down per student costs for smaller higher education institutions.

5.1.1 Models of reduced costs online

Cumulatively, table 2 offers an extreme case of radical cost-cutting online. MOOC providers take all or most cost cutting options; they also cost shift course development to their partner universities. At least temporarily, this model has let MOOC provider offer subjects for free. But none of the other higher

education providers discussed in chapter 1 have so radically cut labour costs. The cheapest, StraighterLine, still offers limited tutorial support and optional ‘professor-led’ versions of their courses. Western Governors University offers enrolment counsellors to guide students in their course choices, student mentors who regularly discuss academic progress with each student and give them advice as appropriate, and course mentors who answer queries related to specific courses. Separate evaluators determine whether competency standards have been reached (recall that it offers competency-based rather than time-based courses). The University of Phoenix offers a similarly personalised experience to its online students.

Just as primarily online delivery can be combined with personal support, on-campus universities can reduce some costs. In some cases, copyrighted material on which they must pay royalties can be replaced with open educational resources materials.⁵³ The National Center for Academic Transformation in the United States offers numerous case studies of how IT has been used in cost-saving course redesigns, usually for courses that are mainly delivered on-campus.⁵⁴ Despite these examples, it seems unlikely that online technologies overall offer major money-saving opportunities for universities that offer blended learning. For the most part, online technologies improve on rather than replace face-to-face teaching. Possibly academics will spend less time developing and delivering lectures. In the flipped classroom model, lecture-style information delivery is based on recordings, possibly purchased from third-party providers. But academics are likely to spend more time interacting with students in the

⁵³ OER (2013)
⁵⁴ NCAT (2013)

classroom than now. Meeting with students will still require campuses and buildings. In the medium term, new teaching models may add to campus costs as old buildings are renovated to accommodate new teaching methods.

5.1.2 Costs to students in the United States

The MOOC providers, Western Governors University and StraighterLine discussed in chapter 1 provide examples of how education can be offered to students at a lower cost to students than the median US\$9,000 a year charged by subsidised public universities (lower than costs due to state subsidies).⁵⁵ Western Governors charges about \$3,000 per six month term or \$6,000 a year, a saving of about one-third for students.

However, lower fees for online education are the exception rather than the rule. The for-profit sector has had a large role in expanding online education in the United States, and they are typically more expensive than directly subsidised public universities (though cheaper than private not-for-profit universities).⁵⁶ In a comparison of 47 online or on-campus courses at 10 American universities, the online option was cheaper for only 8 courses and more expensive in 15 courses. The survey was not comprehensive, but nor was it based on random choices. Universities were selected because of their high online enrolments or inclusion in a *US News and World Report* list of 'best' online courses.

⁵⁵ College Board (2012), p. 12

⁵⁶ Ibid., p. 10

5.2 Production costs and student charges in Australia

Open Universities Australia provides an interesting local insight into the economics of online delivery. Its average revenue per student place is much lower than for public universities. In 2011 OUA earned an average \$7,600 per student place, compared to around \$15,000 per student place for public universities.⁵⁷ OUA reported a profit of 12 per cent of revenues, implying that costs averaged \$6,700 a place (table 3). By contrast, a 2010 public university cost study found that on average they made only a small surplus on undergraduate places, after deducting teaching and scholarship costs.⁵⁸ These figures imply that OUA's costs per student place are about half those of public universities.

Without internal OUA and university data, this conclusion is necessarily approximate. We cannot tell how much it costs universities to deliver OUA subjects (and given the economics of online education, this will be sensitive to enrolment levels). OUA's annual report suggests that continued work is needed to ensure that quality online technology is used, which may drive costs up.⁵⁹ But the gap between apparent OUA and public university costs is so large that it must show the capacity of online technology to deliver cheaper higher education.

⁵⁷ Calculated using average EFTSL numbers from DIISRTE (2012d) and revenue from OUA (2012) and DIISRTE (2013b). Commonwealth-supported places only for public universities.

⁵⁸ Deloitte Access Economics (2011). Universities lose money on CSPs if research costs are included.

⁵⁹ OUA (2012), p.23

Table 3: Open Universities Australia, inferred costs 2011

Revenue per EFTSL	Profit per EFTSL	Inferred cost per EFTSL
\$7,600	\$900	\$6,700

Sources: Grattan calculations from OUA (2012), DIISRTE (2012d)

Another local example is Swinburne Online, a joint venture between Swinburne University and SEEK. Swinburne Online offers students Commonwealth-supported places (CSPs) in business, social science and teaching courses. Though on average CSP funding rates yield only small surpluses, SEEK must believe that in Swinburne Online's case costs will be low enough for it to make a profit (SEEK says that revenues are ahead of their business plan, but not yet generating a profit).⁶⁰ Swinburne Online charges the same fees as Swinburne's on-campus courses.

There is no price competition for Commonwealth-supported places, but it is a feature of the full-fee MBA market. The most expensive MBA costs more than twice as much as the cheapest MBA. On average online MBAs are cheaper than on-campus MBAs, by about \$6,000 a year. However, this largely reflects cheaper universities being more likely to offer online MBAs. In the 13 cases where the same university offered online and on-campus MBAs, they had the same price in 12 instances. The one exception was cheaper online.

5.3 Why is online education not cheaper?

The pricing of online education was an unexpected finding of research for this report. In practice universities do not pursue

⁶⁰ SEEK (2013), p. 33

most of the potential savings identified section 5.1. There are also market reasons why cost reductions are not passed on to students.

The larger degree-granting online universities save on building infrastructure and spread course development costs over many students. They do not typically automate academic support or student services. Indeed, some offer more extensive personal support than on-campus universities. For example, student mentors who provide on-going general advice is a personal service rarely provided by on-campus universities.

This personal service reflects the market history of for-profit online higher education providers, which have increased their enrolment share over the last 20 years. They did not do this by under-cutting on price, but instead by targeting working adults, who had been poorly served by 'traditional' on-campus colleges and universities. For-profit providers developed online platforms because they believed their target market would pay for this added convenience, and not because they needed a price advantage. American market research on online education found that convenience factors were by far the most common reasons why students took online courses.⁶¹ This may explain why the University of Phoenix, the biggest of the for-profits, charges more for online courses than for its on-campus equivalents.

Online higher education providers like Phoenix also teach all-year round and offer regular course starts. They avoid the long delays

⁶¹ Aslanian and Clinefelter (2012), p. 16. Cost was the 4th most common reason for choosing online education, given by 30 per cent of respondents. Cost was a factor in institutional choice for nearly three-quarters of respondents: p. 19

caused by the infrequent intakes and long holidays of most on-campus universities. By getting students into better-paid jobs more quickly, these semester format changes decrease the time costs and bring forward the financial benefits of higher education. Phoenix's pricing may reflect a judgment that students consider the total costs and benefits of their education alternatives, and not just tuition charges.

Phoenix is not unusual in the education industry in one respect: it started as an on-campus business (with many small campuses in convenient locations for people with jobs, rather than the big campuses of 'traditional' universities). Most online higher education providers are also on-campus providers. If they make their online courses cheaper, they could undermine their on-campus business. Western Governors University has no on-campus courses. This may help explain its competitive pricing.

In the long-run, online education may come down in price relative to on-campus alternatives. If so, it will not just be because technology allows higher education providers to cut costs and therefore prices. It will be because the higher education market itself changes, due to competitors aiming to win market share through lower fees.

6. The future of on-campus universities

The current debate appears stuck in an argument between traditional delivery models and the perceived threat that MOOCs and purely online formats may pose to established providers.

In reality, most on-campus universities are multi-faceted organisations that do much more than teach their students. This is likely to make them resilient, even if online higher education grows in its market share.

The real change for on-campus courses is likely to be more subtle, but profound. Online tools and platforms have significant potential to improve learning throughout mainstream on-campus education. The real game changer here is not purely online degrees replacing on-campus courses. Rather, technology may drive a major re-design of teaching and learning across all modes of delivery. These are the real questions for on-campus universities that warrant serious attention.

6.1 Many students are likely to still want the on-campus experience

Despite the concerns of some commentators, demand for the on-campus experience is likely to remain strong. Chapter 1 discusses the various reasons why students attend university – preparing for a job, personal growth and interest, the student lifestyle, and learning new things. Young people are more than likely to want the student lifestyle on-campus, and prefer strong university brands as a value signal to employers. Generic professional skill development and practical training probably cannot yet be effectively done online – which are key skills that employers look for in graduate recruitment. As young people make up the majority of the student population (more than three-quarters of domestic undergraduate enrolments are aged 25 years or less), the bulk of the student population is unlikely to switch in the near future.

These issues are shown in [Figure 15](#) which lists the higher education outcomes discussed in chapter 1 and adds a rating of how achievable they are in purely online courses compared to blended learning approaches on-campus. It can be seen that *purely* online courses are unable to meet a number of student needs in the near term, while blended learning approaches on-campus offer much potential.

Figure 15: Which outcomes can be achieved online?

		Purely online	Blended learning on-campus
I want to learn new things	Vocational knowledge	Yes	Yes
	Generic skills	Some skills difficult?	Yes
	Practical training	Some skills difficult?	Yes
	Knowledge for its own sake	Yes	Yes
I want to improve my employment prospects	Formal credential	Yes	Yes
	Quality Signal	Potentially – brand dependent?	Yes
	Evidence of achievement	Yes	Yes
I want to go to university for the broader opportunities	Networking	Some skills difficult?	Yes
	Student lifestyle	No	Yes
	Migration rights	No	Yes
	Social signal	Probably not – brand-dependent?	Brand-dependent

A sub-set of existing on-campus enrolments could be contestable for online providers. Students who are disengaged from campus life (box 11) may prefer online education services at a lower price. But to date higher education providers offer few cheaper online options (chapter 5).

Those who study online often do so for convenience reasons.⁶² Students who are time poor and struggle to balance study with

⁶² Ibid.

family and other commitments may be likely candidates. People who fall into these categories are likely to be older and work part-time. Women may also be particularly interested. A 2009 survey shows that women are more likely to express stress in managing study alongside other commitments. A much higher percentage of women currently undertake off-campus and multi-modal study than men at present.⁶³

Box 11: What are student attitudes toward campus life?

Students appear to still value on-campus life in the main. In 2009, an estimated 63 per cent of students agreeing they “really like” being a university student on-campus, up from 60 per cent five years before. Only a minority of students (34 per cent) are not particularly interested in university facilities or extra-curricular activities, which has not shifted much with time.

Of course, not all students value on campus life the same. School leavers are much more likely to report “making close friends” and “like being on campus and involved in extra-curricular activities” compared to mature age students.⁶⁴

A key question is how rapidly purely online degrees will expand into new markets and attract people who would not have studied otherwise. The postgraduate online market may expand more quickly than the undergraduate one, given many postgraduate students are mature-aged working professionals. One area for growth may be in online credit-bearing subjects which can

⁶³ James, *et al.* (2010), DIISRTE (2013a)

⁶⁴ James, *et al.* (2010)

contribute towards a degree, for example those taken through Open Universities Australia.

One group that will not study online is international students located in Australia. International students must take at least three-quarters of their subjects on-campus if residing in Australia. In turn, studying in Australia improves the chances of international students being able to remain in Australia. This has been a major driver of the international student market. In 2012, more than 70,000 former international student visa holders were granted another visa.⁶⁵

6.2 MOOCs and purely online courses could spark major re-designs to on-campus learning

MOOCs and online degrees may act as catalysts for reform. The very act of universities moving course content online in the MOOC movement has started fresh conversations about teaching and learning across campus. New technologies can challenge the logic of traditional formats, and open up fresh and engaging approaches for instruction. Technology can be harnessed to help universities do what they do best: engage students in learning.

Importantly, new technologies can support the key drivers of effective learning, not just novel or interesting ways of doing things. Technology can engage students in active, problem-based learning, provide quick feedback on student progress, identify areas of misunderstanding, and adjust curriculum to student needs – all factors known to positively influence student outcomes.

⁶⁵ DIAC (2013), p. 8

Mixed delivery approaches can provide the best of both worlds to the majority of students: on-campus lifestyle combined with quality online teaching and learning. Figure 16 shows a subject shifting to a much more intensive use of online technology. While increasing use of technology-based methods may reduce time on campus, the quality overall quality may still be higher.

Figure 16: A blended subject becoming more online intensive

	Blended: mostly on-campus		Blended: mostly online		
Instruction	Lectures	Tutorials	Lectures online	Tutorials	Online forums
	Instructor feedback & advice	Online forums	Adaptive learning platform	Virtual simulation	Video recorded feedback
Assessment	Paper final exam	Online quizzes, short tests	Online final exam	Online assessment	Early warning systems
Content delivery	Readings	Lectures	Readings online	Lectures online	PC, tablets
Peer learning	Tutorials	Group work	Tutorials	Online group work	Online peer assessment

Legend: ■ Online ■ Offline

7. Policies for online higher education

Online higher education's promise is that it can improve learning for all students. That's an attractive proposition for students, universities and policymakers. But how can we ensure Australian students get the benefits of new technology?

The answer is unlikely to be specific policies on online education. The technology does not need government subsidies; universities, for-profit companies and philanthropic ventures are already driving rapid change. Nor can policymakers (or anyone else) reliably 'pick winners'. Nobody knows for sure which technologies and business models will bring lasting benefits. It will take much trial and error by higher education providers and students to work out what works and what doesn't.

What policymakers can do is design a higher education market that encourages innovation. Current policy settings don't do this as well as they could. Some lower-cost higher education models would not be approved by the Tertiary Education Quality and Standards Agency (TEQSA), Australia's higher education quality regulator. Both TEQSA and the Commonwealth Government higher education funding policy put new entrants to the higher education market at a disadvantage, especially if they come from overseas.

Open markets are important for innovation. Current market leaders rarely offer new services that challenge their existing businesses.⁶⁶ Australia's print media let online competitors like

⁶⁶ Christensen (1997)

realstate.com.au, carsales.com.au and SEEK's job site take much of their classified advertising. Book retailers shrank as online competitors like Amazon took their customers. Consistent with this pattern, Australian universities charge the same fees for online and on-campus students.

Australian universities are, however, likely to respond to competition with other higher education providers. With the introduction of a 'demand-driven' funding system for public universities in 2012, Australian students have more scope than ever before to choose between universities.⁶⁷ Innovative use of blending learning technologies could be important in attracting and retaining students.

7.1 New higher education business models

To award a degree, higher education providers must meet detailed and complex regulatory requirements. These rules are contained in standards set by the Commonwealth education minister, on advice from the Higher Education Standards Panel. These standards cover higher education provider registration, course accreditation, qualifications and other matters.⁶⁸ The standards are enforced by TEQSA. Some vice-chancellors believe that these regulations are obstacles to innovation in higher education.⁶⁹

⁶⁷ See Norton (2013) p. 55-58 for more detail on demand-driven funding.

⁶⁸ DIISRTE (2012c)

⁶⁹ Barber (2012); Den Hollander (2012)

7.1.1 Time versus competency-based courses

Australian qualifications are legally defined in part by their ‘volume of learning’, expressed in years of study. The volume of learning for a bachelor degree is typically 3 to 4 years, reflecting the time it takes to deliver courses on-campus with two semesters a year and a long break over summer.⁷⁰ For on-campus education it is most efficient to bring students together at the same time, in large rooms with one academic teaching them all simultaneously. This requires delivery of course content at a scheduled time and place. The schedule also reflects assumptions about what a ‘full-time’ student can achieve over a semester of around 12 weeks.

Deakin University vice-chancellor Jane den Hollander argues that online technologies challenge this time basis for qualifications.⁷¹ Without the need to bring students together, learning can be self-paced. Students who are particularly bright or hard-working can speed through the course materials in less than the prescribed time. Students who struggle academically or have other time commitments can move more slowly. Online education lends itself to the ‘competency’ based approach rather than a time-based approach. Students need to demonstrate achievement, but not show that they have served time.

At the edges of Australia’s higher education system similar ideas are already in place. Students can sometimes receive credit towards their qualifications through recognition of prior learning,

which can be tested through exams or other forms of assessment.⁷² The University of New England is using recognition of prior learning in UNE Open, a venture announced in early 2013. Students will be able to take online UNE subjects for free, and pay separately for assessment. However, these students cannot receive any government financial support (section 7.2) and UNE could not offer a full degree this way.

Competency-based education is not suitable for all forms of higher education.⁷³ Some disciplines lack clear ‘competencies’ that students are supposed to achieve. The process of learning can be valuable in itself, in addition to the outcomes achieved. Competency-based education is most relevant for vocationally-oriented fields where graduates are expected to have highly-specific skills. It would appeal most to students focused on improving their employment prospects (section 2.1.2).

7.1.2 Course admissions

Current course accreditation standards regulate higher education admissions. Higher education providers must ensure that students have adequate prior knowledge and skills to take the course, and that admission decisions are made by appropriately qualified personnel.⁷⁴ This rule is prudent when enrolment is expensive for the student, the higher education provider, and the taxpayer, as is typically the case for on-campus education. All parties need to manage their risk of incurring expenditure without benefits. The

⁷⁰ AQF (2013). There is scope for offering courses on a different basis outside the Australian Qualifications Framework, without one of the regulated credentials.

⁷¹ Den Hollander (2012)

⁷² AQF (2012)

⁷³ Donoghue and Chapman (2010)

⁷⁴ Provider Course Accreditation Standards, section 3: DIISRTE (2012c)

rule is also sensible when higher education places are limited, as a student who drops out has deprived someone else of a place.

For low-cost online education delivery these cost concerns are much less significant. As MOOC providers show, the time and money costs of enrolling and trying a set of course materials can be kept low for all parties – a modest time commitment for students, a low marginal cost for the MOOC platform, and zero expenditure for taxpayers. For MOOC providers, general advice on their website about necessary or desirable prior knowledge is more efficient than a labour-intensive selection system. The assessment rather than admission process screens out students for whom the course is too difficult.

7.1.3 Welfare provision

Current registration standards require higher education providers to assume a welfare role. They must ensure that students are informed of and have access to counselling, health, welfare, accommodation and career services. They need to advise students of actions they can take to enhance their security on- and off-campus.⁷⁵ These ideas reflect ideas of a campus community where universities take pastoral responsibility for their students.

For some universities, a campus community is a key part of what they offer. Given the associated services students want to bundle with higher education, it would be surprising if we ever had a higher education market in which they were not available. But it is not essential for all higher education providers to offer these

⁷⁵ *ibid.* Provider Registration Standards, section 6.6 and 6.7.

services, which are available elsewhere independently of higher education enrolment. For online universities the requirement is impractical. With students spread over wide geographic areas it would be very difficult and costly to identify appropriate services. For some students and higher education providers, welfare provisions add unnecessary costs to higher education. For online students, quite different services such as technical support for IT and software problems may be more useful.

7.1.4 Standards revision

The Higher Education Standards Panel is reviewing the standards during 2013. It should abandon the current approach to standard setting, which is based on codifying existing practices of public universities. Revised standards should be more neutral between technologies, recognising that rules appropriate for on-campus education impose superfluous restrictions or burdens on online education.

7.2 Funding policy

Australian government higher education funding policy does not directly discriminate against online provision. However, it favours existing higher education providers and Australian higher education providers. In practice, this means that it is difficult for online higher education providers, and particularly foreign online higher education providers, to compete in the Australian market.

7.2.1 Commonwealth-supported places

Most Australian undergraduates are in Commonwealth-supported places (CSPs). Universities receive a tuition subsidy called a

Commonwealth contribution for each Commonwealth-supported student place, and each student pays a price-controlled student contribution.⁷⁶ Commonwealth contributions are identical for on or off-campus study but vary significantly by discipline, between \$2,000 and \$21,000 a year. Universities set their own student contributions up to a maximum set by law. They could charge less for online courses, though none do.

CSP funding is formally neutral between online and on-campus, but key assumptions reflect on-campus practices. CSP funding is organised around a 'unit of study' or subject, in which students learn about and are assessed on a specified amount of material in a set time frame. The CSP funding system can't support models like Western Governors University, where students pay for time periods unlinked to specific subjects. Nor can it fund competency tests or other assessments charged for separately.

The CSP funding system is a conservative force in Australian higher education. Historically public universities and a few other higher education providers have been allocated specific numbers of student places. This limited innovation and competition within the public system. In 2012 most restrictions on student places at public universities were lifted. The expansion of online education was one response to uncapping the number of student places. Swinburne University and Curtin University both established online arms, Swinburne Online and Curtin Online. Several more universities started offering full online courses through Open Universities Australia.

⁷⁶ For a more detailed description of CSPs, including funding rates, see Norton (2013), p. 51-53

The old system for distributing CSPs created a trade-off between existing campus-based and new online places. It is difficult for university administrators to re-allocate places, as academics protest internally and to the media. The uncapping of places made room for entrepreneurial expansion into online education without offending university interest groups.

Competitors to public universities can offer as many student places as they like. But without CSPs they have to charge full fees. They would have to keep costs very low to be price competitive against institutions that enjoy sometimes large per student tuition subsidies. As a result, higher education providers outside the publicly-funded system have typically targeted niche markets rather than compete on price. The absence of competition from cheaper TAFE or private higher education providers has meant that no public university has seen the need to reduce student contributions.

Opening up CSPs to higher education providers beyond the existing public universities has been proposed many times, but never implemented.⁷⁷ The main obstacle appears to be cost. Government tuition subsidy expenditure on CSPs is forecast to reach nearly \$7 billion by 2015-16, so this is a legitimate concern.⁷⁸ Grattan research published during 2012 found that per student subsidies could be reduced with little effect on student

⁷⁷ Including by the Bradley review of higher education policy, which led to the uncapping of undergraduate CSPs and TEQSA: Bradley (2008).

⁷⁸ DIISRTE (2012a), p. 92

demand.⁷⁹ The savings could be used to open the market to new competitors in the next few years.

Over the medium term, changes in the higher education industry are likely to require a complete renovation of the subsidy system. In its current form, it risks distorting the higher education market in favour of the homogenous bundle of higher education services the subsidy system was set up to support. This pushes up costs for students and taxpayers, and discourages innovative new higher education business models.

7.2.2 Student loans

Most Australian higher education students can borrow money to pay for their student contributions or tuition fees under the Higher Education Loan Program (HELP). The main two loan programs are HECS-HELP, for students in CSPs, and FEE-HELP, for full-fee students. HELP is an income-contingent scheme, and students or graduates need not repay unless their income exceeds \$49,000 a year. Above that amount, repayments increase with income.⁸⁰

Eligibility for HELP is much broader than for CSPs. Any higher education provider meeting objective criteria can be approved for FEE-HELP, allowing its Australian students to take out a FEE-HELP loan. FEE-HELP eligibility has helped non-university higher education providers (NUHEPs) and private universities expand their enrolments.⁸¹ NUHEPs have a higher proportion of domestic

⁷⁹ Norton (2012a)

⁸⁰ For more detail on HELP, see Norton (2013), p. 44-45

⁸¹ Ryan (2012)

off-campus or multi-modal enrolments than universities: 35 per cent compared to 24 per cent.⁸² FEE-HELP has been an important part of the rapid expansion of the online Open Universities Australia. Its enrolments have increased from 15,000 in 2005 to 55,000 in 2011, with 85 per cent of domestic students taking out FEE-HELP loans in 2011.⁸³

FEE-HELP has given Australian students access to a wider range of higher education options. However, it is difficult (though not impossible) for foreign higher education providers to become eligible for FEE-HELP. This is discussed further in section 7.3.

7.2.3 Student income support

The main student income support programs are Youth Allowance and Austudy. Students have the same entitlements whether they study online or on-campus. All undergraduate courses from higher education providers registered by TEQSA carry student income support eligibility.⁸⁴ Student income support law does not discriminate based on mode of study.

7.2.4 International students

Australia is a leading exporter of higher education. In 2011, 250,000 overseas students studied a higher education course in Australia, and another 80,000 attended an Australian off-shore

⁸² DIISRTE (2013a)

⁸³ DIISRTE (2012d) and preceding years of same publication for enrolment numbers.

⁸⁴ Student Assistance Act 1973; Student Assistance (Education Institutions and Courses) Determination 2009 (No.2)

university campus.⁸⁵ This success has not been replicated in off-campus education, with numbers declining from a peak of 24,000 in 2004 to just 11,000 in 2011. A likely contributing factor was a change to migration rules announced in mid-2003. The number of years an international student must study in Australia to receive additional migration points was increased from one year to two years.⁸⁶ It is still two years now.⁸⁷ The two year rule maximises export revenue and gives students more time to adjust to Australia before seeking work. This report does not recommend changing it.

International students resident in Australia are required to take at least three-quarters of their subjects on-campus. This is intended to ensure student visas are not used to gain entry to the Australian labour market. It is a reasonable requirement that this report does not recommend changing.

7.3 The foreign/Australian divide

Australian students are reluctant travellers. Only 10,000 Australians were enrolled in overseas higher education institutions in 2011.⁸⁸ There are no published statistics on Australian enrolments in overseas online universities, but according to an August 2012 newspaper report, 7,000 Australian students had signed up for a MOOC through Coursera.⁸⁹ Coursera's zero

tuition and travel costs make it an accessible form of American higher education.

Coursera does not offer degree courses. But it is an interesting example of how online technologies facilitate cross-border higher education trade. Students can take advantage of developments in pedagogy, educational technology and pricing in other countries without leaving home. As importantly, foreign competition can benefit Australian students who never study with an overseas higher education provider. It encourages Australian universities to match or improve on what is available on international markets.

Australian students can search for and enrol in foreign online higher education providers, as they have with Coursera subjects. However, if Australian students want financial support for their study – whether through tuition subsidies, student loans, or student income support – current policy restricts their international options. As noted in section 7.2.1, access to CSPs is largely restricted to Australian public universities. Access to student income support and FEE-HELP is possible for Australian students of foreign higher education providers, but with many regulatory obstacles along the way.

For their students to be eligible for financial support, overseas higher education providers must be registered as a higher education provider in Australia, have at least one course accredited in Australia, and meet additional requirements for accessing FEE-HELP.

Figure 17 shows the legal steps for a higher education provider wanting to offer courses in Australia. The higher education standards require 'governance and management of Australian

⁸⁵ DIISRTE (2012d)

⁸⁶ Koleth (2010), p. 9

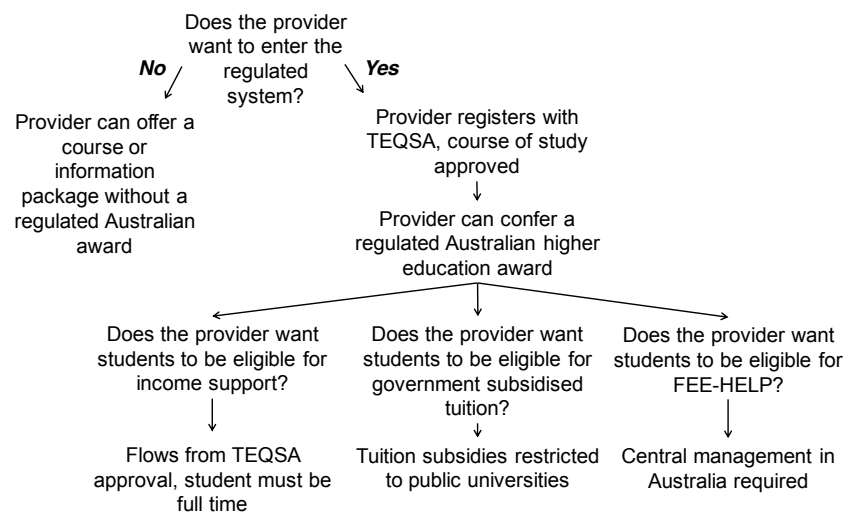
⁸⁷ DIAC (2012), p. 25

⁸⁸ UNESCO Institute for Statistics (2013). This does not include students on exchange programs with overseas universities.

⁸⁹ Dunn and Cincotta (2012)

higher education operations' to be in Australia.⁹⁰ An Australian office may be needed for local management issues, including the receipt of FEE-HELP funds. Local management staff are necessary for campus-based education. However, it is not clear that Australian governance is required, especially for online higher education providers. The principal organisation of educational delivery will occur in the provider's home country.

Figure 17: Process for getting access to Australia's higher education market



Numerous requirements and conditions are attached to both registration of a higher education provider and accreditation of its courses. The TEQSA guides to registration and accreditation run to 50 pages each.⁹¹ For higher education providers already registered and accredited in their own countries, this would mean considerable duplication of effort.

When overseas universities award their home country degrees in Australia, TEQSA takes account of home country registration and accreditation authority.⁹² This does not exempt overseas universities in Australia from meeting other TEQSA requirements. A broader mutual recognition process could avoid costly duplicated registration and accreditation processes. International trade agreements could facilitate mutual recognition, giving Australia's entrepreneurial higher education providers better access to foreign markets, while giving Australian students better access to higher education providers overseas.⁹³

There is precedent for lowering international barriers to educational mobility. The European Credit Transfer and Accumulation System (ECTS) harmonises degree structures and aids student mobility between most European countries.⁹⁴ Australia is part of tentative steps along similar lines. The APEC meeting held in Russia in 2012 reached agreement to benchmark best practice in educational quality assurance, to map existing regulation on the entry of foreign education providers, and to

⁹⁰ Provider registration standards, section 1: DIISRTE (2012c)

⁹¹ TEQSA (2012b); TEQSA (2012a)

⁹² Provider category standards, section 5: DIISRTE (2012c)

⁹³ Lester (2013)

⁹⁴ EU (2013)

remove unnecessary barriers to market access.⁹⁵ Australia's free trade agreement with the United States has provisions for mutual recognition of licensing and certification for professional services, including accreditation of schools or academic programs.⁹⁶ Given the complexities involved in multi-lateral trade negotiations, bilateral agreements may yield faster results. Priority nations are the United States as the main source of entrepreneurial education providers and Asian countries as the main source of student growth markets.

A mutual recognition system for accreditation would create student income support eligibility for Australian students taking courses with overseas higher education providers. It would not, however, on its own give students access to FEE-HELP loans. To satisfy FEE-HELP requirements, a higher education provider needs to have its 'central' management and control in Australia. Subsidiaries of foreign education companies have satisfied this requirement, but the Adelaide operations of Carnegie Mellon University and University College, London (UCL) did not.⁹⁷ Higher education funding legislation was amended to specifically authorise them to receive FEE-HELP.⁹⁸

⁹⁵ APEC (2012)

⁹⁶ Australia-United States Free Trade Agreement, Chapter 10 Cross-Border Trade in Services

⁹⁷ Foreign-owned NUHEPs with access to FEE-HELP include Blue Mountains International Hotel Management School (Laureate International Universities), Carrick Higher Education (Washington Post Company), Kaplan Business School (Washington Post Company), Kaplan Higher Education (Washington Post Company) and Raffles College (Raffles Education Corporation).

⁹⁸ Higher Education Support Act 2003, table C.

Australian management and control helps ensure that HELP money is used for educational purposes. It is not clear why 'central' management is required. Adding Carnegie Mellon and UCL to the statute concedes that 'central' management is not critical. The legal need for legislative amendment introduces an undesirable political dimension to operating a foreign higher education institution in Australia. Australia will become a more attractive educational investment destination when there are clear and stable rules that apply to all higher education providers.

Box 12: What is a university?

One obstacle to mutual recognition is that key definitions differ between countries. Australia strictly regulates the term 'university'. To be a full university in Australia requires research activity across three broad fields of study, in addition to delivering undergraduate and postgraduate courses.⁹⁹ In the United States, many higher education providers with little or no research activity – including online providers – are called 'universities'. The research requirement adds significantly to costs, making it difficult to offer competitively-priced higher education for institutions without public or philanthropic research funding. Local operations can be re-branded. Kaplan University is Kaplan Online Higher Education in Australia. However, it would be more difficult to re-brand a common website used by Australian and other students.

⁹⁹ Provider category standards, section 2: DIISRTE (2012c). See Norton (2013) p. 14-19 for analysis.

7.4 Policy summary

This chapter’s policy recommendations are summarised in table 4. Most are not specific to online higher education, but are especially relevant to it. From time-based qualifications to compulsory welfare services, the organisational and social implications of the campus-based university pervade higher education regulations. They do not prevent online educational delivery, but they do create obstacles to innovative business models that could save students time and money.

Australia’s higher education system has evolved so that it is now substantially market-based: higher education providers are generally free to offer as many or as few student places as they like, with market price-setting for a substantial minority of student places. But this outcome results from a long series of incremental adjustments to a bureaucratically-controlled system. Higher education policy is not yet based on coherent market design.

A well-designed higher education market would promote new industry entrants as an important part of bringing innovative new education-related services to students. Companies based overseas should be seen as a desirable source of innovation, bringing ideas and expertise to Australia. A ‘level playing field’ should be created between foreign and Australian and between new and old higher education providers.

Table 4: Summary of policy recommendations

	Issue	Recommendation
Encourage new business models	Time-basis for qualifications	Consider extension of competency-based higher education
	Compulsory admissions process	Level of admission assessment should depend on risks of poor choices
	Compulsory student welfare services	Level of required student welfare services should be decided by the higher education provider
Encourage new entrants	Restriction of Commonwealth-supported places to public universities	Commonwealth-supported places should be available to all higher education providers
	Higher education providers must have governance in Australia	Consider removing the Australian governance requirement, especially for online higher education providers
	Higher education providers must have central management and control in Australia	‘Central’ management is not required
	Foreign higher education providers must go through detailed Australian registration processes	Australia should pursue APEC and bilateral negotiations for mutual recognition of higher education providers

8. Conclusion

Online technologies are frequently described as ‘disruptive’ forces.¹⁰⁰ Disruptive technologies change the way services are delivered or consumed, and eventually displace existing industry leaders. In the publishing, music, media and photography industries new entrants with novel technologies challenged or bankrupted existing market leaders. Some analysts believe that higher education is another information industry vulnerable to radical change. On-campus higher education providers are locked into a high-cost model of conveying knowledge to students.¹⁰¹ They are therefore at risk of cheaper online competitors putting them out of business.

In higher education, this is not yet the story. Conveying knowledge to students is only one business operated by universities. As chapter 6 argues, on-campus universities have resilient markets because they deliver on a broad range of higher education-related outcomes. On-campus universities provide a student lifestyle that cannot be replicated online, and international students in Australia must study principally on-campus. Aspects of generic professional skill development, professional networking and practical training probably cannot yet be effectively done online. The signalling aspects of education are brand-dependent. Clear brand hierarchies exist in higher education, with on-campus research-intensive universities with highly selective student

¹⁰⁰ The terminology is Clayton Christensen’s, though his analysis of higher education is more cautious: Christensen and Eyring (2011). Examples include Deloitte (2012), Draycott (2012) and Burnsed (2011).

¹⁰¹ The late management consultant Peter Drucker is often quoted for predicting in 1997 that university campuses would end up as relics: Drucker (1997)

admissions at the top. University rankings with criteria that are typically biased towards research benefit ‘traditional’ university business models. High-prestige university involvement in MOOC providers may give them brand power among students and employers, and perhaps improve overall perceptions of online education. But for now branding issues strongly favour incumbent education providers.

Due to their limited product range, online-focused higher education providers do not serve the entire higher education market. But they have helped create new markets from people not well-served by more traditional universities. Open Universities Australia provides an entry into higher education for students who do not meet admission requirements elsewhere. The University of Phoenix in the United States focuses on working adults looking for convenient education. Online convenience markets will grow, especially as postgraduate qualifications become more necessary for career advancement. But this expands the market rather than squeezes out on-campus providers.

Although OUA and Phoenix are successful businesses, they are also in the most exposed higher education market. Once students have decided to study online, they are unconstrained by geography. Online higher education providers with superior technology or lower fees could rapidly take market share. The Australian regional universities that dominate public university provision (section 1.3) are therefore particularly vulnerable to online competition. The University of New England’s UNE Open initiative is a prudent response to likely competition. It lets

students try UNE courses for free, and discounts fees by only charging for tutorial support and examinations.

These online providers may provide serious competition for a subset of existing on-campus enrolments. Students who are disengaged from campus life (box 11) may prefer a smaller bundle of higher education services at a lower price. But to date higher education providers offer few cheaper online options (chapter 5). Students pay for easy accessibility, and universities avoid internal competition between their online and on-campus courses. Fees are unlikely to come down without competition from exclusively online providers. Competition needs better regulation and funding policies (chapter 7).

For the near future, choices between fully online and on-campus education are less important than the spread of new learning technologies (chapter 3). These can benefit all students, online and off. Technology that will drive improved productivity in higher education: more learning per hour and dollar invested. As they do in other parts of their lives, students will expect good technology in higher education. Competition for students will encourage universities to invest in new teaching technology.

Especially with more favourable policy, successful new universities may emerge over coming years. But the more certain structural change is the re-organisation of higher education production. Consider ASU Online, described in section 1.2. Arizona State University provides the curriculum and the credentials, Pearson Education delivers the online courses, Knewton provides the learning analytics, and ProctorU supervises exams. An established higher education retail brand, Arizona

State, is using other organisations to offer an innovative new service. MOOC providers may also become suppliers to universities. Deals with Antioch University and San Jose State University to provide course content could be the MOOC business model. These entrepreneurial companies see existing higher education institutions as clients, not competitors.

Online technology may prompt further changes in how higher education is organised. The role of academics could change – we may not need as many ‘lecturers’ in flipped classrooms using MOOC-based lectures, but we will need people skilled at quickly adapting their classes in light of learning analytics data. Paradoxically, technology may help revive face-to-face education. But universities will face considerable difficulties in getting academic staff and their union to adapt. Classes held at any time in courses taken at a student’s own pace raise doubts about the time basis of courses and qualifications. As chapter 7 argues, these developments have implications for both accreditation and funding policy in Australia.

Almost every day the world’s higher education media carries another story about new educational technology or new businesses offering educational services. There technological and commercial entrepreneurs are energising higher education. With so many new ideas and products, it is impossible to tell exactly what higher education will look like in ten or twenty years. Many of today’s prominent higher education brands will probably still exist, but the educational experience they offer will have greatly changed.

9. Glossary

ABS	Australian Bureau of Statistics	Distance education	Education where the student is not expected to attend campus for classes
ACU	Australian Catholic University		
AQF	Australian Qualifications Framework	EFTSL	Equivalent full-time student load
Blended learning	Learning which combines technology with other approaches, such as face-to-face	FEE-HELP	HELP for full-fee students
		Flipped classroom	Students view lecture materials online before class, and then participate in active learning in class time with the lecturer / tutor
CGS	Commonwealth Grants Scheme		
Commonwealth contribution	The federal government's tuition subsidy	FTE	Full-time equivalent
Course	A series of subjects that together lead to a qualification	Full-time student	A student taking subjects equivalent to 75% or more of the standard course requirements for a year
CQU	Central Queensland University, rebranded CQUniversity	GCA	Graduate Careers Australia
DEEWR	Australian Department of Education, Employment and Workplace Relations	HECS	Higher Education Contribution Scheme
DIISR	Australian Department of Innovation, Industry, Science and Research	HECS-HELP	HELP for Commonwealth-supported students
		HELP	Higher Education Loan Program
DIISRTE	Australian Department of Industry, Innovation, Science, Research and Tertiary Education	HEP	Higher Education Provider
		ICT	Information and communications technology

MOOC	Massive open online course	QUT	Queensland University of Technology
Multi-modal	A courses taken partly on-campus and partly online or through another form of distance education	Student contribution	The amount paid by a student in a Commonwealth-supported place
NUHEP	Non-university higher education provider	Subject	A unit of study centred around a particular area of knowledge or skill acquisition. Subjects can be combined to form a course.
OUA	Open Universities Australia	TEQSA	Tertiary Education Quality and Standards Agency
Part-time student	A student taking subjects equivalent to 25% or less of the standard course requirements for a year	Unit of study	See "Subject"
		UWS	University of Western Sydney

Appendix A: Overview of empirical evidence

Most empirical evidence on online learning is of limited quality. Many comparative studies do not randomly allocate students to offline or online formats which can skew results, given certain types of learners are often attracted to online learning. Many comparative studies also compare apples with oranges, for example high quality on-campus learning with poor quality online education (or vice-versa). Often the multiple dimensions of course quality are not adequately controlled for, such as pedagogy.

The US Department of Education undertook a major meta-study on online education in 2010.¹⁰² The meta-study screened the vast amount of online literature for both experimental and quasi-experimental studies comparing online and face-to-face methods. Only 46 studies adequately met the quality criteria for inclusion, highlighting the limited amount of rigorous evidence available.¹⁰³ Of the selected studies, many still suffered methodological limitations, such as small sample sizes and/or a lack of controls. For these reasons, the meta-study findings – which were in favour of online conditions relative to face-to-face models – should be interpreted cautiously.

A 2012 review of the literature confirms there is little hard data available to conclusively say how effective online education is.¹⁰⁴ Since then, however, a study by Bowen, et al (2013), provides a rigorous piece of research that could be significant for the sector. It involves a randomised trial comparing hybrid learning to traditional courses, and finds no clear differences in learning outcomes or pass rates between students in the two groups. Over 600 students participated in the trial across six public university campuses in the US. It tested interactive learning online based courses in statistics involving computer-guided instruction which substituted some (but not usually all) of traditional instruction.

¹⁰² Means, *et al.* (2010)

¹⁰³ Studies included do the following; 1) compare blended and pure online learning against face-to-face instruction, 2) are experimental or quasi-experimental, and 3) objectively measure against student learning outcomes. Studies were excluded if the online course involved only videos or stand alone computer programs.

¹⁰⁴ Bowen and Lack (2012)

10. References

- ABS (2010) *Education and training experience 2009, Cat. 6278.0*, Australian Bureau of Statistics
- ACER (2012) *AUSSE Australasian university respondent characteristics report 2011*, Australian Centre for Education Research
- Adams, J. and DeFleur, M. (2006) 'The acceptability of online degrees earned as a credential for obtaining employment', *Communication Education*, 55(1), p 32-45
- Allen, E. and Seaman, J. (2013) *Changing course: ten years of tracking online education in the United States*, Babson Survey Research Group
- APEC (2012) *20th APEC economic leaders' declaration: annex D, promoting cross-border education*, Asia-Pacific Economic Cooperation
- AQF (2012) *Recognition of prior learning: an explanation*, from <http://www.aqf.edu.au/Portals/0/Documents/2013%20docs/RPL%20Explanation.pdf>
- AQF (2013) *Australian Qualifications Framework, Second Edition*, from <http://www.aqf.edu.au/Portals/0/Documents/2013%20docs/AQF%202nd%20Edition%20January%202013.pdf>
- Archibold, R. and Feldman, D. (2011) *Why does college cost so much?*, Oxford University Press
- Arum, R. and Roksa, J. (2011) *Academically adrift: Limited learning on college campuses*, The University of Chicago Press
- Aslanian, C. and Clinefelter, D. (2012) *Online college students 2012: Comprehensive data on demands and preferences*, The Learning House Inc
- Bailey, J. and Flegle, L. (2012) 'Hiring managers perceptions of the value of an online MBA', *Online Journal of Distance Learning Administration*, XV(II), p 1-3
- Barber, J. (2012) *Australia's quality regulators and the threat they pose to the NBN*, Centre for the Study of Higher Education, University of Melbourne
- Biggs, J. (2012) 'What the student does: teaching for enhanced learning', *Higher Education Research and Development*, 31(1), p 39-55
- Bouzidi, L. and Jaillet, A. (2009) 'Can online peer assessment be trusted?', *Educational Technology & Society* 12(4), p 257-268
- Bowen, W. and Lack, K. (2012) *Current status of research on online learning in postsecondary education*, Ithaca
- Bradley, D. (2008) *Review of Australian higher education: final report*, Department of Education, Employment, and Workplace Relations
- Burnsed, B. (2011) 'Online education may transform higher education', *US News and World Report*, from <http://www.usnews.com/education/online-education/articles/2011/04/20/online-education-may-transform-higher-ed>
- Castaneda, R. (2008) *The impact of computer-based simulation within an instructional sequence on learner performance in a Web-based environment*, PhD diss, Arizona State University
- Cavus, N., H. Uzonboylu and Ibrahim., D. (2007) 'Assessing the success rate of students using a learning management system together with a collaborative tool in Web-based teaching of programming languages', *Journal of Educational Computing Research*, 36(3), p 301-321

- Chickering, A. and Gamson, Z. (1987) *Seven principles for good practice in undergraduate education*, AAHE Bulletin
- Christensen, C. M. (1997) *The innovator's dilemma: when new technologies cause great firms to fail*, Harvard Business Review Press
- Christensen, C. M. and Eyring, H. J. (2011) *The innovative university: Changing the DNA of higher education from the inside out*, Jossey-Bass
- Coates, H. (2008) *Enhancing the engagement of distributed learners*, AUSSE Research Briefing
- College Board (2012) *Trends in college pricing 2012*, College Board Advocacy and Policy Centre
- Collins, A. (1989) *Cognitive apprenticeship and instructional technology*, Center for the Study of Reading, University of Illinois at Urbana-Champaign
- Columbaro, N. and Monaghan, C. (2009) *Employer perceptions of online degrees: a literature review*, Online Journal of Distance Learning Administration
- Crunch Base (2013) 'Company profiles: Coursera', accessed 5 March from <http://www.crunchbase.com/company/coursera>
- DEEWR (2007) *National code of practice for registration authorities and providers of education and training to overseas students*, Department of Education, Employment and Workplace Relations
- Deloitte (2012) *Disruptive innovation case study: transforming higher education*, Deloitte from https://www.deloitte.com/assets/Dcom-Australia/Local%20Assets/Documents/Industries/Government%20Services/Public%20Sector/Deloitte_HigherEducationDICaseStudy_2Apr2012.pdf
- Deloitte Access Economics (2011) *Higher education teaching and learning costs*, Department of Education Employment and Workplace Relations
- Den Hollander, J. (2012) 'Online opportunities: digital innovation or death through regulation', *The Conversation*, 8/10/2012, from <http://theconversation.com/online-opportunities-digital-innovation-or-death-through-regulation-9736>
- DeSantis, N. (2012) 'Harvard and MIT put \$60-million into new platform for free online courses', *The Chronicle of Higher Education*, from <http://chronicle.com/blogs/wiredcampus/harvard-and-mit-put-60-million-into-new-platform-for-free-online-courses/36284>
- Devlin, M. and Samarawickrema, G. (2010) 'The criteria of effective teaching in a changing higher education context', *Higher Education Research & Development*, 29(2), p 111-124
- DIAC (2012) *Points based skilled migration (subclasses 189, 190 and 489) visa*, Department of Immigration and Citizenship
- DIAC (2013) *Student visa program quarterly report: quarter ending at 31 December 2012*, Department of Immigration and Citizenship
- DIISRTE (2012a) *2012-13 Budget statements, outcomes and performance – outcome 3*, Department of Industry, Innovation, Science, Research and Tertiary Education, accessed 18/12/12, from <http://www.aiatsis.gov.au/corporate/documents/IISRTEPortfolioBudgetStatementsFull2012-13.pdf>
- DIISRTE (2012b) *Finance 2011: financial reports of higher education providers*, Department of Industry, Innovation, Science, Research and Tertiary Education, accessed 18/12/12, from <http://www.innovation.gov.au/HigherEducation/ResourcesAndPublications/HigherEducationPublications/FinanceReports/Pages/Finance2011.aspx>
- DIISRTE (2012c) *Higher Education Standards Framework (Threshold Standards) 2011*, Department of Industry, Innovation, Science, Research and Tertiary Education from Available at <http://www.comlaw.gov.au/Details/F2012L00003/Download>

- DIISRTE (2012d) *Students: selected higher education statistics 2011*, Department of Industry, Innovation, Science, Research and Tertiary Education
- DIISRTE (2013a) *uCube - Higher education statistics*, from <http://www.highereducationstatistics.deewr.gov.au/Default.aspx>
- DIISRTE Department of Industry, Innovation, Science, Research and Tertiary Education (2013b) *Universities payment information system*,
- Dinov, I. D., J. Sanchez and Christou, N. (2008) 'Pedagogical utilization and assessment of the statistic online computational resource in introductory probability and statistics courses', *Computers & Education*, 50(1), p 284-300
- Dodd, T. (2013) 'Revolution in university teaching, MOOC's next steps in learning', *Australian Financial Review*, 04/03/2013,
- Donoghue, T. and Chapman, E. (2010) 'Problems and prospects in competencies-based education: a curriculum studies perspective ', *Education Research and Perspectives*, 37(1), p 85-104
- Draycott, M. (2012) 'Disruptive technologies in higher education: adapt or get left behind', *The Guardian*, 21/03/2012, from <http://www.guardian.co.uk/higher-education-network/blog/2012/mar/21/disruptive-technology-in-he>
- Drucker, P. (1997) 'Seeing things as they really are', *Forbes*, 03/08/1997, from http://www.forbes.com/forbes/1997/0310/5905122a_print.html
- Dunn, A. and Cincotta, K. (2012) 'Free courses from world's top unis a swipe away in online revolution', *Sydney Morning Herald*, 12/08/2012, from <http://www.smh.com.au/technology/technology-news/free-courses-from-worlds-top-unis-a-swipe-away-in-online-revolution-20120811-241i5.html>
- EU European Commission (2013) *European credit transfer and accumulation system*, from http://ec.europa.eu/education/lifelong-learning-policy/ects_en.htm
- Gao, T. and Lehman, J. D. (2003) 'The effects of different levels of interaction on the achievement and motivational perceptions of college students in a Web-based learning environment', *Journal of Interactive Learning Research*, 14(4), p 367-386
- Garrett, R. (2012) *Online higher education in the United States - explaining market success and diagnosing market friction*, Unpublished, Eduventures
- GCA (2012) *Australian graduate outlook survey 2009-2011*, Graduate Careers Australia
- Graduate Careers Australia (2011) *Graduate Course Experience 2011, The Report of the Course Experience Questionnaire*, from <http://www.graduatecareers.com.au/wp-content/uploads/2012/08/Graduate-Course-Experience-2011-secured.pdf>
- Grant, L. K. and Courtoreille, M. (2007) 'Comparison of fixed-item and response-sensitive versions of an online tutorial', *Psychological Record*, 57(2), p 265 - 272
- Hibelink (2007) *The effectiveness and user perception of 3-dimensional digital human anatomy in an online undergraduate anatomy laboratory*, University of South Florida
- James, R., Krause, K.-L. and Jennings, C. (2010) *The first year experience in Australian universities: findings from 1994 to 2009* Centre for the Study of Higher Education, University of Melbourne
- Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A. and Ludgate, H. (2013) *Horizon report: 2013 Higher education edition* The New Media Consortium

- Knewton (2013) *Adaptive Learning White Paper: Building the world's most powerful education recommendation engine*, www.knewton.com
- Koleth, E. (2010) *Overseas students: immigration policy changes 1997–May 2010*, Parliamentary Library, Parliament of Australia
- Kolowich, S. (2013) 'How edX plans to earn, and share, revenue from its free online courses', *The Chronicle of Higher Education*, 21 February, from <http://chronicle.com/article/How-EdX-Plans-to-Earn-and/137433/>
- Kuh, G., Carini, R. and Klein, S. (2004) 'Student engagement and student learning: testing the linkages', *Research in Higher Education*, Vol. 47(No. 1), p 1-32
- Kuh, G. D. (2009) 'What student affairs professionals need to know about student engagement', *Journal of College Student Development*, 50(6), p 683–706
- Kuh, G. D. and Hu, S. (2001) 'The effects of student faculty interaction in the 1990s', *Review of Higher Education*, 24(3), p 309-332
- Lester, S. (2013) *Liberalizing cross-border trade in higher education: the coming revolution of online universities*, No. 720, Cato Institute Policy Analysis
- Means, B., Toyama, Y., Murphy, R., Bakia, M. and Jone, K. (2010) *Evaluation of evidence-based practices in online learning: a meta-analysis and review of online learning studies*, US Department of Education
- NCAT (2013) 'Projects sorted by discipline', accessed 19 February 2013, from http://www.thencat.org/PCR/Proj_Discipline_all.html
- NCES (2012) 'Fast facts: highest enrolment', accessed 11 February 2013, from <http://nces.ed.gov/FastFacts/display.asp?id=74>
- Nguyen, F. (2007) *The effect of an electronic performance support system and training as performance interventions*, PhD dissertation, Arizona State University
- Nisen, M. (2013) 'Online start-up plans to create ivy caliber education for half the price', *Business Insider*, 14 January, 2013, from <http://au.businessinsider.com/the-pitch-for-the-minerva-project-2013-1>
- Norton, A. (2012a) *Graduate Winners: Assessing the public and private benefits of higher education*, Grattan Institute
- Norton, A. (2013) *Mapping Australian higher education, 2013 version*, Grattan Institute
- OER (2013) 'Open Educational Resources Commons', accessed 5 April, from <http://www.oercommons.org/>
- OUA (2012) *Open Universities Australia annual report 2011*, Open Universities Australia
- Park, J.-H. and Choi, H. J. (2009) 'Factors influencing adult learners' decision to drop out or persist in online learning', *Educational Technology & Society*, , 12(4), p 207–217
- Pascarella, E. and Terenzini, P. (2005) *How college affects students: A third decade of research*, John Wiley & Sons
- Roy Morgan Research (2009) *Year 12 choices: a survey of factors influencing year 12 decision-making on post-school destination, choice of university and preferred subject*, Australian Department of Education, Employment and Workplace Relations
- Ryan, P. (2012) 'Growth and consolidation of the private higher education sector', *The ACPET Journal of Private Higher Education* 1(1), p 6-11
- SEEK (2013) *Half year results presentation 2013*, SEEK Ltd
- SHRM (2010) *SHRM poll: Hiring practices and attitudes, traditional vs. online degree credentials*, Society for Human Resource Management

- Sloan, P. (2012) *Udacity snags \$15M to continue its assault on higher education*, from [http://news.cnet.com/8301-32973_3-57539722-296/udacity-snags-\\$15m-to-continue-its-assault-on-higher-education/](http://news.cnet.com/8301-32973_3-57539722-296/udacity-snags-$15m-to-continue-its-assault-on-higher-education/)
- Spies, M. (2011) *Engaging the online learning: Student reactions to the use of audio podcast in off campus courses*, Australian College of Applied Psychology
- TEQSA (2012a) *Application form for accreditation of a higher education course of study (AQF qualification)*, Tertiary Education Quality and Standards Agency
- TEQSA (2012b) *Application guide: application for accreditation of a higher education course of study (AQF qualification)*, Tertiary Education Quality and Standards Agency
- The Chronicle of Higher Education (2012) *The role of higher education in career development: employer perceptions*, from <http://chronicle.com/items/biz/pdf/Employers%20Survey.pdf>
- The University of Queensland (2012) *Lecturer explores innovative approach to student learning*, from <http://www.uq.edu.au/news/?article=25481>
- U.S. Department of Education Office of Educational Technology (2013) *Expanding evidence approaches for learning in a digital world*, Washington, D.C, from <http://www.ed.gov/edblogs/technology/files/2013/02/Expanding-Evidence-Approaches.pdf>
- UA (2012) *Response to the ALRC issues paper: copyright and the digital economy*, Universities Australia from <http://www.universitiesaustralia.edu.au/resources/777/1509>
- UNESCO Institute for Statistics (2013) 'Outbound mobile students (students from a given country studying abroad)', from <http://stats.uis.unesco.org/unesco/TableViewer/tableView.aspx>
- Wildavasky, B. (2012) *Adapting higher education to improve innovation and productivity*, Papers for the Alliance 21 Education and Innovation Conference
- Young, J. (2012) *Online classes see cheating go high-tech*, The Chronicle of Higher Education, from <http://chronicle.com/article/Cheating-Goes-High-Tech/132093/>
- Young, J. (2013) *Coursera announces detail for selling certificates and verifying identities*, The Chronicle of Higher Education, from <http://chronicle.com/blogs/wiredcampus/coursera-announces-details-for-selling-certificates-and-verifying-identities/41519>
- Zhang, D. (2005) 'Interactive multimedia-based e-learning: A study of effectiveness', *American Journal of Distance Education*, 19(3), p 149-162