MOOCs and UWA Futures: A Response

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Abstract

The Vice Chancellor's *UWA Futures* white paper provides leadership in three ways: (a) it rallies the university to collectively address an imminent threat, (b) it spells out a process for discussion with milestones, and (c) it offers specific proposals for consideration.

This response draws on the history of universities, the literature on university management, and the economics of higher education to: (a) argue a research-intensive university like UWA does not provide the incentives or structures to simultaneously improve on teaching and research at levels implicit in *UWA Futures* and (b) show it is unlikely MOOCs will prove disruptive to research-intensive universities, although MOOCs will – it is very much to be hoped – facilitate wider, more convenient access to post-secondary education.

Research-intensive universities have a distinctive appeal to high-achieving students. In time, we can use online education to focus more on aspects of education that are our comparative advantage at UWA and leave more responsibility for learning to students. This would be "back to the future"; a closer approximation to Wilhelm von Humboldt's extraordinary 19th century ideal of a research university based on "freedom to teach" and "freedom to learn".

MOOCs are not UWA's most pressing challenge. A more critical task is drafting an institutional goal more specific than a top 50 ranking in 2050 based on whatever metric is in vogue that year.

[*] The views expressed are my own and are intended to contribute to discussion. They do not represent the endorsed view of the UWA Academic Staff Association or of UWA Business School. A companion discussion paper "Enhancing UWA's Research Reputation" is available from the UWA Academic Staff Association website http://www.uwaasa.uwa.edu.au/

Executive Summary

Introduction

- UWA Futures proposes we address the disruption posed by online learning courses by providing students with greater support and engagement whilst improving our research to be ranked in the top 1% of universities.
- This paper:
  (a) argues UWA's incentive and structures make the proposed strategy infeasible
  (b) disputes that MOOCs are disruptive to research-intensive universities, and
  (c) proposes UWA's most pressing challenge is identifying a teaching mission consistent with its ambitious research mission. Trade-offs are necessary.

Infeasibility of simultaneously improving teaching and research

- Studies show to maintain even a modestly strong emphasis on both undergraduate teaching and research a university must compromise more on research than teaching. This is consistent with the experiences of Syracuse University and the University of Arizona that aimed to be "student-centred research universities".
- Specific reasons it is difficult to simultaneously improve teaching and research at UWA include:
  i. Student-staff ratios are too high to be world-class competitive. At highly-ranked public American universities such as University of California, Berkeley and the University of Michigan, the ratios are in the mid-teens to 1; at UWA it is 28 to 1. At leading private US universities the ratios are less than 10 to 1. UWA staff surveys have consistently cited workload and lack of time as barriers to making improvements in teaching.
  ii. Online courses an academic time-sink. They are not a solution to both improving teaching and freeing time for research
  iii. There is an entrenched institutional bias towards research. History helps us understand how this bias arose and the challenges in addressing it.

A Historical Perspective on Teaching, Research and University Prestige

- The primary function of universities for most of their 900-year history has been preparing aspiring candidates to enter the professions – not research. Universities did not contribute to the scientific revolution.
- Wilhelm Von Humboldt's reforms in early nineteenth century Germany revolutionised universities by making research their primary aim. Research subsequently earned universities their highest prestige. Research remains the primary driver of university status and esteem.
- Humboldt regarded attendance at lectures as secondary. Indeed, German students were free to study as they pleased as long as they turned up for exams. By the end of the nineteenth century, leading US research universities saw undergraduates as an unnecessary distraction and tried to farm them off to satellite colleges.

MOOCs and the awkward economics of universities

- It is common to characterise universities as businesses offering a service to customers. This framing suggests massive open online courses (MOOCs) will disrupt universities' "business model" by offering a high quality service at lower cost.
- The model of universities as businesses overlooks the implications of: **(i)** universities' non-profit status, **(ii)** quality of education being a function of attributes of the student body ("student peers' effect"), and **(iii)** society's multiple expectations of universities.
- The viability of research-intensive universities does not rest on providing "*the best education for the lowest price*". Research-intensive universities have always relied and will continue to rely largely on Government funding. UWA's ambitions are inextricably linked to government willingness to fund an elite set of research-intensive universities.
- At present, much government funding is tied to student enrolment. This fits research-intensive universities because there is a strong association – manifested in premiums paid

by international fee-paying students - between research reputation and attractiveness to students, particularly academically high achieving students.
- Selectivity is a characteristic of elite universities. UWA's policies and advertising promote this version of elitism. (It reflects values adopted virtually by default over time, or at least without obvious critical institutional reflection.)

MOOCs: implications and possibilities for UWA

- MOOCs do not threaten the viability of research-intensive universities such as UWA.
- In time, courses of the kind being developed by Carnegie-Mellon's online learning initiative (OLI) that enact instruction without instructors or classmates will make achieving high quality post-secondary qualifications accessible to many more people that at present.
- UWA can then return to Humboldt's vision of a university where fostering a particular set of values and approach to discovery becomes our key offering to students. We can de-emphasise teaching and focus on student learning.

Concluding comments

- The achievements of research-intensive universities make them attractive to students and to governments who finance them. The best pedagogy for UWA's students must be consistent with UWA's research ambitions. There are trade-offs to be made.
- It's possible to have a constructive extended discussion involving the whole university whilst we identify the qualities and competencies we wish to develop in students and the trade-offs that need to be made.
- UWA's institutional ambition is to be amongst the top 50 universities in the world in 2050. We boast often of our place in the ARWU top 100 but are reluctant to commit to it as our measure of performance for 2050. Waiting to see which measure is in vogue in 2050 is an uninspiring approach that fails to give direction when we need it most. Identifying what we stand for is the most pressing problem facing UWA, not MOOCs.

Introduction

The principal driver of *UWA Futures* is the observation:

> *"[m]assively open online courseware [MOOCs] is widely seen as a disruptive technology that has the potential to completely transform the structure and nature of higher education over the next 15 years*."

To compete with online education providers, *UWA Futures* proposes

> *"… every student receives a level and quality of personal support and advice that will differentiate the student experience at UWA from that provided by other physical and virtual universities. … [and] that all our students engage actively with academic staff and fellow students in their learning both on and off campus…*".

In addition, *UWA Futures* contends

> "*… we need to recruit and retain the very best researchers, … we are already providing a quality research environment, but we could do more, and do so more consistently, particularly if we are to achieve our aim of being a university ranked in the top 1% worldwide in a broad range of disciplines*."

This paper elaborates three points:

(a) UWA does not presently have either the incentives (at the individual level) or the organizational structures to implement the above strategy. This isn't because of failings specific to UWA but reflects the priorities of a research-intensive university.

(b) History and the economics of higher education do not support the notion that MOOCs will prove disruptive to research-intensive universities, although MOOCs will – it is very much to be hoped – provide wider, more convenient access to post-secondary education. MOOCs facilitate closer approximation to Wilhelm von Humboldt's 19th century ideal of a university focused on discovery rather than mass education.

(c) The best pedagogy for UWA's students must be consistent with UWA's research ambitions. To aim to be amongst the top 50 universities but not commit to a measure is confusing. Admirable universities – e.g., Chicago, BYU-Utah, DeVry - have clarity. They, not others, define their goals.

Infeasibility of simultaneously improving teaching and research

Universities in general find it infeasible to simultaneous improve teaching and research because they

> "*do not represent aspects of a single dimension of interests, commitments, and orientation, but are different dimensions that are at odds with each other*" (Fox, 1992).

One consequence is that

> " … *to maintain even a modestly strong emphasis on both undergraduate teaching and research, an institution apparently must compromise more on research than on teaching*" (Astin and Chang, 1995).

Astin and Chang analyse 212 leading US universities and find

> "[*v]irtually no institutions with very strong Research Orientations (top ten percent) are even above average in Student Orientation*" (p. 46).

In Knowledge and Money: Research Universities and the Paradox of the Marketplace (2004) Roger Geiger shows these trade-offs at Syracuse University and Arizona University when each resolved to become a "student-centred research university" (Ch.3, pp. 101-115).

Geiger's analysis suggests Syracuse University pursued its mission more thoroughly. It has been successful on several measures but research declined and in 2011 Syracuse chose to withdraw from the prestigious 60-member Association of American Universities (AAU) before it

was pushed out[1]. In contrast, Arizona University, a member of AAU and ranked 74th in the ARWU in 2012, appears to have been more politically calculating. Gieger contends

> "*a substantial portion of the Arizona [University] community always saw the policy as a ploy to placate the board [of Regents[2]]. The aloofness of the administration, the locus of student-centered initiatives in the bureaucracy, and the overindulgence in rhetoric all tended to distance this effort from the rank and file … [Further], nearly 60 percent of research [at Arizona] is performed at centers and institutes, distanced somewhat from undergraduate education*" (p. 114).

Geiger is scathing in his assessment of Arizona's unreflective approach towards becoming more "student-centered". He remarks,

> "*The UA [University of Arizona] documents … seem wholly uncritical. The phrase "a preeminent student-centered research university" is repeated like a mantra. The premise seems to be that enough welcoming, caring, involving, and mentoring by the faculty will lead to the achievement of the university's student learning goals. But just in case, the university promises to maintain "a program of extensive and focused assessment that* ***makes sure*** *all these aims are* ***really*** *pursued and accomplished" (emphasis added). It is ironic that an institution that employs empty rhetoric aspires to teach critical thinking to its students. The real danger is that the overuse of slogans and feel-good language interferes with critical thinking about managing a research university*" (Geiger, p. 113, ch. 3)[3].

The political challenges of acknowledging the tension between teaching and research[4] make it helpful to identify and discuss specific reasons it is not feasible to simultaneously improve both research and teaching at UWA in a substantial way.

Three reasons are discussed in turn: (i) student-staff ratios are too high to be world-class competitive in teaching. (ii) Greater use of online technology does not free up time for research because online courses are an academic time-sink. (ii) There is an institutional bias towards research because research trumps teaching in the prestige stakes.

High student:staff ratios

The University of Melbourne's March 2011 "Submission to the Higher Education Base Funding Review" makes clear Australian universities' disadvantage in student:staff ratios:

> "*Student:staff ratios are a proxy for the staff resources available for teaching. Leading international universities have student:staff ratios that are lower than the Australian norm. At highly-ranked American public universities such as the University of California at Berkeley and the University of Michigan at Ann Arbor the ratios are in the mid-teens*

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[1] For accounts of the trade-offs Syracuse made see "As Chancellor focuses on the 'Public Good,' Syracuse's reputation slides by Robin Wilson *Chronicle of Higher Education* 2 October 2011, and "Who needs the AAU, anyway?" by Stephen Joel Trachtenberg *Chronicle of Higher Education* 5 May 2011

[2] Gieger claims Arizona University adopted this stance in order to placate its "*Board of Regents, who climbed on the national bandwagon by posing as champions of the students against an uncaring research university*" (p. 114).

[3] The University of Arizona is not alone in glossing over the trade-offs entailed in teaching and research. Alan Gilbert, the [then] Vice-Chancellor of Manchester University, stated in his briefing paper for his university's 2007-2008 review of teaching, learning and the student experience, that *"[w]e do not have to choose between excellence in research, on the one hand, and excellence undergraduate teaching, on the other*. ***In profoundly important ways, the two are inextricably linked***" (2007, p. 6, emphasis added). Manchester University's subsequent history does not support this proposition. In 2007 Manchester ranked 48 in the ARWU ranking. By 2010 it had risen to 41. However, also in 2010, a newspaper reported "*hundreds of Manchester University engineering students have become the latest British undergraduates to stage a revolt against poor-quality teaching … expatriate Australian vice-chancellor Alan Gilbert recently described the low level of student satisfaction with the university's teaching as ``totally unacceptable*'''' (*The Australian* "British students agitate for teaching quality" 24 March 2010).

[4] In their highly cited (2002) paper "The relation between research productivity and teaching effectiveness: complementary, antagonistic or independent constructs?" Herbert Marsh and John Hattie allude to these political difficulties: "*the rationale of modern research universities dictates that there should be a positive relation between teaching and research. Without this positive relation, the claim that teaching and research are mutually supporting activities is weakened, and one basis for funding universities to pursue research as well as providing teaching is undermined. Reflecting this ideal or, perhaps, these pragmatics, many academics and administrators want to believe that the relation is positive" (p. 605).* Marsh and Hattie further observe that *"the most common defence that teaching and research are related is the reliance on the single case: "The quintessential academician is a Nobel Prize winner who can enthral an undergraduate class" …. The evidence suggests that these exceptions are far from the norm*" (p. 631).

to 1. At Oxford and Cambridge, student:staff ratios are around 11 to 1, and at leading American private universities less than 10 to 1."

In contrast,

> "[*f]rom around 13 to 1 in 1990, the most recent Universities Australia figures put them at nearly 20 to 1 sector-wide in 2008 … Universities Australia no longer publishes the ratios at a discipline level, but earlier figures indicate large differences between fields of study, with particularly high ratios in management and commerce.*"

Data from the Australian Bureau of Statistics indicates the student:staff ratio has increased substantially since 2008. In 2011, across the Go8 universities plus Queensland University of Technology, Griffith University and Curtin University, the median student:staff ratio was 30.4. ANU had the lowest student:staff ratio at 27.2; UWA was next at 28.0. Curtin's student:staff ratio of 46.1 was the highest.

The summary statistics on student:staff ratio mask considerable variation across faculties and courses. All universities have considerable right skewness in the distribution of class sizes such that 50% of enrolments are in classes numbering in the hundreds. For instance, in 2012 at UWA 153 units account for 50% of all enrolments. The smallest of the 153 units has 213 students enrolled; the median class size in the 153 largest unit is 304 students, the average is 376 students[5].

In contemplating the implications of the above for quality teaching, note Melbourne University's submission did not say that large class sizes are associated with poor quality teaching but rather "*[s]tudent:staff ratios are a proxy for the staff resources available for teaching."*

A 2009 Higher Education Chronicle report on Harvard's acclaimed Michal Sandel shows that large classes are not an insurmountable barrier to positive student evaluations:

> *"Michael Sandel, a 56-year-old political scientist who teaches one of Harvard's most popular courses, "Justice," shrinks that university's cavernous Sanders Theatre down to a seminar room. An exaggeration, yes, but not by much. Sandel handles 1,000 students more adroitly than most teachers can a tenth, a fiftieth, that number*"[6]

Closer to home, my Business School colleagues, Andrew Williams, Alan Simon, and Leo Langa, handle classes hovering on the 1,000 student mark with similar facility. They are outstanding lecturers of large classes.

It need hardly be said that most academics do not have the talent to lecture large classes as effectively as Michael Sandel or indeed Andrew Williams, Alan Simon, and Leo Langa. Most of us could improve significantly[7]. This is where the lack of resources is a barrier. The requirement for more resources and time to improve teaching quality at UWA has long surfaced in surveys of staff.

In May 2001, Professor Alan Robson, then UWA's DVC, reported on the results from the 2000 Working Life Survey. Professor Robson wrote, inter alia, that

> "*the most serious issues for academic staff that emerge from the data relate to workload and time pressures. It is also of concern that some 79% of staff who teach*

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[5] As a matter of interest, Charles Clotfelter in his (1996) book Buying the best: cost escalation in elite higher education reports that the average undergraduate class size in the Social Science Department at Harvard in 1991/1992 was 242 students (1996, ch.8, p.225). Class sizes have shrunk since, seemingly driven by ranking measures. A CBS news report in 2009 headed "*Harvard tops college ranking list" states "Harvard University is the country's oldest, wealthiest and most selective university. Now it's back on top of the U.S. News & World Report college rankings, claiming sole possession of the No. 1 spot for the first time in 12 years … So how did Harvard edge past its Ivy League rival? A comparison of last year's numbers points to one category where it moved ahead of Princeton - average class size … Harvard reports the percentage of students in classes under 20 students rose from 69 percent to 75 percent since last year's report, while the percentage in classes bigger than 50 fell from 13 percent to 9 percent. Asked whether Harvard had made a particular effort to reduce class sizes, Mitchell said: "We have worked and will continue to work very hard to enhance the academic experience for undergraduate students." Since 2000, he said, Harvard has added 86 freshman seminars (which have fewer than 12 students), and more than 100 tenure-track faculty, while its student body size has stayed about the same*" (Source: http://www.cbsnews.com/2100-18569_162-4373294.html)

[6] "Michael Sandel wants to talk to you about Justice" by Christopher Shea, *Chronicle Review* 28 September 2009.

[7] Hacker and Dreifus (2010) report "*… not all senior professors are good teachers themselves, so they don't have any useful advice to pass on. At best, observing them might provide lessons in what not to do."*

> *plan to make changes to their teaching in the next three years but 77% believe there is inadequate time and resources to support such changes*"[8].

The Executive Summary of the 2003 Working Life Survey reported a similar response[9]:

> "*[m]ost respondents agreed that they had made considerable changes to their teaching methods over the last three years and that they plan to make changes over the next three years. 68% of Academic and 42% of General staff disagreed that they had adequate time and resources to help them make these changes*" (p. 2).

By 2006, views had not changed, although it is pertinent to note the 2006 Working Life Survey found"

> "*a high proportion of Academic (91%) and General (87%) staff agreed that they care about the fate of UWA and that they are willing to put in an effort beyond that normally expected in order to help the University be successful*".

In Report No. 06/34 Prepared by the Institutional Research Unit[10] it was noted

> "*most respondents agreed that they made considerable changes to their teaching methods over the last 3 years (64% Academic, 48% General) and that they plan to make changes over the next 3 years (74% Academic, 59% General). Almost three in five Academic staff members (59%) and two in five General staff members (40%) disagreed that they had adequate time and resources to help make these changes*."

The 2009 survey did not include a similar question as the survey was completely redesigned. It's curious that whilst students' views on the quality of their teaching are elicited for every course via SURF (and SPOT, if the lecturer agrees) surveys, UWA does not see fit to formally or systematically canvas lecturers on their perceptions of the teaching environment or the support they receive. The Academic Staff Association survey of UWA academics' perception of teaching environment (APOTE) with results publicised in 2011 was the first ever survey.

Given the priorities that have been signaled via the university's allocation of resources, it is not surprising individual academics and faculties at UWA have responded accordingly. For instance, in 2009 an academic workload model was

> "*explicitly designed to reduce the number of hours spent teaching each unit, to encourage large units and discourage small ones.*"

Pertinently, the faculty committee that recommended the workload model noted the potentially negative effect on teaching quality but observed the university's rhetoric on teaching was not matched by the level of financial support it provided.

Online teaching is an academic time sink

Some may argue the focus on resources is misplaced; we can provide improved support for student learning with the same or even fewer resources by exploiting advances in communications technology. This view gains credence from well regarded researchers such as Clayton Christensen and Henry Eyring who write in The Innovative University: Changing the DNA of Higher Education from the Inside Out that

> *"[t]he increasing speed of internet communication has been mirrored by enhancements in online instruction technology; online courses are getting demonstrably better, now equaling or exceeding the cognitive outcomes of classroom instruction*" (2011, p. 212).

Christensen and Eyring are right that online courses have already been shown to be associated with improved learning outcomes in some subjects and are getting better (more on this point later) but online teaching – particularly in courses involving a mix of online and face-to-face teaching – is *more* rather than less demanding of time.

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[8] Letter available at http://www.hr.uwa.edu.au/__data/page/7520/workinglife00.pdf [last accessed 30 Oct 2012]

[9] Executive summary (Report No. 04/25 - Working Life Survey 2003 Institutional Research Unit) available at http://www.hr.uwa.edu.au/__data/page/54372/WLS2003ExSumm.pdf

[10] 2006 WLS Final Report available at http://www.hr.uwa.edu.au/publications/discussion_docs/working_life_surveys/2006

Economist Peter Navarro pinpoints this issue in "Economics in the cyberclassroom" (2000):

> "…*there appears to be a significant "triple whammy" visited upon many instructors who teach cybercourses: the up-front, fixed costs of course preparation are considerably higher; the variable costs of servicing a course likewise appear to be higher, more complex, and more unpredictable; and the economies of scale appear to be far less, so that the marginal cost of servicing each additional student does not fall at anywhere near the same rate as with a traditional course*".

Navarro's last point may seem counterintuitive; surely adding students to an online course shouldn't entail any further work by the lecturer? Actually, it does. As Navarro observes:

> " … *a cyberprofessor trades the "chains" of lecturing in a classroom for a predictable number of hours at a specific time and place for the more unpredictable "freedom" of being accessible by e-mail and other technologies … Thus, many cybercourse instructors do find themselves being drawn into an endless time drain. As one respondent put it: "Time does not diminish with experience—unlike traditional teaching where I can rely on some good notes from the past, on-line requires a large time commitment every time through to monitor and assist students*"" (p. 129).

Navarro's article was published in 2000. Perhaps advances in technology have reduced the time required to give students personalized attention over the internet? It seems not[11]. In their (2010) book Higher education?: How colleges are wasting our money and failing our kids---and what we can do about it US academics Andrew Hacker and Claudia Dreifus report on the experiences of adjunct instructors. Deborah Louise, an adjunct interviewed by Hacker and Dreifus, stated,

> *"[o]nline teaching, .. was tougher than face-to-face instruction, because, if you do it seriously, you never get a break from it. You almost sleep with your computer"* (p. 54).

To state the obvious: if, as noted earlier, lack of time and resources have caused academics to struggle to make changes to their teaching methods in a relatively stable environment it is going to be considerably more challenging for them to adapt their teaching to online learning which will most likely entail substantial changes in pedagogical approach. Navarro (2000) reports,

> "… *of the respondents to my survey, 92 percent indicated that it took significantly more time to develop a cyber-course than a traditional course. Perhaps most startlingly, over 73 percent of those who said it took more time said it took* ***twice*** *as long or more for course development*" (p. 128, emphasis in original).

Incidentally, some have harboured hopes the advent of online courses will increase the rewards to teaching at university. For instance, Navarro speculates

> "*demand (and presumably compensation) for cybereconomics instructors conceivably [will increase] in the future. This may happen because there are higher demands on faculty for creating a cybercourse than widely appreciated, and because there are ongoing demands on faculty time for running such a course*" (2000, p. 129/130).

Regrettably, Navarro's prediction is unlikely to be borne out. Quite the reverse. Deborah Louise, quoted earlier, is an adjunct who teaches 16 "distance" courses and barely makes ends meet. However, Hacker and Dreifus report that whilst Louise's work conditions are far less attractive than those to which the typical tenured academic is accustomed she is attracted by the flexibility and convenience of online course delivery. It seems many others are attracted as well. Strong demand for positions as an online instructor means universities can get away (in at least in the US) with paying them subsistence wages[12]

The point is: online courses are unlikely to improve the market power of teaching specialists and thereby deliver them higher pay or even higher status. This is not a novel conclusion. In Marginal Worth: Teaching and the Academic Labor Market (1996) sociologist Lionel Lewis provides an extended analysis to support his claim that

[11] Online courses that do away entirely with the need for an instructor can - and indeed have been – developed. They are however expensive to develop. We return to this point later.

[12] Low pay is a reality even for adjuncts who don't teach online. Hacker and Dreifus report Matt Williams, an adjunct who teaches public speaking at the University of Akron, claims he earns just $8.65 per hour (2010, p.52).

"*regardless of what efforts or seeming success faculty [ie, university teachers] may have in the classroom, they cannot expect that the academic labor market will bring about conditions that will enhance their rewards*" (p. 155).

Systematic research confirms Lewis' proposition. James Fairweather in "Beyond the rhetoric: trends in the relative value of teaching and research in faculty salaries" (2005) investigates

"*whether the decade-long push for greater commitment to teaching and learning and to restoring the balance between teaching and research is reflected in a key reward—faculty pay. Has the monetary value of teaching increased in the past 5 years? Does this pattern vary by type of institution?*" (p. 403).

Fairweather reports his

"*regression results show that spending more hours teaching in the classroom continues to be related to a lower basic salary for faculty members in research, doctoral granting, and comprehensive universities. For liberal arts colleges, the most teaching-oriented of all institutions, in 1998–1999 hours spent in the classroom changed from a neutral to a negative factor in pay* (p. 416) … "*[T]he evidence strongly suggests that without intentional institutional intervention to counteract market forces, we should not expect teaching to emerge as a positive factor in pay on a national level any time soon*" (p. 419).

Institutional values favouring research

The under-allocation of resources to teaching isn't just due to unreasonably small budgets. It is also – in fact primarily - a consequence of institutional values, of priorities. Here is a stark illustration.

Yale has an endowment of US$19.3 billion, an impressive sum for an university with just 3,953 academic staff[13]. By way of comparison, Uni Super, the industry superannuation fund with more than 450,000 members has Aus $28 billion in assets[14].

Notwithstanding Yale's wealth, in 2006 the *Yale Daily News* reported

"*the University does not have any centralized system for preparing graduate student teaching fellows to assist a professor or lead a class, and there is no official remedy for dealing with the problems that may arise throughout the semester if a teaching fellow is unprofessional or unprepared*."

The *Yale Daily News* also reported the Yale teaching guide has a section headed "Keeping Students at Bay like the Rabid Dogs They Are"[15].

In Higher Education?: How colleges are wasting our money and failing our kids Hacker and Dreifus note that even though adjunct teachers are low-cost labour,

"[a]t some schools, contingents, cheap as they are, are seen as still too costly. Several of the University of Pennsylvania's freshmen sections at the Wharton School are supervised by other undergraduates. Yale has a shortage of graduate teaching assistants and there has been talk, as we write, to train upperclassmen and women to serve as "section leaders"" (p.59).

The problem of course is not unique to Yale. Harvard has by far the largest university endowment in the world at US$30.7 billion[16] but its teaching falls considerably short of matching its endowment ranking. Hacker and Dreifus report being told by a Harvard junior (ie, second year student)

[13] Source: *Yale Facts* at http://www.yale.edu/about/facts.html [last accessed 30 Oct 2012].
[14] Source: https://www.unisuper.com.au/about-us [last accessed 30 Oct 2012].
[15] Becoming Teachers: The Graduate Student Guide to Teaching at Yale University is available on the web. The guide includes sensible advice that students should be held responsible for their learning. It also suggests undergraduates should not be granted undue deference, advising Teaching Assistants to "[e]mphasize that students who call you at unacceptable times will be the object of unrestrained wrath".
[16] Source: Bloomberg report http://www.bloomberg.com/news/2012-09-26/harvard-lags-peers-as-endowment-loses-less-than-1-.html [report dated 26 September 2012]

> "*We don't feel the professors are here for us …When we come to Harvard, we have to understand it's not for the education we get, but for the reputation its degree gives us*" (p.78).

Hacker and Dreifus' charges have been echoed by insiders including.

The relative lack of attention to teaching at Harvard and Yale isn't a function of shortcomings particular to these two universities but rather reflects the institutional values of research-focused universities, a point made at length in Excellence without a Soul: How a Great University Forgot Education (2006)[17] by Harry Lewis, a former Dean of Harvard College and professor of computer science (his former students include Bill Gates and Mark Zuckerberg).

The relevance to UWA is that even a massive increase in resources is unlikely, in itself, to improve quality of teaching. A significant obstacle is the low priority given to teaching in a research-intensive university. To understand how this came about and the challenges in addressing the problem it is helpful to review the history of teaching and research at universities and their connection to prestige.

A historical perspective on teaching, research and university prestige

It's well documented that teaching - not research - has been the primary function of Western universities for most of their 900-year history[18], with studies leading to a career in the professions being the core expectation of students. Investigating patronage patterns at Oxford Colleges between 1300 and 1530, Guy Fitch Lytle found

> "*if a university degree could not assure students of good jobs after they graduated, the institutions faced imminent decline*" (1975, p.123).

Consistent with Lytle's finding, the university historian Hastings Rashdall has claimed

> "*the rapid multiplication of universities during the fourteenth and fifteenth centuries was largely due to a direct demand for highly educated lawyers and administrators*. *In a sense the academic discipline of the Middle Ages was too practical.*" (1936, p. 246).

Indeed as late as 1854 it was not controversial for John Henry Newman to argue against research at universities. In the preface to his famous text *The Idea of a University* (1854), Newman claimed a university's:

> "*object is, on the one hand, intellectual, not moral; and, on the other, the diffusion and extension of knowledge rather than the advancement. If its object were scientific and philosophical discovery, I do not see why a University should have students*…"[19].

Newman's view would not have raised eyebrows in Australia. Andrew Norton (2013) writes,

> *"[t]he original Australian universities established in the mid-19th century were to be places of scholarship – expertise in existing knowledge rather than original research. Though universities were conducting some research by the later part of the 19th century, the first Australian PhD was not awarded until the 1940s*" (p. 14).

As late as 1957, a young British academic arriving at UWA found that

> *"[t]he general atmosphere on the campus was that research was good, but it was what happened after one's teaching had been satisfactorily completed*" (Melville-Jones, 2012).

The extent universities were removed from research is remarkable. Robert Bell (1971) notes:

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[17] A paperback edition of the same book came out in 2007 with the revised title: Excellence Without a Soul: Does Liberal Education have a Future?

[18] The foundation of Bologna University dates back to 1088 AD, University of Paris was founded around 1150 AD and Oxford University in 1167 AD (source: Europe – A History by Norman Davies, Oxford University Press, 1996, p. 1248). The Guinness Book of World Records states "[t]he oldest existing, and continually operating educational institution in the world is the University of Karueein, founded in 859 AD in Fez, Morocco" (source: http://www.guinnessworldrecords.com/world-records/3000/oldest-university).

[19] Ian Ker, author of a Newman biography, contends Newman's opposition to research has been overstated. Ker claims "*Newman's concern is to argue that a university is for education, not as opposed to research, but as opposed to moral and spiritual formation*" (2011, p. 27)

> "*it remains a challenging fact that from the period 1700 to 1850, one of the greatest period of British intellectual, industrial, and scientific development, happened also to be the period when the universities were at their lowest ebb. The portraits of distinguished men, the magnificent old libraries and the current activities of particular institutions must not blind us to the fact that the majority of their inhabitants, during a considerable period of their existence, were in so sense part of any academic elite …*" (p. 68)[20].

Wilhelm Von Humboldt's educational reforms in early nineteenth century Germany revolutionised universities. Sociologist Jan Szczepanski has written Humboldt's idea of a university was that

> "*it should be an institution whose basic function consisted in the education of a creative elite having at its disposal scientific method as a powerful means of influencing people and institutions*" (1968, p. 419)[21].

Szczepanski goes on to say Humboldt's institutional innovation succeeded brilliantly:

> *"[t]here were no other research institutions at this time [in Germany], outside the university, and universities could assume unquestioned leadership of the intellectual world. The emergence of large-scale industry and the growing economic importance of science conferred on them the highest prestige of all the institutions in German society*" (p. 420).

As Szczepanski suggests, it is the connection of universities with material progress via their research activities that confers them prestige. Research outcomes manifest in progress towards specific goals, have discernible social impact, and are attributable to individuals and institutions.

The case that research not teaching drives university prestige is put forthrightly in The Great American University: Its Rise To Pre-eminence, Its Indispensable National Role, Why It Must Be Protected (2009) by Jonathan Cole:

> "*"What has made our great universities so distinguished is not the quality of our undergraduate education. Other systems of higher learning, including our own liberal arts colleges, compete well against our great universities in transmitting knowledge to undergraduates. At its best, undergraduate education in the United States is exceptionally good, and at its worst it is very poor, but this is simply not what distinguishes great universities from lesser one. Nor is it our training of graduate professional students the greatest in the world, although we do that very well in comparison with many other nations. In short, although the transmission of knowledge is a core mission of our universities, it is not what makes them the best institutions in the world.*
>
> *We are the greatest because our finest universities are able to produce a very high proportion of the most important fundamental knowledge and practical research discoveries in the world. It is the quality of the research produced, and the system that invests in and trains young people to be leading scientists and scholars that distinguishes them and makes them the envy of the world. This is true across the board, from the sciences and engineering to the social and behavioural sciences to the humanities. In fact, almost all truly distinguished universities create a seamless web of cognitive influence among the individual disciplines that affects the quality of the whole.*

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[20] Sir Eric Ashby underscores Bell's point in Technology and the Academics: An Essay on Universities and the Scientific Revolution (1958), stating "*although there has been no age since the time of Aristotle without its scientists, there was, contained within two generations in the seventeenth century, a unique flowering of genius which re-orientated the thought of Western Man … The history of this scientific revolution lies almost completely outside the universities. It is true that Harvey did the best of his work in Padua and Newton taught at Cambridge. But these circumstances were incidental to their discoveries. In no sense can the universities of Europe be regarded as instigators of the scientific revolution*" (p.4) Sir Eric notes *"[e]ven at the threshold of the nineteenth century, 113 years after the publication of Newton's Principia, institutions for higher education in Britain were still making practically no contribution to scientific thought*" (p. 6)

[21] Szczepański claims "*Humboldt's idea of the university was formulated in a period of crisis for traditional Prussian society, after the defeats at Jena and Auerstadt (1806) had destroyed the two most powerful pillars of the Prussian state: the army and a bureaucracy organised as an almost military order. … Humboldt was looking for a new basis of values and a new idle force which could provide his nation with a foundation for restoration and new greatness. His answer was: science, knowledge--Erziehung durch Wissenschaft. Scientific methods would open all doors*" (1968, 419).

> *That is one reason I believe you cannot build great universities without representation of the humanities as well as the sciences" (pp. 4-5)*"

Simon Marginson, Professor of Higher Education at the Centre for the Study of Higher Education, University of Melbourne concurs with Cole, remarking,

> "*[a]ll over the world, research is the driver of university mission and status, and for good reason. All else equal, strong research universities attract more resources and better academics; have a more advanced capacity in teaching; and offer more to governments, professions, industry, foreign universities and the brighter students from home and abroad*" (2005, p. 8).

The historical record supports Cole and Marginson. Universities gained their highest status when they turned to research subsequent to Humboldt's reforms. Daniel Fallon (1980) writes

> "*at the end of the eighteenth century universities in German-speaking Europe could be characterised as sites of rote disputation inhabited largely by pedants. Many genuine intellectuals regarded them with disdain. This situation had existed for at least a century, if one judges from instances such as the behaviour of Leibniz, who essentially wrote the universities off in the seventeenth century … Liebniz referred to universities as monk-like institutions concerning themselves with sterile fancies*" (p. 5)

The situation was no different in the United Kingdom, where standards of education at Oxford and Cambridge had deteriorated remarkably prior to the government-prompted reforms of the second half of the nineteenth century. Eric Ashby reports that at Oxford

> "*as late as 1852 the Regius Professor of Medicine reported that he had discontinued his lectures. He formerly had 10 students a year and the numbers had dwindled to 4. The Professor of Geometry gave tuition in his house to about 3 students a year. The Professor of Botany was obliged to give 12 lectures a year but there were often no students to attend* (p. 8) … *Eighteenth-century Oxford concentrated its teaching upon what even a fourteenth-century university would have regarded as only the pre-requisites of a university education*" (1958, p.9).

As late as 1868 Matthew Arnold, the English poet and cultural critic, described Oxford and Cambridge

> "*as places where the youth of the upper class prolong to a very great age, and under some very valuable influences, their school-education, yet, with their college and tutor system, nay, with their examination and degree system, they are still, in fact, schools, and do not carry education beyond the stage of general and school education*.[22]"

(In light of this unflattering description, it's ironic the University of Sydney, Australia's oldest university founded in 1850, should have chosen as its motto "*Sidere mens eadem mutate"*. The motto is intended to convey that "[t]he traditions of the older universities of the Northern Hemisphere are continued here in the Southern"[23].)

Humboldt did more than introduce research to universities, he recast the function of teaching. Teaching for the professions became secondary. In History of the University in Europe: (vol 3) Universities in the Nineteenth and Early Twentieth Centuries (2004), Walter Ruegg points out Humboldt's reforms were based

> "*on the liberal ideas of the theologian and philosopher Friedrich Schleiermacher. According to the latter, the function of the university was not to pass on recognized and directly usable knowledge such as the schools and colleges did, but rather to demonstrate how this knowledge is discovered, "to stimulate the idea of science in the minds of the students, to encourage to take account of the fundamental laws of science in all their thinking*. *The manner of student, the content of the teaching, and the relations of the university with the authorities were to be characterized by "freedom"* (p. 5).

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[22] Quote from Ch. 3 "Education" (p. 61) from Literary Lives: Matthew Arnold by GWE Russell available from the Project Gutenberg Ebook of Matthew Arnold http://www.gutenberg.org/files/16745/16745-h/16745-h.htm#page48

[23] Source of explanation of Sydney University's motto: http://sydney.edu.au/heraldry/coat_of_arms/motto.shtml

Ironically, in light of much commentary that MOOCs will overturn centuries teaching practice, MOOCs foreshadow not radical revolution but a return to Humboldt's vision. MOOCs facilitate what Humboldt envisaged (from Schleiermacher): freedom to learn and freedom to choose what to learn.

In Walter Ruegg's words:

> *"[i]n contrast to the student liberties of the medieval and early modern university, personal freedom, which offered students an academic education according to the Berlin University model, referred to study as the core of its activity and assigned it its own responsibility. Wilhelm von Humboldt took this as the basis of his idea of a university: "The university's domain is what man can only find through and within himself – insight into science. Freedom is necessary and solitude helpful to the self-act in its own understanding, and the entire outer organization of the university flows from these two points. Attending lectures is only secondary; what is essential is that for a series of years one lives in close connection with like-minded people of the same age, who are aware that in this same place there are many thoroughly learned people, dedicated solely to the elevation and diffusion of science …The teacher must produce everything he says before his listeners: he must not narrate what he knows, but rather reproduce his own way to knowledge, the action itself. The listeners should not only collect knowledge. They should directly observe he activity of intelligence producing knowledge and by observing it, learn how to do it themselves"* (p. 21).
>
> "*Both Schleiemacher and Humboldt – and consequently the followers of the so-called Humboldt university model – no longer saw the professor as a teacher who lectured on the current state of the art in an orderly textbook fashion, but rather as a model that the student should follow so that he might scientifically grasp an object in order to arrive at new, rationally scrutinized knowledge. At the very least, study should aim for the acquisition of specialized knowledge, as with the capacity to solve problems, which result in scientifically disciplined analyses of this specialized knowledge*" (p. 22)
>
> "*Thus, during the period discussed in this volume and at the universities based on the German university model, with the exception of medicine, there were no compulsory lessons with monitored attendance or check-up exams. Only at the end of the course of study was the candidate tested through academic or state exams in his chosen field. However, the way in which the individual acquired this knowledge was left entirely up to him. The student could put a plan of study together as he liked, and this is exactly what scientifically successful candidates for the diploma did, as their autobiographical information shows. They often had lectures and seminars outside their own fields, or certain Privatdozentsen might show them the way to new knowledge based on their own research. Freedom to learn and responsibility for oneself were thus no utopian ideals for the founding fathers of Berlin University. Rather, at universities that followed the German university model, the freedom of study bore its imprint until the middle of the twentieth century*" (p. 22)[24].

In time, the Americans adapted Humboldt's vision to create the teaching and research university that the world now seeks to emulate. German historian, Walter Ruegg, has remarked:

> "… *the higher educational systems of continental Europe have never been able to combine the general education of undergraduate scientific teaching a la Humboldt, as they do in the best Anglo-American universities*" (2004, p. 12).

Notwithstanding Ruegg's encomium, even in the "best Anglo-American universities" teaching and research have not received equal attention and resources. Jonathan Cole dates the founding of the American research university to 1876 when Johns Hopkins University was

[24] Over time, Humboldt's particular approach lost its effectiveness, as Daniel Fallon shows in his award-winning history The German universities: a heroic ideal in conflict with the modern world (1980). Fallon posits the German model couldn't cope with mass education. The system was designed to be, in effect, an apprenticeship in research for a small elite of talented students; the structures appropriate for research apprentices were not suited to delivering the masses of "job ready" graduates that a modern industrial economy demands or even the more general education that a student with inchoate aspirations and ideals may require. Two other likely contributing factors were that the German ideal of the heroic individual scientist did not square well with the realities of science based on research programs and that institutional features related to hierarchy stultified academic development of junior staff.

opened (Cole, 2011, p. 27)[25] and right from the start the overturning of American higher education priorities was evident. Andrew Delbanco reports

> "*Harvard philologist Francis James Child was excused, in 1876, from grading undergraduate papers in response to a job offer from Johns Hopkins*" (2012, p. 81).

By the end of the nineteenth century leading US research universities saw undergraduates as an unnecessary distraction. Delbanco notes

> "[*i[n the view of William Rainey Harper, first president of the University of Chicago, keeping college students around at all was "a temporary concession to the weakness of the founder" (John D. Rockefeller), who, inexplicably, had a soft spot for them*" (2012, p. 81).

Harper's view that undergraduates detract from the "real" business of the university is not an isolated one[26] (which perhaps explains American poet John Ciardi's quip that "*a university is what a college becomes when it loses interest in its students*"[27]). However, Harper's determined focus on research allowed him to achieve his goal of renown for Chicago in remarkably short time. Jonathan Cole observes:

> "*no more than a decade after he founded the University of Chicago in 1892 – using Rockefeller's money, in short order - William Rainey Harper, a tireless recruiter with a truffle-hunting dog's nose for talent, had made the University of Chicago one of the top five research universities in the United States*" (2011, p. 29).

In short, history shows the idea of a university – in particular, the relative emphasis on teaching and research – has changed over time and remains contestable. The notion a "true" university has this or that attribute is not supported by the historical record. We return to this point after reviewing how MOOCs will affect universities.

MOOCs and the awkward economics of universities

UWA Futures labels MOOCs a "disruptive technology", drawing on a concept from business strategy theory[28]. A disruptive technology is an innovation that initially facilitates a service (or product) "good enough" for customers who cannot afford the "high quality" service offered by established businesses. Over time the innovative service improves in quality to the point where it disrupts the established businesses[29].

In "hard-headed" analyses of universities it is common to characterise them as businesses offering a service to customers (a.k.a. students). Given this framing it seems plain that MOOCs undermine the universities' "business model". Why wouldn't students prefer a low-cost, conveniently accessible *Investment Analysis* course sleekly delivered by a world-renowned expert to a lecture by a distracted academic befuddled by the electronic lectern?

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[25] Harvard opened its doors much earlier, in 1636. Nevertheless, Cole states *"[r]esearch universities are for the most part twentieth-century institutions. Their growth can be traced to the last quarter of the nineteenth century; by the 1930s, the system's core set of values was in place*" (2011, p. 28).

[26] *"Derek Bok, who served as president of Harvard from 1971 to 1991, recalls that after he was named to the job but before he took office, he was taken aside by "an older man of wide experience who had held high posts in Washington, had served on boards of trustees, and now headed an academic institution of considerable reputation." The sage had a suggestion for a bold move by Mr. Bok: "While you are still in your honeymoon period and people are reluctant to be critical, why not announce your intention to do away with Harvard College?" Doing so, the sage said, would "acknowledge that teaching undergraduates has become an anachronism in the modern university. Professors are equipped to do research and to train their graduate students to do research. Teaching introductory economics to freshmen or European history to sophomores is a waste of talented scholars who should have no responsibilities to divert them from what they do uniquely well*" Extract from "What's Wrong With Harvard?" book review by Ira Stoll (*The Sun* newspaper, May 10, 2006).

[27] Quote from "Harvard has forgotten its students" (review of Harry Lewis' book "Excellence without a soul…") by Luther Spoehr *The Providence Journal* (25 June 2006).

[28] This subheading recollects Gordon Winston's (1999) paper "Subsidies, hierarchy and peers: the awkward economics of higher education" from which some concepts discussed in this section are drawn.

[29] The theory of disruptive innovation originated with Clayton Christensen. Chapter one of The Innovative University: Changing the DNA of Higher Education from the Inside Out (2011) by Clayton Christensen and Henry Eyring provides an accessible overview of the theory. The Innovative University includes engrossing histories of Harvard University and BYU-Idaho, a teaching only non-profit university which they hold as a model of excellence although BYU-Idaho is unlikely ever to feature within a few hundred rungs of Harvard in most popular ranking systems.

What the model of universities as businesses misses are the implications of: (i) universities' non-profit status, (ii) quality of education being a function of attributes of the student body ("student peers' effect"), and (iii) society's multiple expectations of universities. These aspects of universities mean that, as Gordon Winston (1999) pithily puts it, "*one who thinks a college is like any other business will look in all the wrong places*" (p. 33)[30].

Universities are (typically) non-profit because it reduces the incentive for commercially exploitative behaviour when the provider has to allocate time and attention to multiple objectives and quality is difficult to assess[31]. Further, non-complementary multiple objectives make efficiency difficult to measure, which is why two universities hailed as models for the future because of their efficient use of resources, for-profit DeVry University and non-profit BYU-Idaho, are teaching-only institutions.

In its (2010) report, "Winning by degrees: the strategies of highly productive higher-education institutions" McKinsey & Company, a global management consulting firm, lauds DeVry for being among eight universities whose "*best practices show how the U.S. can meet its higher education attainment goals without increasing public spending or putting more financial pressure on students*." A key element of DeVry's efficiency-maximising strategy in achieving what the McKinsey claims is "*higher education's core process* [sic] *of transforming freshmen into degree-holders*" (p.7) is its policy of eschewing "non-core activities" such as research. In a footnote, the McKinsey report states "[*r]esearch institutions, which are not the focus of our report, may consider research core to their mission*" (footnote 13, p. 14).

Other strategies adopted by DeVry include reducing "nonproductive" or excess credits because as the McKinsey report observes "*although excess crediting may give students extra educational benefit, it adds to the cost of a degree and so diminishes degree productivity*" (p.13).

Clayton Christensen and Henry Eyring show in The Innovative University: Changing the DNA of Higher Education from the Inside Out (2011) that non-profit BYU-Idaho achieves similar operating efficiencies to DeVry also by focusing only on teaching[32].

Universities like DeVry and BYU-Idaho fulfil a real need. They are excellent. However, the advice summarised in the headline of a recent (10 December 2011) Op Ed in *The Economist* "*University Challenge – Slim down, focus and embrace technology: American universities need to be more businesslike*" is impractical for research-intensive universities. In Buying the Best: Cost Escalation in Elite Higher Education, Charles Clotfelter (1996) points out

> "…*the university lacks any corporate goal other than the pursuit of excellence. When it comes to the research that it undertakes, the university has little to guide it other than an uncompromising devotion to the highest standards of inquiry. Limits do exist and compromises must be made, of course, but the official policies of any university provide few guideposts for making these compromises … the university's aim of excellence*

[30] Winston and Zimmerman (2004) note the model of a university as a business cannot account for the following features (some more salient in US colleges):
"[a] Colleges always charge a price that fails—significantly—to cover their production costs.
[b] They turn away a majority of potential customers who are willing and able to buy their product if they can.
[c] They don't expand output to meet persistent excess demand.
[d] They lower the price to attract one customer, replacing another who would pay a higher price.
[e] They judge institutional quality by how many customers they can turn away, and they may manipulate sales-admission policies to increase that number.
[f] They require elaborate application procedures before one is allowed to make a purchase.
[g]They practice extensive price discrimination not only to increase sales revenues but often to redistribute income among their customers" (2004, pp. 397-398).

[31] Henry Hansmann describes the economic basis for non-profits in his seminal (1980) article "The role of non-profit enterprises". The recent history of the University of Phoenix, a US for-profit university that had close to 600,000 students in 2010 and continues to have by far the largest number of students enrolled of any US university, shows the scope and limitations of for-profit universities (see "University of Phoenix to shutter 115 Locations" by Tamar Lewin *New York Times* 17 October 2012. An entertaining account of the same kind of issue is Nancy Mitford's famous expose of *Famous Writers School* : "Let us now appraise famous writers" (1970) in *The Atlantic Monthly*.

[32] See also Kim Clark's (2011) account of how BYU-Idaho met its institutional goals through a tightly focused strategy aimed at improving "*the quality of every aspect of the student experience— intellectual, personal, and social—and to educate students more deeply and powerfully so they can succeed in our globalized world*" (p. 23). Clark had spent over 35 years at Harvard University, including stints as Dean, when he answered the call to head up BYU-Idaho.

> *contains little that can be used to justify cuts in the same way a profit objective can be used to guide such decisions in corporations*" (1996, p. 253)[33].

The point is the viability of research intensive universities does not rest on providing "the best education for the lowest price" as it were. This is implicit in Howard Bowen's famous *Revenue Theory of Costs*, sometimes referred to as *Bowen's Law*:

> "… *at any given time, the unit cost of education is determined by the amount of revenues currently available for education relative to enrolment. The statement is more than a tautology, as it expresses the fundamental fact that unit cost [i.e., the cost of education] is determined by hard dollars of revenue and* ***only indirectly and distantly by considerations of need, technology, efficiency, and market wages and prices***" (1980, p. 19, emphasis added[34]).

How does a research-intensive university get funded? Largely by the government, depending on much it is motivated by a premise elegantly stated in Richard Nelson's highly cited (1959) paper "The simple economics of basic research":

> "…*to the extent that we want our economy to remain competitive and want efficient use of basic-research funds, the laboratories of colleges, universities, and other non-profit institutions must perform a large share of our basic research if we are to put as much of our resources into basic research as we should*" (p. 305)[35].

Universities are, of course, not the only kind of non-profit research institutions. However, the disproportionate success of elite US universities post-WWII in winning Nobel Prizes and assuming intellectual leadership in many diverse fields has consolidated a view that universities provide the best environment to advance research[36]. Gieger surmises this is because

> "… *the scale and scope of universities would appear to produce some notable efficiencies. Universities are usually the lowest priced performers of advanced research. Overhead costs tend to be much less than those in independent or industrial laboratories. And when purchasing advanced, individualized instruction, business and government routinely pay prices that exceed those for even elite college education*" (Ch. 2, p. 51).

Reassuringly, the Australian government endorses the importance of a strong university system. In the White Paper (October 2012) Australia in the Asian Century National Objective No 12 states

> "*Australia will remain among the world's best for research and teaching in universities, delivering excellent outcomes for a larger number of Australian students, attracting the best academics and students from around the world and strengthening links between*

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[33] Economist Ronald Ehrenberg makes similar observations in "Adam Smith goes to college: an economist becomes an academic administrator" (1999) where he relates his experiences as a senior administrator and executive officer of Cornell University. The authors of the E&Y report "University of the Future" could have usefully read the extensive literature on cost containment in universities. It might have prompted a more nuanced analysis than the one that led them to conclude "there's not a single Australian university that can survive to 2025 with its current business model".

[34] Source: Wikipedia (http://en.wikipedia.org/wiki/Howard_Bowen last accessed 14 Feb 2012). The Wikipedia entry cites Bowen's (1980) book The Costs of Higher Education*:* How much do colleges and universities spend per student and how much should they spend?

[35] This argument is largely accepted. For instance, in their (2008) article "Research universities: core of the US science and technology system" Richard Atkinson and William Blanpied report "[o]f the $42,431 billion in research performed by the US academic sector in 2004, 61.5% was provided by the federal government, 19.3% from the institutions' own funds, 9.0% by private non-profit organizations, and approximately 5% each by industry and special state government programs" (p. 43).

[36] Atkinson (2006) describes the extent of US government support for American universities in the post-WWII period and the world-wide eminence the universities achieved: *"[t]he dramatic expansion of the university's teaching domain pales in comparison with the explosion of research and scholarship that has occurred since World War II, primarily because of the powerful funding relationship between the federal government and research in the university. (For our purposes "research" refers to scholarship in the humanities and social sciences, as well as in engineering and the physical and biological sciences.) In 1955, the U.S. spent $409 million in academic research (U.S. Department of Commerce, 1971); by 1989 that figure had climbed to $13.9 billion. In constant 1982 dollars, academic R&D expenditures climbed 54 percent between 1980 and 1989. Furthermore, in 1987, 100 universities received 83 percent of the total R&D funds granted to American academic institutions. These figures (taken from the National Science Foundation's Science and Engineering Indicators—1989) bespeak a very successful national effort. Whatever weaknesses may exist in other sectors of American education, the nation's research universities are the envy of the world; as centers of discovery and graduate and professional training, no other system compares with them*." (p.3- 4).

> *Australia and the region. … By 2025, 10 of Australia's universities will be in the world's top 100*[37]" (p. 171).

The White Paper also states:

> "*High-quality research is an important part of Australia's world-class university system. We are committed to supporting and expanding Australia's research capabilities to improve Australia's knowledge and skills base and to drive innovation*" (p. 172).

A national commitment (with associated funding) to retain and even improve on Australia's standing in university ranking systems based on research sees UWA relatively well placed to benefit as the fifth ranked Australian university in the ARWU's top 100. Nevertheless, given that much funding for research comes from student fees or by the government using student load as a basis for research funding[38] it is important to inquire: what attracts students to research-intensive universities? The answer to this question is also relevant to developing a response to the advent of MOOCs

In brief, the answer is, reputation, which is driven by research. In the US, Geiger notes,

> *"[f]or the top public research universities, research reputation appears to be a magnet for attracting superior undergraduates. The seven public universities with the highest numbers of high-ability students … are among the most highly rated public universities for research and doctoral education. The others are generally strong research universities with eminence in certain areas. Their reputations, especially within their own states, may attract talented students. However, if one were to look very far beyond the academically strong public universities, ratings and reputation slump and the number of top students falls below the 5 percent average. Put simply, public research universities with highly rated departments attract high-ability students, and those without them generally do not*" (Geiger, p. 91/92, ch. 3 Undergraduates)

The relationship between research reputation and attractiveness to students holds true in Australia as well. A (2011) study by Michael Beaton-Well and Ernie Thompson, The Economic Role of International Students Fees in Australian Universities, puts a dollar value on the "market" advantage of a strong research reputation:

> "*In 2009, international students contributed more than $5,000 each on average in premiums above the likely average costs structures of universities. This varied by institution, with students at some institutions contributing in the order of $10,000 each in premium … Correlation analysis is used to demonstrate a strong relationship (co-efficient between 0.83 and 0.90) between the level of premium and the level of research activity/quality at each university … There appears to be strong correlations between international price premiums and both research quantum (publications, RTS) and research quality (ACG, ERA). Although a circular, compounding relationship between these variables is to be expected, given reputational effects, it remains open to conclude that research activity and quality is being directly subsidised in Australia by international student premiums. It is also likely that research activity is additionally subsidised by other university activities where cashflows are available.*"

To summarise: (a) prestigious universities attract students (b) students are prepared to pay a premium for a degree from a prestigious university, and (c) prestigious universities are highly research focused[39].

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[37] Footnote seven on page 171 of the White Paper says *"[t]he 2012 Academic Ranking of World Universities placed five Australian universities in the top 100*". The reference to the ARWU suggests the authors of the White Paper had a largely research-based ranking in mind; the ARWU does not include teaching or learning in its ranking criteria.

[38] For instance, the Final Report (October 2011) of the Federal Government commissioned Higher Education Base Funding Review included Recommendation 15: "*In determining the ongoing allocation of the proportion of base funding provided to universities to support base research capability, the Australian Government could choose to continue to allocate this proportion on the current basis using student load; or to distribute this proportion of base funding on a basis that reflects variations between the institutions' research outputs*" (p. 92).

[39] Regrettably, to reiterate a point discussed in an earlier section, quality of teaching doesn't appear to contribute significantly to reputation and prestige. Ramsden and Moses (1992) report their investigation of the relationship between research and undergraduate teaching in Australia "*revealed typically no relation or a negative relation between teaching and research at the level of the individual and at the level of the department, across all subject areas*". Reflecting on their analysis, Ramsden and Moses observe: "*our findings suggest that undergraduate students who select their*

The entry by elite US universities in the MOOCs space has sparked anxiety that talented, ambitious students will simply get their degrees via MOOCs from the likes of Harvard and Stanford. This is unlikely for two related reasons. One is that the elite universities are not offering credit towards their degrees and are unlikely to do so[40]. The second is that an important input to education is the quality of one's student peers[41] and quality of peers is typically assessed by a university's selectivity in admitting students.

Winston (1999) points out the implications:

> " …*a firm that depends on its own customers to supply an important input to production will care very much about who those customers are and how well-equipped they are with the input that matters. If it can, the firm will try to control who its customers are. … Colleges exercise control whom they sell to by generating excess demand and then selecting the students with the characteristics they most desire from the resulting queue … Indeed, selectivity, as measured by the ratio of applicants to admissions is one of the most significant and sought-after descriptions of a college's educational quality – so much so that some colleges have aggressively manipulated the numbers*[42]*. High quality colleges are selective because that is the way they assure an ample input of student quality*" (p. 23).

UWA evidently subscribes to the importance of selectivity. In its "2009 Performance Portfolio" submitted to the Australian Universities Quality Agency, UWA states

> "[*a] focus on recruiting and graduating high quality students has been a long-standing objective of the University and is embedded in the University's major planning documents such as the University's Strategic Plan, Operational Priorities Plans and Education Strategies. UWA gives priority to attracting a high proportion of the top students in Western Australia" (p. 6). Later in the document UWA asserts "[t]he high quality of students at UWA, from entry to graduation, is integral to the University's mission and goals." It boasts "[e]ach year, UWA attracts first preference applications for admission from over 80% of the top 5% of WA school-leavers and over three quarters of the top 10% of WA school-leavers … From an international perspective, UWA admissions have a predicted equivalent SAT (Scholastic Aptitude Test) score of about 1370 (out of 1600). In a table of universities ranked on mean SAT scores, this would place UWA amongst many leading US universities [including Princeton, University of California at Berkeley and Penn State].*"

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programmes of study in the belief that high status, highly selective, highly productive research departments will provide the best teaching may be making a mistake. The most committed teachers are sometimes to be found in the less distinguished departments which paradoxically often have lower entry requirements. Although we have seen that good teaching and good research sometimes coexist, it is equally clear that scholarly prestige and extremely competitive entry requirements do not necessarily indicate excellence in teaching" (p. 294).

[40] Whilst an air of *noblesse oblige* attends elite institutions' hosting of MOOCs it's telling that MIT and Harvard, among others, do not provide students enrolled in their MOOCs with credit towards their degrees. Walsh (2011) spells out the reasoning: "[*b]y decoupling the traditionally "bundled" aspects of the courses they offer - providing digital versions of course content for enrichment purposes only, yet reserving credit for enrolled students - these universities maintain the scarcity that has defined their business model by limiting access, ensuring that admissions rates stay competitively low … Former MIT Provost Robert Brown recounted that in planning the OCW effort, the faculty subcommittee realized that "we're not trying to devalue the brand, we're trying to increase the brand. . . . So whatever you do, it can't be MIT, it can't quite be us*"". Walsh goes on to comment: *"[c]learly MIT and other institutions have determined that giving away their course content does not undercut the value of the traditional university experience, but giving away the credit might - suggesting that universities view their credit-granting role as an essential source of their value*" (from the non page-numbered pdf file of Unlocking the Gates, available at http://www.sr.ithaka.org/research-publications/unlocking-gates-how-and-why-leading-universities-are-opening-access-their).

[41] Systematic research confirms the influence of peer effect on educational outcomes. For instance, Winston and Zimmerman (2004, p. 418) report results that *"[add] to our confidence that peer effects exist and that the signs of those effects are in the direction that would motivate institutional selectivity - strong students tend to increase peers' academic performance, and weak students tend to reduce it*."

[42] Being a non-profit institution may blunt the incentive to hustle for commercial dollars but it doesn't eliminate the propensity to engage in sharp practice. Over the past few years, US higher education institutions have been caught out making claims that are closely analogous to the ways some financial sector have been alleged to "cook their books". See for instance, "Cheat sheets: Colleges inflate SATS and graduation rates in popular guidebooks – Schools say they must fib to US News and others to compete effectively – Moody's requires the truth" by Steve Stecklow 5 April 1995 *The Wall Street Journal*. Also, "Gaming the college rankings" by Richard Perepena and Daniel E. Slotnick, *New York Times* 31 January 2012

The importance of peer quality to education and the practical usefulness of selectivity as a measure of quality are two critical aspects of higher education that ensure highly regarded and selective universities will survive the advent of MOOCs. Indeed, MOOCs are likely to enhance the attractiveness of highly selective institutions. Economists John Bound, Brad Hershbein and Bridget Long posit

> "*as more workers are college educated, employers may view the average college-educated worker as less productive than in the past. Under this signaling type of framework, a degree from an elite college becomes more valuable*" (2009, p. 2).

Importantly, student enrolment data from the *Carnegie Foundation for the Advancement of Teachin*g indicate research-intensive public universities have prestige enough to attract a disproportionate share of students. In 2012, there were over 4,600 higher education institutions in the US. Around 208 universities (ie, 4.5% of the total) were classified as Research Intensive or Very Research Intensive institutions. These universities accounted for 4.6 million (ie, 22%) of the total population of 20.7 million higher education students. In Australia, ABS data show the Go8 universities accounted for 26.7% of all students enrolled in higher education institutions in 2011.

MOOCS: implications and possibilities for UWA

A frequent observation in discussions of MOOCs is that they portend unprecedented changes in the ways universities have operated for the past few hundred years. This observation is inaccurate in significant respects. Wilhelm von Humboldt's 19th century reforms introducing research to universities and the "massification" of higher education have been arguably much more significant developments than MOOCs. Indeed, as mentioned earlier, aspects of MOOCs facilitate a return to von Humboldt's ideal (two principal elements of his ideal being: "freedom to teach" and "freedom to learn").

Even the much-hyped advent of testing centres[43] where students can sit examinations that, if passed, will allow them get credit for MOOCs courses they have enrolled in is merely an update of a 19th century development: The University of London was for many years after its founding principally a federal examining body. In "Open Universities in 19th Century Britain" (1995) Robert Bell and Malcolm Tight report that following the University of London's adoption of a new charter in 1858, the University's exams were thrown open to everyone who studied anywhere in the world:

> *"[t]he University was no longer concerned whether its students had pursued a course of study at a recognized institution, or studied with a recognised tutor, or had gained their knowledge purely by self-study. All were to be allowed to enter the examination system on equal terms*" (p. 5).

I don't wish to downplay the significance of MOOCs, quite the reverse. They are a development to be celebrated because they make "freedom to teach" and "freedom to learn" a reality for a much more of the world's population than is presently the case. My point is that MOOCs do not threaten the viability of research-intensive universities.

If our principal objective is better learning rather better teaching at UWA, there is potential for academics at UWA to let students to do much of their learning via MOOCs (sourced from a variety of institutions) and use the time freed from teaching to devote our attention to those aspects of education that are our comparative advantage at UWA. For instance, I teach *Investment Analysis* and whilst I enjoy putting together and delivering my lectures to the 650+ students enrolled, it may be a more effective learning experience for the students if they were directed to alternative sources of material for much of the content and I focused on two or three extended case analyses that drew on my research. Another possibility is to attend more to aspects of education that relate to socialisation and development of values pertaining to the professions. We may even reconsider if the weekly lecture is necessary.

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[43] See for example "Into the future with MOOCs" by Kevin Carey The Chronicle of Higher Education (3 September 2012). Carey is director of the education policy program at the New America Foundation He claims colleges have a monopoly on the sale of college credits and with the advent of MOOCs "*some organizations will develop businesses devoted exclusively to credible, secure assessments of what MOOC students have learned*". Carey is right but well over 100 years behind the times.

I suspect we are still some years away from the time when readily available on-line courses offer the quality and range of content to allow the above approach to be adopted. However, there are clear indications that online courses are en-route to being capable of matching campus-based courses in effectiveness. The most compelling proof of concept comes not from the MOOCs offered via Coursera or edX[44] but in Carnegie-Mellon University's much more radically innovative Open Learning Initiative (OLI) that has received far less media attention.

The goal of Carnegie-Mellon's OLI

> "*has been to create complete online courses that enact instruction: they offer structure, information, activities, practice, and feedback all arranged so that students can learn even if they do not have the benefit of an instructor or classmates*" (Lovett, Meyer, and Thille, 2008).

Carnegie-Mellon President Jared Cohon has observed that

> "*what we set out to do and what we are doing is very different from MIT. I know what MIT's doing is not as simple as just dumping your syllabus on the web, but it's not much more than that: it's making available materials that already exist. We created a platform . . . that delivers a course, an educational experience—that's a very different thing*"[45].

A distinctive feature element of Carnegie-Mellon's Open Learning Initiative (OLI) is that there is extensive science behind its development[46]. OLI undertakes carefully designed evaluations of the effectiveness of its courses. Earlier in 2012, researchers from ITHAKA (a not-for-profit entity) released the results of an independent randomized trials evaluation of a statistics course developed by OLI. William Bowen, a former president of Princeton University who was also one of the researchers, reports two striking findings from the study:

> "*[f]irst, we found no statistically significant differences in standard measures of learning outcomes (pass/completion rates, scores on common final exam questions, and results of a national test of statistical literacy) between students in the traditional classes and students in the hybrid-online format classes."*
>
> *Second, this finding is relentlessly consistent across not only campuses, but also across sub-groups of what was a very diverse student population. Half the students in our study came from families with incomes less than $50,000 and half were first-generation*

[44] Indeed, notwithstanding all the publicity MIT has received from its participation in on-line education, the university has had cause for second thoughts. William Bowen, a former president of Princeton and pioneer and authority on online education, has recently (October 2012) observed that in "that "*MIT is today still paying the running costs of OCW each year, and we are told that the faculty and trustees of MIT are convinced that they cannot go down the same path again – their pride in OCW as a truly pioneering venture notwithstanding*" ("The 'cost disease' in higher education: is technology the answer?" The Tanner Lectures, Stanford University, October 2012 p. 33). An MIT website (http://ocw.mit.edu/donate/why-donate/) states MIT meets half the US$4 million direct cost of running OCW. It relies on donations for the remainder. I speculate that the more significant cost for MIT is the attention required of academics and other staff to keep OCW running. In short, MIT's values and incentives are not compatible with developing MOOCs It's a common problem for established institutions when faced with a new technology. For instance, Kodak invented the digital camera in 1975 and by 1993 had spent $5 billion on research and development related to digital photography yet in 2012 it filed for bankruptcy because it was not able to adapt to the market for digital photography. In "Disruptive technology: How Kodak missed the digital photography revolution" Lucas and Goh (2009) describe the entrenched organizational values, incentives and processes that crippled Kodak in developing an effective response to the disruptive technology of digital photography. They note "*Kodak is unique in that it developed and patented many of the components of digital photography, yet this new form of photography has had a serious, negative impact on the firm*" (p.46).

[45] Since Cohon made his observations, MIT has launched OCW Scholar which goes further than MIT's initial OCW progam to support independent learners. In the words of Stephen Carson External Relations Director, MIT OpenCourseWare: "*MIT faculty, staff and students work closely with the OCW team to structure the course materials for independent learners. These courses offer more materials than typical OCW courses and include new custom-created content. The Introduction to Psychology course provides a complete learning experience for independent learners, including lecture videos, reading assignments from a free online textbook and detailed notes from another book, interactive quizzes for each session, discussion content to elaborate key concepts, online resources for further study, review questions, and exams with solution keys*" (Source: http://web.mit.edu/newsoffice/2012/introduction-to-psychology-now-available-ocw-scholar.html 31 July 2012 last accessed: 2 Nov 2012)

[46] "Each of our courses is developed by a team composed of learning scientists, faculty content experts, human computer interaction experts, and software engineers in order to make best use of multidisciplinary knowledge for designing effective instruction. Moreover, as students work through the OLI courses, we collect realtime, interaction level data on how they are learning, and we use this data to inform further course revisions and improvements. In addition to this ongoing formative evaluation, we conduct formal learning studies on a regular basis" (Lovett, Meyer, and Thille, 2008).

> *college students. Fewer than half were white, and the group was about evenly divided between students with college GPAs above and below 3.0. The finding of consistent outcomes across this varied population rebuts the proposition that only exceptionally well-prepared, high achieving students can succeed in online settings*" (Bowen, 2012, p.28)

As far as I am aware, only Carnegie Mellon OLI's statistics course has been evaluated as carefully. However, other OLI courses are scheduled for evaluation. The other interactive courses developed (and available to anyone to access) are American English speech, anatomy and physiology, argument diagramming, biochemistry, elementary French I, elementary French II, engineering statics, introduction to biology, introduction to chemistry, introduction to psychology, logic and proofs, media programming, modern biology.

When OLI courses covering the gamut of our present units are developed and available - and my guess is it is a question of when, not if[47] - we will finally be able to make real Wilhelm von Humbold's vision of a university where, as noted earlier,

> *"[a]ttending lectures is only secondary; what is essential is that for a series of years one lives in close connection with like-minded people of the same age, who are aware that in this same place there are many thoroughly learned people, dedicated solely to the elevation and diffusion of science …The teacher must produce everything he says before his listeners: he must not narrate what he knows, but rather reproduce his own way to knowledge, the action itself. The listeners should not only collect knowledge. They should directly observe the activity of intelligence producing knowledge and by observing it, learn how to do it themselves".*

Concluding comments

MOOCs are a side-show to the viability of UWA as a research-intensive university. The achievements of research-intensive universities make them attractive to students and to governments who finance them. This isn't speculation, it's a summary of the way it is[48].

The best pedagogy for UWA's students must be consistent with UWA's research ambitions. UWA Futures proposes that

> *"… every student receives a level and quality of personal support and advice that will differentiate the student experience at UWA from that provided by other physical and virtual universities. … [and] that all our students engage actively with academic staff and fellow students in their learning both on and off campus…*".

The devil is in the interpretation. If the above implies a "hand-held" walk through three years of a UWA undergraduate degree where we rely on students to advise us of the support they require, there's no feasible way for UWA to maintain or improve its research reputation. If, on the other hand (so to speak), we identify our capacity and set out our expectations and standards clearly we can create a university environment that's enriching for each student who welcomes the challenge we provide.

It's possible to have a constructive extended discussion involving the whole university whilst we identify the pedagogical approach that fits us best. Kim Clark, a former Dean of Harvard Business School, implemented a consultative process at BYU-Utah that took about two years to

[47] There's no guarantee all courses developed using Carnegie Mellon's OLI approach will prove as effective as its statistics course but equally there is no strong basis to be skeptical. One oft-cited hurdle is cost. The state-of-the-art Carnegie-Mellon OLI courses are expensive to develop. Joel Smith, a former head of Carnegie Mellon's Office of Technology for Education, is reported by Taylor Walsh as stating "*OLI has hit a wall in terms of its ability to lower the cost per course, and that it will probably not dip much below $500,000*". Walsh conducted that interview in 2008. In 2011, in a paper co-authored with Candace Thille, the Director of the Open Learning Initiative, with the provocative title "Cold rolled steel and knowledge: what can higher education learn about productivity?" Joel Smith makes the case for expecting substantial efficiencies in developing OLI-style courses.

[48] Philip Altbach (2011) Director of the Center for International Higher Education at Boston College, believes "*because research universities are central institutions in any knowledge- and technology-intensive society and because they are seen as the key to a world-class higher education system, their future is reasonably bright ... The fact is that modern societies cannot do without them*" (p. 72).

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accomplish (see Clark, 2011). There are other similar examples. The process does take time but outcomes are more enduring because (to use a business cliché) “everyone buys into it”.

UWA’s institutional ambition is to be amongst the top 50 universities in the world in 2050. We boast often of our place in the ARWU top 100 but are reluctant to commit to it as our measure of performance for 2050. Waiting to see which measure is in vogue in 2050 is an uninspiring approach that fails to give direction when we need it most. Identifying what we stand for is the most pressing problem facing UWA, not MOOCs.

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