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## Industry Certifications: Challenges for the Conduct of University Security Based Courses

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### ABSTRACT

*Currently we are seeing more and more universities avail themselves of information technology certification courses to deliver in the University in place of or parallel to more tradition forms of University education. This is occurring for several reasons none of which often have anything to do with sound educational practice. Some of the factors responsible for this including perceived need from stakeholders and the vendor's willingness to offer substantial financial incentives. This paper will explore the educational nexus that this emergence of industry based certification programs produces for universities in particular with a focus on security education.*

### INTRODUCTION

The rapid emergence of new security based certifications in the past two years coupled with their general industry acceptance, places new focus on University level security programs in Australia. Many universities have already aligned themselves with vendor based certification courses in other curriculum areas that they now deliver either as part or full substitution for existing classes. So what place do the new security certifications have if any within existing University based security courses?

If one were to believe the popular press IT industry based certifications are rapidly becoming be a prerequisite for advancing your career or maintaining your current level of perceived expertise (Roberts, 2002a, Piazza, 2002, George, 2002). Gartner Group estimates that by 2004 that certification will be required for 60% of information security officers (Dugan, 2001). Much of the existing literature has people in industry basically using the certification as a corporate weapon an example from (Dugan, 2001) p.36 follows:

Certification was crucial to his postservice success. "A CISSP proves my worth with senior executives," says the CISO, who also preaches the certification's merits to staff.

The logic being applied here is no certificate = no credibility therefore, no credibility = no success, therefore no success = no job.

Ray(2000) examined the role of certification in information systems with a particular look at its place in University courses. In the article Ray identifies four areas of concern for educators. Firstly, the lack of credible, truly neutral, objective examination within certain areas of the certification industry. It also projects the spotlight onto the value of vendor-based certifications that are seen as extolling the virtues of one product. The second concern is that the rapidly changing knowledge base required for success in the area of information systems brings into question the sustainability of these certifications. Thirdly, that educators themselves may be uncomfortable with the need to maintain their own proficiency levels and certification status as required by many vendor certifications. The final and most important issue is that the certification examinations, which are at best advanced multiple-choice tests, will usurp theory and principles as the core drivers of academic programs.

Building on the issues raised by Ray (*ibid*) this paper will examine the nexus that the new range of security certifications creates within a University context.

## THE CURRENT SCENE

Certification is here to stay for the interim and as such is a valid mechanism for many in the IT industry to obtain vocational based training to enable them to progress their careers. There are a myriad of certifications from vendor specific types such as MCSE - Microsoft, CNE - Novell and DBA - Oracle and non-vendor specific types such as Network+ - COMPTIA, CISSP and GIAC.

The statistics from vendors such as Cisco states they have 296,443 Students Enrolled in 10,182 Total Academies (Cisco, 2003). Granted, not all of these academies are university based but many are. Universities globally are now offering vendor based training courses either as part of or replacement of existing University units. Many of the courses allow universities to readily avail themselves of shrink-wrapped content and some would posit shrink-wrapped customers. Universities are taking on these courses and in doing so are taking them away from the more traditional avenues such as vendors themselves, specialist commercial trainers, technical and community colleges.

## CERTIFICATION DOES NOT EQUAL EDUCATION

In the article by Ray (2000) the first point made was that of credibility, objectivity and neutrality of some the vendor-based certifications. Credibility is greatly lacking in some quarters, as is ethicality of much of the practices that permeate this arena. An ethical point of view would have to question why many vendors provide large incentives in the form of price inducements to academies or institutions setting up vendor based training. The prices offered for products are often well below what even distributors can acquire these products for. It can reasonably be argued that the vendors are discounting product not out of corporate benevolence but to get advantageous placement by trying to align their product with traditional education systems. Hence by attaining this placement, they, by association, gain credibility for their certification and product. One has to ask where else does this considerable inducement occur within a university environment.

In fairness to many of the vendors their certifications are meant to be lacking in neutrality, as they are product focused. The purpose of these certifications is that they are meant to develop skills in product use. They are not intended to be vehicles for the education of individuals but for certification to a certain standard on a specific product.

Objectivity of examination is done as best can be given the constraints; with most vendors preferring to have testing done by a third party such as Prometric. Before sitting examinations at these centers one must provide similar evidence provided to obtain a passport i.e. one photo ID and other supporting documents before being given the test which is often more stringent than similar university examination requirements. Furthermore, most test centers who are run by third party operators undergo certification themselves to become a center to ensure the integrity of operations.

The second point raised by Ray (*ibid*) is that many of the vendor based certifications have high levels of knowledge obsolescence in them. If you take an average undergraduate student who is undertaking a 3 or 4 year degree this is an extremely long time in IT product certification and vendor production cycles. Due to the march of the technology, the products vendors provide either expire or eventually move product to unsupported status, hence making the technology redundant. This makes for rapid change of knowledge and supporting curriculum as it is necessitated by the changes in the product revisions so that people can become competent operators of the product. The type of knowledge in these certifications is operational. Largely, you do not have to have a theoretical understanding of how the product functions or actually achieves interconnection for instance to be successfully certified. There is also often debate about how good a metric these certifications are at assessing a person's knowledge of an area leading to derogatory terms such as "Textbook <insert vendor certification

acronym here>". Thurman (2001) relates similar problems "However, as the interview progressed, I realized that this person had little real-world experience in security or systems administration. His certifications were all gained through crash courses intended to teach you what you need to know to pass the certification tests. I needed someone who could hit the ground running. I didn't have time to train anyone."

Even for vendor neutral qualifications there is some debate also ensuing about how good a measure they are for assessing a person's knowledge or expertise in an area. (Patilla, 2001) examines the Certified Information Systems Security Professional (CISSP) qualification and makes the point that "Practitioners disagree as to the applicability of some of the exam questions and on whether passing the exam is a true measure of a person's real-world security expertise."

Thirdly, Ray (2000) put forward that educators themselves may be uncomfortable with attaining certification and the constant upgrading of skills required to maintain a vendor certification. To some degree this is not what an academics function but it is clearly the role of a trainer. Furthermore, one of the bigger issues is that Universities will have to engage in is proactive and expensive means of re-education for their staff should they wish to pursue this path of embedding certification.

Furthermore, a university that engages in training staff in one particular platform is in fact narrowing choices and opportunity for understanding of technologies. This lack of variety could be counter productive to a University's research and education obligations, binding the university too tightly to a commercial enterprise or solution type.

The fourth point Ray (*ibid*) makes is that certifications will usurp theory and principles as core drivers of University curriculum. As a small case example, several universities in Western Australia have become aligned with various vendor certifications in the past 2-3 years. Upon investigation of the universities web sites it became apparent that many of the "certification driven" units offered heavily relied upon vendor's course materials. Several of the units being offered were using the vendor's designated or approved courseware books as the actual unit textbooks.

The problem is that vendor based certification materials are made for one thing, that is, to get you to pass the vendors certification. The passing of these certifications often has little to do with theory or principles of operation. The material that the student learns is typically targeted at the use or configuration of a vendor specific technology or product. The course content, rarely, if at all deals with underlying theoretical concepts or principles of operation that a university education is supposed to deliver to enable the student undertake life long learning in the area.

The Ray(*ibid*) article was pro-inclusion of certifications into a University curriculum. In response to the article Brookshire (2000) cites the case of the student seeking admission to a University who stated their prime reason for wishing to attend was to become a Unix administrator. The problem was that the student had already attained such a qualification and hence it was a null proposition. What Brookshire(*ibid*) did point out in the article it was a university's mission "...to develop in students a wide variety of less specific abilities: critical thinking, analysis, appreciation of the arts and diverse cultures, foreign languages, the scientific method, and the history and politics of their own and other societies. In addition, we inculcate more detailed knowledge in one or more major fields of study, some quite technical".

Brookshire(*ibid*) alludes to soft skills and other non-specific skills that can not be gained by reading a manual and answering the multiple choice test. Soft skills and certifications are proving their worth in marketplace with people who have both retaining higher salaries and employment prospects (Piazza, 2002, Choy, 2002).

## SECURITY NEXT?

There are several environmental factors that will see security based certification courses being considered by universities currently and in the future. There is increasing industry demand for security personnel to have certification (Roberts, 2002a, Choy, 2002, Clancy, 2002, Guzzo, 2002, Piazza, 2002). Some employing organisations are now also starting to use industry certifications as a simple human resources filter for some IT related jobs that is by not having certification you are simply not considered a serious candidate (George, 2002). There has been an increase in the number of security related courses and certifications offered by vendors and non-vendor specific institutions in the past few years (Roberts, 2002b, Savage, 2002). Computer and related security as a science is not mature, and as such often has limited scope and exposure in university based computer science courses. Due to this lack of maturity it may lead Universities to use the certifications as an external validity exercise. In Australia, universities are becoming more reliant on external funding of courses and need to maintain or increase student numbers to retain government funding. As an avenue to attract students some universities are using the duopoly of a university degree and technical certification.

The above factors would seem strong indicators and impetus for universities to consider offering security based certifications. The *prima-face* question, which needs to be asked, is what does the current range of certifications offer in terms of extra content or knowledge. The author would posit for a student who has completed several units or a minor in security it should be very little at all. Should we be training students in a vendor-based solution? Is not study at university a better vehicle for teaching generic principles and theories than existing vendor curricula? Vendor based solutions give you training on a specific product, which date readily. For example does anyone still use the CP/M operating system? However, if you understood the principles of operation and theory behind an operating system such as CP/M you can readily adapt that knowledge to modern operating systems. Even, non-vendor specific certifications offer no more than a relevant university security course should.

One of the arguments put forward by (Ray, 2000) for certification is that "Educational institutions and educators benefit through improved program content and assessment capability". This argument is largely null, as should this not be a part of a relevant and properly delivered university course?

There is no doubt that these certifications have some value for gaining employment. However, the degree to which they make a difference in combination with an undergraduate degree could be questioned. For instance would an institution employ a student who graduated *cum laude* or a student with barely passing grades in the degree who holds 3 industry level certifications?

## CONCLUSION

There is a definite place for industry level certifications instruction by technical colleges, high schools and training vendors. However, the validity and need for industry level certification at university level is contentious. The very courses themselves are often contradictory in approach to the goals and mission of a university education. However, they may have a place being used as a complimentary tool to existing courses but not as end in themselves.

Non-vendor based certifications do offer some advantages over vendor specific courses, as they do not have such a narrow content focus. Granted, these certifications may cover the same generic content as existing University courses but do they as a result of their pedagogical orientation equip students with the higher level cognitive skills such as synthesis that allows one to think abstractly and understand concepts. How do these industry certifications teach the soft skills and critical thinking that employers rely on universities to impart?

Universities should consider with gravity what it is that they are trying to achieve by offering vendor or non-vendor based certifications that replace existing courses that are well grounded in theory and principles. This total curriculum replacement via industry certification substitution path is perilous and

will see universities becoming vendor savants. Security based units will be no less immune to this practise of curriculum via substitution if we as university security educators allow it.

As a closing thought some of us reading this article will have used at some stage a CP/M based PC or PDP-11 to word process their first digital documents using WordStar or may even have created their first marks spreadsheet with VisiCalc. These were then saved onto a 8 inch or 5 ¼ inch floppy disk or disk drive and typically printed via a serial line to a daisy wheel impact printer so what you may ask? Well what has got us this far, was it an intimate knowledge of vendor specific WordStar or VisiCalc commands or was it an understanding of the key principles of operation of these technologies?

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