Graduate Education Challenges: Where Do Technologies Fit In?

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Educational technology has revolutionized almost every facet of education: from the way in which classes are delivered to how lectures are accessed and learning is experienced. It could easily be argued that technological capabilities of the modern university in administration, research, and teaching uniquely delineate their opportunity horizons. In this paper I would like to make some broad comments on the Summit topic of "graduate education and promises of technology," including some observations specific to Australia.

If forced to rank key Australian challenges in graduate education, I doubt the question of technology would be either on my list or that of fellow leaders in graduate education. Our preoccupation is mostly with the issues that are shared globally: funding of graduate education, pathways into PhD programs, completion times, improved industry partnerships in the context of graduate education, and the overall quality of graduate student experience. There are probably a few more topics that could be added to the list, but they are not likely to include any specific technology-driven issues (or at least they would not be *seen* as such).

In Australia, we have a solid informational and technological infrastructure which helps us connect our researchers with educational and research opportunities around the globe. Informational and technological platforms are so intrinsically linked to day-to-day educational and research components of graduate education that they tend to – rightly or wrongly – blend into background. This does not mean that technology is of no relevance. It simply means that it can no longer be treated as separate from the educational experience. This apparent invisibility of technology is misleading because it in fact drives virtually every facet of graduate education.

For the purpose of this discussion, I would like to divide technology used in graduate education as falling into five categories: a) critical administrative systems technologies, b) research-enhancing, c) value-adding, d) curricular, and e) cutting-edge technologies. In practice, these categories can never be neatly separated.

Critical Administrative Systems Technologies

There is a vast range of administrative systems technology infrastructure which supports graduate education processes. In the context of ever stronger global and national competition for graduate student talent, this infrastructure is gaining in importance. It includes the admission systems, promotional web-based interfaces, and candidature management and examination tools. The visibility of the institution and its graduate program, the speed with which technology-enabled systems convert expression of interest into offer, and the experience of the graduate studies applicant in navigating application processes, make for critical elements of competitiveness. As graduate education leaders we often focus on vision and innovative approaches to graduate education but the neglect of these critical technology-driven administrative systems may prove disastrous.

Research Enhancing Technologies

It is practically impossible to imagine a graduate research project bereft of technological tools, which may range from a mandatory computer to perhaps electronic microscope and even

synchrotron. In many fields of research, the "big toys" are the prerequisite component of research generally and graduate education in particular. Technological infrastructure is both an enabler of graduate projects, but also an institutional pull factor for graduate students who may require technology to execute their projects. Access to technology is also often a key driver behind the partnership between universities and industry – a partnership often utilised for the benefit of graduate students.

Value-Adding Technologies
These are technologies that serve as critical enablers of good practice in graduate education. They enable graduate alumni tracking, evaluate graduate experience, or measure bibliometric outputs. They provide a feedback loop to the graduate education portfolio, but also add value and benefits to the institution as a whole. As a rule of thumb, we would say that universities which excel in the utilisation of these value-adding technologies tend to be the ones that lead innovation in graduate training.

Curricular
As the agenda of this meeting suggests, many institutions offer online programs and combine these with traditional delivery of education. Importantly, these online programs may not be seen as exclusively limited to the use of graduate students, but may be used to support the professional development of graduate supervisors, as is the case at my own institution. The very same technology interface can thus be beneficially utilised by both graduate "teachers" and "learners."

Cutting-Edge Technologies (e.g., MOOCs)
MOOCs perhaps deserve a separate category, because they are on the cutting edge of the educational horizon. Nevertheless, MOOCs are not a "technology" but simply technologically-enabled educational offerings. In fact, they share a lot in common with curricular technologies, but their rapid rise and potentially revolutionary impact on almost every aspect education (from learning, assessment to cost/access) dictate a special mention. Although much has been written about the MOOCs (Bowen 2013) very little commentary has been given to MOOCs in the context of research graduate studies. On the face of it, MOOCs could be easily adopted for taught components of graduate training; yet, they appear antithetical to research-based components of graduate programs which are inherently predicated on unique encounters with highly specific research problems. In Australia, which is becoming rapidly MOOC-isied (Guthrie 2013), one clear possibility for the introduction of MOOCs into graduate education is in relation to professional development components of graduate programs where institutional uniqueness does not play a critical role. For example, there are opportunities to develop MOOCs on topics such as grant writing and time management skills, which could easily cut across sector needs. These would be particularly useful where the content is dictated by regulatory requirements (research integrity) or industry needs (research commercialisation) and where MOOCs could be rolled out at a national or university-alliance level. Yet, this is largely an unchartered territory albeit one which should be traversed soon if the full potential of MOOCs is to be realised.

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The purpose of this commentary was to fundamentally highlight the extent to which technology is actually immersed in, and integral to, educational effort. Graduate education is no exception. I simply endeavoured to highlight the need for us to understand technology in all its manifestations, in so far as they relate to graduate education effort. Although educational technology must be taken seriously, we should avoid what social scientists call

"technological determinism" – an excessive fixation with technology where technology becomes an end in itself. It is essential that we understand technology for what it is: an opportunity for improving every single facet of educational opportunities. As such, educational technologies must always be understood *relative to* the educational context and aims. If they are not, we easily miss the point.

References

Bowen, W.G. (2013) *Higher Education in the Digital Age*, Princeton University, Princeton.

Guthrie, J. (2013) 'MOOCs and the corporate World', *Campus Review* 23(8): 26-7.