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Combining academic and workplace learning experiences in the design of a professional masters IT degree

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Abstract: The paper is an example of industry involvement in tertiary learning and delivery of a postgraduate degree in IT, which contextualises the curriculum, and combines theoretical knowledge with practical work-based learning. The context of the study is a master's degree that utilises online learning and self-directed learning pedagogies. The design of the environment is presented within a framework for professional knowledge development and the tasks and forms of engagement that occurred in this empirical study are described. Critical success factors for engagement with industry in the co-design of the learning environment are reflected on.

Keywords: workplace learning, industry partnership, curriculum design

Introduction

Adult learning theory and higher education recognises that much learning does and should take place in the workplace, and the importance of establishing workplaces as centres of learning is emphasised increasingly in higher education (Schultz, 2005). As a sound education is often seen as the key to employability and social inclusion, in many European countries national policies are formulated on linkages between education and workplace learning. Such policies are predicated on a linear relationship between education and work, with one as preparation for the other. Many Australian universities now offer workplace units of study for credit. Workplace learning often includes a variety of learning tasks, including opportunities that develop specific competencies, transferable skills and dispositions (Hodkinson, 2005).

In the provision of educational opportunities a range of partnerships can be created to support student learning. While universities have a particular role to play in responding to the need for high level skills because of their independent degree awarding powers, they may not succeed unless they can facilitate the development of innovative programs. In the same spirit, the Commonwealth Department of Education, Science and Training document *Higher Education at the Crossroads* (Nelson, 2002) has emphasised the need for universities to engage with their communities and with industry.

The interest in providing learning opportunities at work has also become more popular among employers with a growing emphasis on the workplace as a community of practice (Fuller, Hodkinson, Hodkinson & Unwin, 2005). In the wider view of the community of practice model, learning is seen as social activity, where a key characteristic is the nature of belonging (Wenger, 1998). These notions are associated with the idea of the learning society, lifelong learning, and the learning organisation, and have encouraged change within higher education in a number of ways. Firstly there is greater pressure on the universities to work more closely with industry in contributing to the processes of economic change and development.

Secondly, universities are expected to be increasingly flexible in their modes of delivery in meeting the lifelong learning agenda. Thirdly, the role of an increasingly wide range of organisations and agencies in meeting learning needs has been emphasised. This creates a challenge to the role of universities at this important time of change, and the recognition, on their part, of the need for adaptation and change if they are to avoid being marginalised with respect to meet the needs of a new generation of learners. In this paper, particular emphasis is placed on partnerships which involve industry stakeholders in developing curricula, learning tasks and forms of assessment that have direct input from practitioners in the field. The paper outlines the challenges and successes achieved by a industry-university partnership in designing a joint IT Masters program, and considers the broader theoretical issues and tensions in combining workplace learning with more traditional academic experiences for a diverse student body.

Context of the study: Demand, internationalisation and student diversity

There is currently a demand for accreditation in IT skills, which needs to be seen in historic perspective. The increased demand for places in the IT industry in the years 1999-2001 has been 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 reports state that successful on-shore visa applications had soared from 5,480 in 2001-02 to an estimated 12,000 for 2003-04.

Birrel 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 said that "From 2000 to 2003, the number of international students enrolled in Australian universities jumped 73 per cent to 136,000. (p.37)

Moldofsky (2004) states that China has 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 an 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 IT qualifications held by these student-workers were also never recognised.

Philipson (2005) reported that "Just a few years ago, to be "in computers" was something special but with 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 at CSU 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)

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. The demand for professional qualifications in IT is rising, and many Australian universities are responding to the challenge. Nevertheless, the apprehensiveness of the professional IT body in accepting a new program such as the IT Masters has been echoed in West (1998) who quotes Goldstein who 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’. This highlights the tension that has existed and still exists, in designing courses for the professions and in establishing the workplace as a legitimate site for learning.

Theorising work-based learning

World wide, higher education is changing rapidly and e-learning and blended learning solution are being used widely, with huge investment on the part of universities. In addition, there has been criticism of traditional teaching practices for their passive, surface approaches to learning whereby students seek to meet the demands of decontextualised and irrelevant assessment systems (Bennett, Dunne & Carre, 2000). The fast pace of change has redefined the kinds of skill needed in professional, commercial and academic life, with an emphasis in intellectual and personal transferable skills. Increasingly, there is a shift of thinking about the role of universities and their contribution to the creation of a skilled and educated workforce (Barnett, 1994). In the UK, trends towards new outcomes for graduates were emphasised in the Dearing report (Dearing report, 1997:1):

We see historic boundaries between vocational and academic education breaking down, with increasingly active partnerships between higher education institutions and the worlds of industry, commerce and public service.

In response to employer expectations and demands, many universities in Australia are now deliberately focussing of the development of generic skills, core competencies or graduate attributes. The key skills included in the mission statements of most universities tend to include higher level aims relating to critical thinking, inquiry and a capacity for lifelong learning. Generic skills described for university graduates include:

- skills needed to become a successful and self-sufficient learner. For example, information literacy, metacognitive skills
- intellectual and imaginative powers, understanding and judgement, problem solving skills, critical thinking skills and an ability to see relationships
- interpersonal skills needed for communication, cooperative and collaborative teamwork, and leadership
- skills for successful work practices including time management, task management leadership and self-evaluation

This increased focus on ensuring that graduates develop generic skills has brought about a reconsideration of the similarities of university and workplace learning. Billett (2002, p. 57) expresses this very clearly as follows: “Workplaces and educational institutions merely

represent different instances of social practices in which learning occurs through participation”. The design of the IT program in this study incorporated this principle.

Course structure

The structure of the IT Masters program is designed to balance academic, professional and enterprise skills. Wilson (2003) stated that “only half of the 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)
• ITC511 Networking Concepts 1 • ITC512 Networking Concepts 2 • ITC513 Wireless Networking Concepts • ITC514 Network & Security Administration • ITC593 Network Security • ITC506 Topics in IT Ethics	• 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

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). Achieving balance in the design of the program required cooperation from employers and university academics. 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 master’s degree.

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 inquiry into stakeholder perceptions of the course and the integration of industry involvement and real life experience.

- In the view of stakeholders, is a balance of 50% (total 8 subjects) in the industry stream and 50% of academic subjects is more effective than 100% academic subjects?
- Are students studying the IT Professional Masters degree because a university degree is better recognised than industry certification?
- What are stakeholder perceptions, (students, academics and industry) of the greatest strengths in the professional IT Masters degree?

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 (see appendix 1 for an overview of the questions asked of each stakeholder group). The online survey was sent to 100 students, all lecturers and 6 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. Results are presented in table 3.

Results and discussion

Table 3: Summary of results

Focus questions	Students n=48		Lecturers n=11		Employers n=12	
	f	Percent	f	Percent	f	Percent
Current course content mix of 50% academic and 50% industry subjects <i>All stakeholders are in agreement with this mix</i>	46	95.80%	11	100.00%	10	83.30%
Academic subjects provided are relevant to the IT industry <i>A percentage of students and industry stakeholders remain sceptical of the role of academic subjects</i>	37	77.08%	10	90.90%	10	83.30%
Industry subjects provided are relevant to the IT industry <i>All stakeholders are aware of the relevance of industry subjects</i>	45	93.75%	10	90.90%	10	83.30%
The course has provided new skill acquisition <i>25% of employers are not convinced of new skill acquisition</i>	45	93.75%	11	100.00%	9	75.00%
Strength of the professional IT Masters degree is industry involvement and real life experience <i>Explanation why the degree sells well!</i>	46	95.83%	11	100.00%	10	83.30%
Recognition of a professional IT Masters degree vs industry certification <i>25% of employers are not convinced of the value of an industry masters degree vs industry certification</i>	39	81.25%	11	100.00%	9	75.00%
I would be prepared to pay a higher salary to someone who has both industry and academic qualifications <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>					11	91.67%

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. However, the results also showed that some students remained sceptical of the value of academic subjects in the program. An interesting finding was that employers were not convinced of the value of an industry masters degree VS 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. There appears to be agreement among employers that the degree is perceived as having higher visibility and credibility than purely industry certification, but there is not wholehearted support for the academic component of the program. This is an area where continued dialogue between stakeholders will be essential.

Conclusion

Today, postgraduate professional development programs are much in demand and many universities are seeking to establish industry links. The challenge for curriculum design of the program transform the traditional teaching of the master's 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 partnership programs will generate better quality teaching materials for professionals not only in the information technology industry, but in the allied health areas or education.

The challenge now is to improve the IT Masters program beyond the pure delivery of current Microsoft, Sun or Cisco content and a combination of 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 in the development of its courses for the professionals who wants 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 researchers (McLoughlin et al, 20003, Oliver (2003). 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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Appendix: Instruments used for data collection

Identify yourself in the IT Masters Program

Student / Teaching Staff / Employer (circle one)

STUDENT QUESTIONNAIRE

Please indicate your degree of agreement from Strongly Disagree to Strongly Agree with the following statements:

SD – Strongly Disagree

D - Disagree

A - Agree

SA – Strongly Agree

The current content mix in the IT Masters program is made up of 50% industry stream subjects (Cisco, Microsoft, etc.) and 50% academic subjects (Ethics, Management, etc)

I enjoy learning both the academic subjects and the industry subjects, equally well.

The subjects taught in the **academic** stream are relevant to the IT industry where I am working.

The subjects taught in the **industry** stream are relevant to the IT industry where I am working.

I find that the **academic** subjects taught have not helped me in my job as an IT professional.

I find that the **industry** subjects taught have not helped me in my job as an IT professional.

The subjects that I have learnt in this Masters have equipped with new technical and/or management skills.

I took this degree because I feel that a professional IT degree is better recognised than an industry certification.

I think the balance of subjects in the professional masters better equips me to work in the IT profession as I am gaining real life experience

I am of the opinion that one of the greatest strengths in professional IT Masters degree is industry involvement and real life experience.

LECTURER QUESTIONNAIRE

Please indicate your degree of agreement from Strongly Disagree to Strongly Agree with the following statements:

SD – Strongly Disagree

D - Disagree

A - Agree

SA – Strongly Agree

The current content mix in the IT Masters program is made up of 50% industry stream subjects (Cisco, Microsoft, etc.) and 50% academic subjects (Ethics, Management, etc)

I enjoy teaching as much in the traditional masters subjects as in the industry masters subjects.

The subjects taught in the **academic** stream are relevant to the IT industry.

The subjects taught in the **industry** stream are relevant to the IT industry.

I find that the **academic** subjects taught to the professional IT Masters students have not helped them in their job as an IT professional.

I find that the **industry** subjects taught to the professional IT Masters students have helped not them in their job as an IT professional.

The subject/s that I have taught these students in this Masters have equipped them with new technical and/or management skills.

These students are taking the professional IT Masters degree because they feel that a degree is better recognised than industry certification.

The inclusion of professional skills in the IT masters degree is one of its key strengths.

I am of the opinion that one of the greatest strengths in professional IT Masters degree is industry involvement and real life experience.

EMPLOYER QUESTIONNAIRE

Please indicate your degree of agreement from Strongly Disagree to Strongly Agree with the following statements:

SD – Strongly Disagree

D - Disagree

A - Agree

SA – Strongly Agree

The current content balance in the IT Masters program is made up of 50% industry stream subjects (Cisco, Microsoft, etc.) and 50% academic subjects (Ethics, Management, etc)

The subjects taught in the **academic** stream are relevant to the IT industry.

The subjects taught in the **industry** stream are relevant to the IT industry.

I find that the **academic** subjects taught to the professional IT Masters students not have helped them in their job as an IT professional.

I find that the **industry** subjects taught to the professional IT Masters students have not helped them in their job as an IT professional.

The professional IT Masters degree has equipped them with new technical and management skills.

These students are taking the professional IT professional Masters degree because they feel that a degree is better recognised than an industry certification.

The inclusion of professional skills in the IT masters degree is one of its key strengths.

I am of the opinion that one of the greatest strengths in the professional IT Masters degree is industry involvement and real life experience.

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