

The search for balance in the design and delivery of an Australian IT professional masters degree

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Abstract

This paper describes how one industry-university partnership in the design of a masters degree is connecting university IT academics with professionals from diverse fields to design an online professional program that links theory to practice. Through this curriculum students benefit by having hands on industry experience, while academic staff are extended by the interface with professionals in cutting edge IT fields. Students are exposed to a range of skills that encourage discovery and experimentation while building solid knowledge of employer expectations. The paper reports on stakeholders' perceptions of the quality of the course, the balance of theory and professional skills, and how quality can be maintained within the industry partnership.

Introduction

When news was first released in November 2002 that Charles Sturt University was starting up a professional post-graduate program for IT practitioners and that half of it was based on workplace experience and skills assessments that were taken with a software vendor, a feeling of scepticism spread about the design and balance of the program. Many academics questioned the motives driving the program, with some labelling it a “sell-out” or “watering down” of academic standards. Firstly, it was allowing prior related work experience to replace a bachelor’s degree and secondly, the use of industry certification to replace half of its traditional, university-based, masters coursework!

There are three different Masters degrees being offered now at Charles Sturt University: A Master of Networking and Systems Administration, Master of Information Systems Security and Master of Systems Development under the *IT Masters* banner. A fourth degree, Masters of Database Administration and Management is expected to start very soon as reported by Cameron. (*IDG Data*, 17 November 2003).

The enrolment numbers from working professionals who have worked for years in the industry is very encouraging, as it has led to a diverse student body. This has pushed the total IT Postgraduate onshore student numbers at Charles Sturt University from 160 to 471 in 2004, according to *The Good Universities Guides to Postgraduate Courses 2004*. The implications of this change are discussed in this paper, and issues include questions of balance and relevance in the program and assessment tasks, perceptions of stakeholders on these issues and how the program can continue to evolve and develop.

Demand, internationalisation and student diversity

Placing IT degrees in the context of current demand is important as it puts in perspective the need to plan ahead for quality programs that cater for a domestic and international market. The demand for places in the IT industry in the years 1999-2001 was also attributed to the immigration policy at that time. O’Keefe (2004) reported that: “The immigration reforms were prompted by labour shortages in accounting and information technology in the 1990s. Amendments included awarding credit points for completing studies in Australia, dropping occupational experience requirements and waiving the condition that hopefuls must go offshore to apply for residency.” (p. 27). The same report states that successful on-shore visa applications had soared from 5,480 in 2001–02 to an estimated 12,000 for 2003–04.

Birrell in Dodd (2004) agrees with O’Keefe’s view in that “the spectacular success of Australian universities in boosting foreign student numbers in the past four years may be due more to immigration incentives than to the inherent attraction of an Australian education.” Dodd (2004) said: “From 2000 to 2003, the number of international students enrolled in Australian universities jumped 73 per cent to 136,000 (p. 37).

One would infer that while the number of IT students in the few years after the year 2000 had increased but they were primarily made up of international students who had come to study in Australia. However, many more domestic students had gone to fill up positions in industry in those years.

Moldofsky (2004) states that China sent the most students to Australian universities: accounting for 22,000 out of the 115,000 international students. However, she says that these mainland Chinese students just come to work hard and achieve the educational outcome. "Achieving a high score on the IELTS English language test allows Chinese students to study in Australia, doesn't guarantee that they can keep up in the classroom or converse with their local counterparts" (p. 37) Hence, the IT industry never benefited from the student labour market. The different qualifications held by these student-workers were also never recognised.

This could be the main reason why there is a boom in these IT Masters courses now. The many domestic students who have worked in the industry without a first degree are now signing up for a masters degree.

Policy and trends impacting on IT degrees and training

In 2004, when the Department of Immigration and Multicultural and Indigenous Affairs (DIMIA) withdrew information technology as one of the occupations in their "major occupations in demand list" this caused a drop of foreign students wanting to study in Australia.

The worldwide bust of the dotcoms as well as the post-Year 2000 bug issue has also flattened out the need for additional IT staff to cope with the demand in upgrading computer hardware and software or in software development areas. Cheaper skilled labour in software development has also emerged in the Indian sub-continent. Overall, the decrease in work opportunities has forced many of those "in work" currently without a higher degree to move on and acquire some form of learning that will take them to the next level.

Philipson (2005) reported that: "Just a few years ago, to be "in computers" was something special but Y2K and the dotcom bust, the computer industry has fallen to earth. Job prospects are bleak, salaries falling; enrolments down and work moving offshore." Having a professional IT Masters program seems to be appropriate at this time. Wilson (2003) reports that Pratley, the dean of the faculty of Science and Agriculture as saying: "The university works with industry across many disciplines. We have our own cheese factory for food science, a winery for the wine science program, a farm for our agriculture program and a NATA-accredited laboratory for science. We try to mix with industry when we can. The university also mixes it with industry by allowing people who don't have degrees to take masters courses if they are deemed to have sufficient industry experience — but some don't think that it is going far enough" (*Sydney Morning Herald*, p. 9).

The apprehensiveness of the professional IT body in accepting a new program such as the IT Masters may also be echoed in West (1998) who quotes Goldstein which states that "criticism has been made of sociologists of professions, for treating professional bodies of knowledge as 'givens' and 'placing the constitution of professional knowledge outside the purview of their investigation'.

In current literature, Beer (2005) remarks that the Australian Computer Society has been criticised for trying to be the Certified Practising Accountants (CPA) of IT. He states that: "IT graduates are not in demand compared to accounting or engineering graduates. According to the 2004/5 Australasian Graduate Recruitment Survey published last November by the Australian Association of Graduate Employers, only about 50 per cent of 45 of the leading graduate employers surveyed were going to hire IT graduates."

If this is a statement to go by, the poor demand for IT will take an even steeper slide. However, Beer balances this by stating that the IT Contract and Recruitment Association (ITCRA) has presented a submission to Immigration Minister Amanda Vanstone calling for an increase in temporary skilled migration by at least 10 per cent. Norman Lacy, the ITRCA executive director was quoted by the same author to say that "If Australian IT professionals cannot get jobs in this market, it's their own fault. It's a profession where you have got to constantly up-skill yourself ". Philipson (2005) quoted Edward Mandla, the president of the Australian Computer Society as saying "Students will continue to abandon IT as a career, with recent research showing they have little understanding of the various IT roles available and where IT can take them." He continues to say that the problem is compounded by the lack of a training culture in the IT departments of many big corporations. Hence, there seems to be a place for the IT Masters program that combines on the job experience, industry certification and an academic study component ... at least for now.

Flexibility in learning and assessment

Increasingly, in the UK, USA and Australia, institutions are engaging in partnership with other institutions, with industry and other agencies in order to achieve efficiencies in program delivery, quality enhancement and productivity (Michael & Balraj, 2003). While this trend has been highly successful, it has not been without some difficulties. For example, over the years, the availability of dubious certificates has been widespread in computer networking and systems companies. Chong (2002) revealed that “there (referring to a website), numerous vendors peddle fake degrees and certificates from universities and reputable companies, such as IT heavyweight Microsoft” (*Straits Times Singapore*).

To ensure quality in certification and assessment, the course at Charles Sturt University provides firstly recognition of prior learning to IT professionals, and also offers a unique online examination method, similar to those offered by Microsoft, Sun and other software vendors certifying their technicians and administrators worldwide. Both of these ingredients ensure that the courses are flexible and accessible.

The examination is based on an “on-demand” basis. Potential candidates make an appointment for the exam and the electronic modules are loaded into a computer at an authorised centre. Candidates then provide pre-approved identification. The exam is conducted online after security details have been verified. A camera records the entire proceedings. Full flexibility in exam dates and times, within that window period, are provided. Questions of multi-level difficulty levels are then extracted from a central bank. The students submit their answers via that computer. Multiple-choice answers are graded electronically and some of the short answer questions are first marked by machine, then re-checked by academics. Essay type questions are marked in the traditional manner.

Many software vendor certification exams are conducted in the same way, except that all of them contain multiple-choice questions and are completely electronically marked. Certificates are also generated automatically if the pass mark has been achieved. Hence, the Charles Sturt University IT Masters program examination style already strikes a chord with the many busy students who have enrolled in this course.

Fidelity to Academic Standards

The structure of the IT Masters programs is designed to balance academic, professional and enterprise skills. Wilson (2003) stated that: “only half of Charles Sturt’s masters course is industry-based. Academic topics in the multi-vendor stream include IT ethics, IT risk management, interconnecting network devices, designing a secure distributed network, operating system essentials and network security fundamentals. (*The Age*, p. 8). The actual structure of the program Master of Networking & Systems Administration is shown in Table 1:

Table 1: Program Structure — Master of Networking & Systems Administration

Academic units	Industry units (Microsoft)
<ul style="list-style-type: none"> • ITC511 Networking Concepts 1 • ITC512 Networking Concepts 2 • ITC513 Wireless Networking Concepts • ITC514 Network & Security Administration • ITC593 Network Security • ITC506 Topics in IT Ethics 	<ul style="list-style-type: none"> • ITI555 Operating System Essentials • ITI556 Supporting a Network Infrastructure I • ITI557 Supporting a Network Infrastructure II • ITI558 Active Directory Infrastructure • ITI559 Designing Active directories & Network Infrastructure • ITI516 Administering a SQL Server

Table 2: Master in Information Systems Security

Academic units	Industry units (multi platform)
<ul style="list-style-type: none"> • ITC511 Networking Concepts 1 • ITC506 Topics in IT Ethics • ITC593 Network Security • ITC595 Information Security • ITC596 IT Risk Management <p>Electives (choose any two):</p> <ul style="list-style-type: none"> • ITC443 Database Management • ITC505 Systems Development Project Management • ITC514 Networking & Security Administration • ITC563 IT Management Issues • ITC566 Human Computer Usability 	<ul style="list-style-type: none"> • ITI555 Operating System Essentials • ITI521 Interconnecting Network Devices • ITI551 Virtual Private Network & Firewall Management I • ITI552 Virtual Private Network & Firewall Management II • ITI555 Operating System Essentials • ITI556 Supporting a Network Infrastructure (I) • ITI581 Network Security Fundamentals

The courses are also authentic learning programs that enable students to develop “know how” or procedural knowledge, which is essential; in the professions (Bennett, Dunne, & Carre, 1999; Oliver & McLoughlin, 2001).

The following sections seek to explore the important quality components of this program: recognition of prior learning (work experience), vendor certification, academic assessment issues and finally, national demand and the university link. Wilson (2003) attributes the course success to the recognition of prior learning such as four years IT industry experience as alternative entry qualifications and the combination of major industry certifications embedded as credible units (*Sydney Morning Herald*, p. 9). However, others felt that a basic degree is required at point of entry for a masters degree.

Recognition of prior learning

The course demands an entry with a minimum of four years experience in the IT industry or a Bachelors degree with two years experience. The former entry requirement is attractive to those who went to work due to the lucrative years where “demand outstripped supply” in IT professionals in the years 1999–2001. Yelland (1999) revealed that “the Australian Information Industries Association (AIIA) estimates that about 30,000 IT jobs are unfilled due to a skills shortage and this is worsening due to a brain-drain to the United States and Britain” (p. 1).

This artificial demand in the industry situation forced many domestic students out to the market to work in the information technology industries in those years due to the attractive salary options, rather than to enrol in a three-year undergraduate degree.

Michael Fry, the Dean of the Faculty of Information Technology at University of Technology in Sydney, was quoted by Thomler (2001), to say that the university was staggered at the demand of postgraduate IT course applications. He said that: “we are looking at 1,000 overseas applications alone. The real problem is getting enough staff to teach”. This effort also goes on beyond the face of the “accepted students”. There are also the hundreds of rejected applications that have to be processed at taxpayers expense when DIMIA has to process each visa application — checking for fraudulent support documentation and claims.

The focus of the universities turned to meet the influx of foreign students and locally, the interest generated by the dotcoms and high salary scales attracted many more to work. The artificial demand associated with the Y2K (Year 2000) computing problem and its associated fear of computers not working properly have now gone away. Hence, we have a large group of IT workers who have all the various industry certificates but no academic qualification.

Wilson (2003) mentions that: “those with real IT experience but no degree were being discriminated against in favour of people who had non-IT degrees and little IT experience” (*Sydney Morning Herald*, p. 9). In the same report, the Dean of the Faculty of Science and Agriculture at Charles Sturt University was quoted by the same writer to say that university records indicate that 25 per cent of the course’s intake crossed the line on industry experience rather than a previous degree, although many held various certificates.

Vendor certification and assessment issues

Industry certification has always been viewed with some suspicion. Argetsinger (2001) reported that Patricia A. McGuire, president of Trinity College as saying: "People are now realising they can get what they want to further their careers without writing a thesis." The report adds: "certificates remain largely unproven quantities. The course requirements vary greatly from subject to subject and from program to program. They have received little monitoring so far from government or accrediting organisations and many are so new that they can't yet point to a track record of their graduates' achievements."

Cost is also a major issue in the re-working of assessment items to be in tune with technology and industry. Urquhart et al. (1996) mentioned that "there has been a considerable commitment of resources, both in terms of teaching time and the energy and enthusiasm of individuals involved. The key question is whether the institution gets back a return on this investment".

In the area of academic assessment, universities have also been asked to tighten up. Way (2002) highlighted that the New South Wales Independent Commission Against Corruption (ICAC), titled Degrees of Risk has mentioned this clearly. Under a report "A corruption risk profile of NSW universities" handed down in August 2002, the concluding point is "The impression is that, while universities are busy in the education marketplace, raising revenue and attracting students, little time is left for things such as internal monitoring and accountability, and the checks and balances needed for policy implementation and adhering to procedures and good record keeping."

Research in the area of quality assurance provides some insights into other obstacles and considerations that need to be taken into account. For example, several authors (Phipps & Merisotis, 1999; Fallah & Ubell, 2000; McLoughlin, 2003) mention Russell's (1999) "no significant difference" claims that despite technological innovations, no measurable improvement has emerged for learning outcomes in technology supported environments. While it is claimed that the Web does offer new opportunities for learning activities, assessment practices must be reframed and reconsidered as part of a holistic approach to curriculum design and pedagogy. The masters program is deigned with these considerations in mind.

Methodology and data collection

Based on the review of literature and their own observations and experience as tertiary educators, the authors put forward the following theses as basis for further research:

- i. In the view of stakeholders, a balance of 50% (total 8 subjects) in the industry stream and 50% of academic subjects is more effective than 100% academic subjects.
- ii. Students are taking the IT Professional Masters degree because a university degree is better recognised than industry certification.
- iii. Stakeholder perceptions, (students, academics and industry) is that one of the greatest strengths in the professional IT Masters degree is industry involvement and real life experience.

An online survey was carried out among students who had completed or were enrolled in the professional IT Masters program to seek their perceptions of the following areas: the balance of academic vs workplace units of study, relevance of the program to the IT profession, recognition of the degree in the profession, level of preparation provided for work in the industry. The online survey was sent to 300 students, all lecturers and 15 major employers of the graduates from the program. Data was collected online and tabulated. In addition, qualitative data was collected in the form of open-ended responses and comments following the questions asked.

Table 3: Summary of results

Focus questions	Students n=148		Lecturers n=11		Employers n=12	
	f	Percent	f	Percent	f	Percent
Current course content mix of 50% academic and 50% industry subjects	136	92.50%	11	100.00%	10	83.30%
<i>All stakeholders are in agreement of this mix</i>						
Academic subjects provided are relevant to the IT industry	112	77.77%	10	90.90%	10	83.30%
<i>Students largely remain sceptical of the role of academic subjects</i>						
Industry subjects provided are relevant to the IT industry	140	95.23%	10	90.90%	10	83.30%
<i>All stakeholders are aware of industry subjects relevance</i>						
The course has provided new skill acquisition	138	93.87%	11	100.00%	9	75.00%
<i>25% of employers are not convinced of new skill acquisition</i>						
Strength of the professional IT Masters degree is industry involvement and real life experience	137	93.19%	11	100.00%	10	83.30%
<i>Explanation why the degree sells well!</i>						
Recognition of a professional IT Masters degree vs industry certification	114	78.62%	11	100.00%	9	75.00%
<i>25% of employers are not convinced of the value of an industry masters degree vs an industry qualification</i>						
I would be prepared to pay a higher salary to someone who has both industry and academic qualifications					11	91.67%
<i>While employers are not totally convinced of new skills acquisition, they are still willing to pay a higher salary to a professional IT Masters degree holder. 10 strongly agreed, 1 agree.</i>						

Results: Critical success factors

The results showed that in the opinion of all stakeholder groups, the program was appropriate for graduates entering the IT profession, and that it prepared them for the world of work. All agreed that the balance of academic and professional content was effective, planned and relevant. Students were overwhelmingly positive that the degree provided new skills, relevant experience and subjects appropriate to the IT profession. An interesting finding was that employers were not convinced of the value of an industry masters degree versus an industry qualification. However, while employers were not totally convinced of new skills acquisition, the majority admitted that they are still willing to pay a higher salary to a professional IT Masters degree holder.

Conclusion

The challenge is for Charles Sturt University to transform the traditional teaching of the masters degree into a unique experience, something that also blends the prior learning skills of the students into its distance education materials. This ability to “move ahead” is important so that more research in this area will generate better quality teaching materials for professionals not only in the information technology industry, but in the allied health areas or education.

Wilson (2003) has already reported the practicality of the IT Masters program: “Through Microsoft, the university has gained access to a huge market at negligible cost, and its recognition of prior learning probably triples the number of potential applicants. Jim Pratley’s peers had better watch this space. And so should Sun Microsystems” (*Sydney Morning Herald*, p. 9).

The challenge now is to how it can improve its IT Masters program beyond the pure delivery of current Microsoft, Sun or Cisco and a combination of its distance education modules. This improvement should come from feedback and participation from its *professional* students in addition to the standard evaluations conducted by academics, based on the syllabus/content prescribed by the software vendor or from the Australian Computer Society. This would certainly make the university a leader again in the development of its courses for the professionals who want to upgrade their skills. For this to occur, there needs to be a rigorous system of quality assurance accompanied by benchmarking with other institutions along the lines suggested by McLoughlin and Visser (2003).

And perhaps, other universities offering similar programs could advise Microsoft and other vendors on the rollout of its certification program and the online methodology in which it uses to impart technical knowledge to its end-users. The successful balance of joint industry and university participation in the creation of a professional degree can be achieved if both partners are open to issues of employability of graduates, currency of skills, demand for IT workers who can combine theory and practice. It is a model of course development that can be extended and improved through active collaboration, partnership in establishing quality assurance frameworks and joint responsibility between industry and academia.

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