DOCTOR OF PHILOSOPHY: IT SECURITY

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Abstract: This paper compares and contrasts the curricula of a PhD and a Doctor of IT programs in IT Security offered by the School of Computer and Information Science of the University of South Australia

Key words: IT Security; Doctorate; Curriculum

1. RELATIONSHIP BETWEEN TITLE AND NATURE OF OUR DOCTORAL PROGRAMS

In the Australian government university system, titles of doctoral programs are very specific. In a technical program in IT Security, the choice of a Doctor of Philosophy (PhD) which is a research doctorate and a Doctor of IT (DIT) which is a Professional doctorate which would need to contain one-third coursework and two-thirds research are available

2. TYPES OF PROGRAM

Currently offer both the PhD and DIT are offered. The PhD is a long-established research program in a wide range of computer science and IT sub-fields. The DIT is a new program, designed in conjunction with our own local defence-focussed industries and the first students are yet to be enrolled

3. OBJECTIVES OF THE PROGRAMS - COMPARISON

The DIT is a structured research degree. The DIT degree is differentiated from the Ph.D. by the following features:

- The structured program of research induction and, most notably, the focus on applied research which differs from the structured program currently operating within the Divisional Ph.D. induction, in its theory and focus on methodology. It is designed to cater to the needs of a graduate student cohort configured as mainly, although not totally, part time, and with a study focus that complements their work.
- The provision of opportunities for professionals to update their academic knowledge in the latest theory and methodologies within their fields. The research induction focuses on applied Information Technology Security research, attending to how current industry issues can be conceptualised and examined from within the most recent theoretical concepts and methodological practices arising in our discipline, and then applied to our current IT Security practice.
- The provision of an extended study semester, to meet the needs of working professionals. The program will be delivered through a mix of intensive summer and winter schools, and face-to-face and online seminar groups and supervision sessions, over a 6 month rather than a 3 month semester. This will enable students to work at a depth and at a pace which will accommodate the demands of their working lives.

4. DURATION WHEN UNDERTAKEN AS A FULL-TIME PROGRAM

Both the DIT and PhD are 3 year full-time programs but the DIT is designed to be studied part-time by practicing professionals.

5. ENTRANCE REQUIREMENTS

Both the DIT and PhD require a student to possess at least an upper second class honours degree (characterised by at least one semester of research) or an equivalent masters degree. The DIT also requires five years of appropriate industry experience. The undergraduate qualification is expected to be in Computer Science, Computer Systems Engineering and

possibly in Information Systems. Undergraduate studies would not have necessarily included any coursework focussing primarily on IT or IS security

6. PROGRAM STRUCTURE

The PhD consists solely of three years of research. The research question and research agenda are determined by the Principal Supervisor and the student. While some learning support is available in research methods and thesis writing, primary, and sometimes total, input comes from the supervisor and, possibly, his or her research group

The DIT has the following structure

FIRST YEAR	SECOND YEAR	THIRD YEAR
Semester 1 Research Practice Professional Seminar 1 Elective Elective Semester 2 Professional Seminar 2 Elective Elective Elective	Semester 1 Information Technology Thesis 1 Semester 2 Information Technology Thesis 2	Semester 1 Information Technology Thesis 1 Semester 2 Information Technology Thesis 2

The only core modules are the Professional seminar and Research Practice

The Electives will be developed out of the Supervisor and research lab directors' current research interest and direction. In our case Electives will be taken from:

- Security Architectures
- E-Commerce Security
- Ad-hoc wireless network security
- Forensic Computing

- Information warfare

Also other electives could be taken (eg in advanced databases) if some correlation between that and the student's potential thesis could be established

7. RECOGNITION OF PRIOR LEARNING

The PhD program does not allow for any recognition of prior learning but the DIT program permits credit for prior learning in exceptional cases when the applicant is able to demonstrate that the prior learning is the equivalent to the core courses in the program. However, exemption will not be granted for the thesis component or for research seminars.

8. REQUIRED SIZE AND NATURE OF RESEARCH PROJECT

A PhD thesis is typically 100,000 words whereas a DIT thesis can be between 30 and 50, 00 words. The PhD project focuses on creating new knowledge while a DIT thesis may be of a more applied nature and directed primarily at an industry focussed applied research issue.

9. INTERNATIONAL STANDARDS TO BE CONSIDERED

As with other universities in Australia, the University of South Australia tends to focus primarily on ACM and IEEE for international benchmarking

10. POTENTIAL FUNDING SOURCES, INDUSTRY PARTNERS AND SCHOLARSHIPS FOR RESEARCH PROJECTS

Our government supplies scholarships for most Australian citizens with 1st class honours degrees or equivalent coursework masters degrees. Government funded cooperative research centres can also supply "top-up" funding for students and some hardware, software and "in-kind" support.

Our local situation with respect to industry collaboration and co-operation is good and projects are supplied by software and hardware companies such as Motorola and Tenix, by our State and Federal Police Departments and by the Defence Science and Technology Organisation, as well as smaller players.

11. POSSIBLE AREAS OF CURRICULUM SPECIALIZATION YOUR ORGANIZATION/INSTITUTION MAY BE ABLE TO PROVIDE AS A PARTICIPATING PARTNER

The University of South Australia would be able to contribute in areas of:

- Information Security Management- especially cultural issues
- Security Architectures
- Ad-hoc wireless network security
- Forensic Computing
- Information Warfare

12. ANY OTHER INFORMATION RELEVANT TO THE PROGRAM

The university has a holistic focus and tends now to want to develop an integrated skill set in researchers. University documentation states a research student

1. *has an understanding of current research-based knowledge in the field, its methodologies for creating new knowledge, and can create, critique, and appraise new and significant knowledge.*
2. *is prepared for lifelong learning in pursuit of ongoing personal development and excellence in research within and beyond a discipline or professional area.*
3. *is an effective problem solver, capable of applying logical, critical and creative thinking to a range of research problems.*
4. *can work both autonomously and collaboratively as a researcher within a particular discipline or professional area and within wider but related areas.*

5. *is committed to ethical action and social responsibility as a researcher in a discipline or professional area and as a leading citizen.*

6. *communicates effectively as a researcher in a discipline or professional area and as a leading member of the community.*

7. *demonstrates international perspectives in research in a discipline or professional area and as a leading citizen.*

Research supervisors, in taking on the supervision take are acknowledging that they "guarantee to the academic and professional sectors that our research degree postgraduates have already engaged in original research in order to solve significant problems, that in doing so they have learned how to work autonomously and collaboratively, that they have set up lifelong learning patterns and networks, that they have been effectively able to communicate their research findings, that they have performed research in an ethical manner and they have introduced international perspectives into their research." [1]

They are required to assess my postgraduate students against this generic framework and this might be adapted to the IT Security context to give us a set of criteria against which to measure the effectiveness of an IT Security postgraduate, and potential long-term researcher.

REFERENCE

[1] Crotty, R 2003, *Towards a Quality Research Environment at UniSA,* Research Supervisor Resources, viewed 2 March 2003 <http://www.unisa.edu.au/resources>