Towards a valued ICT Department by inducting, developing and retaining talented employees

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Master of Computing

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Abstract

This research project looked at the factors involved in developing an effective IT graduate or internship programme within a NZ organisation. To determine these factors, it was necessary to gain the perspectives of existing IT employees, IT management and the engineering graduates within the company.

There was evidence to suggest that there is a supply and demand issue in the number of student enrolments versus the number of people employed in IT professions (McCullum, 2006). In support of a New Zealand knowledge-based IT workforce, programmes have been developed to link academic graduates with industry. In order to achieve an internally sustainable IT workforce, many organisations promote and run graduate or internship programmes. On the surface, it would seem that the majority of the research carried out in this area is from the perspective of the academic institution or from the perspective of the IT graduate student. Prior research would indicate that there is little known about the capabilities of an organisation in supporting a programme and the graduate participants. This research project looked at the subject area from the perspective of the organisation.

This is a qualitative perception-based study using a case study method. IT managers and engineering graduates at a leading New Zealand utility infrastructure organisation shared their experiences and perceptions in regards to graduate and internship programmes. An online survey of IT staff members helped to triangulate and support the findings from the face-to-face interviews.

A conceptual framework emerged based on the components and relationships derived from the literature review, IT management and engineering graduate interviews. Using the conceptual framework, participant responses were analysed to determine how mature the organisation was in adopting a graduate or internship programme. The People Capability Maturity Model (P-CMM) process elements served as a basis for measuring the organisation's graduate and internship maturity.
Participants strongly believed that employing an intern or graduate would benefit the organisation, that there were significant learning opportunities, providing the work was on offer and the individual and supervisor were well supported. The study found that the organisation was at an initial maturity level of one in regards to a graduate or internship programme, compared to the existing engineering graduate programme that was nearing a defined maturity level of three. The study found that an organisation needs workforce practices in place in order to ensure the experience is a positive one and to limit the risk of a person leaving the IT discipline.
Acknowledgements

This thesis represents the culmination of a lot of time, effort and sacrifice.

I dedicate this thesis to my children Emily and Daniel who have a long prosperous life filled with learning ahead of them.

Without the love, support and perseverance of my partner Olivia, this piece of work would never have completed. I am ever grateful to have had the opportunity to fulfil a long time goal.

I wish to thank Professor Kay Fielden, for her guidance and supervision of my thesis and for the topical conversations, we shared along the way.

I also wish to thank Andries van der Westhuizen who I have respectfully considered a long time mentor and friend. Without his support and encouragement, my career would not be where it is today.
Disclaimer

I hereby confirm that this is my own work and that the materials included in this document were cited and referenced according to APA guidelines.

Marty Shatwell.
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## Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>CMM</td>
<td>Capability Maturity Model</td>
</tr>
<tr>
<td>Direct Report</td>
<td>A staff member who is a subordinate of a supervisor, manager or leader</td>
</tr>
<tr>
<td>Graduate</td>
<td>A person that has completed their study and has been awarded an academic qualification</td>
</tr>
<tr>
<td>HR</td>
<td>Human Resources</td>
</tr>
<tr>
<td>ICT</td>
<td>Information Communication Technology</td>
</tr>
<tr>
<td>Intern</td>
<td>A student that undertakes paid or unpaid industry-based work, related to their chosen area of study, in order to gain work experience and gain academic credit</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>ITIL</td>
<td>Information Technology Infrastructure Library</td>
</tr>
</tbody>
</table>

This term has been used throughout this research document. Whilst there can be subtle differences in meaning, the term embodies alternative terms such as:

- Information and Communication Technology (ICT)
- Information Systems (IS)
<table>
<thead>
<tr>
<th>Ontology</th>
<th>Categories of being and their relations - what entities exist or can be said to exist, and how such entities can be grouped, related within a hierarchy, and subdivided according to similarities and differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-CMM</td>
<td>People Capability Maturity Model</td>
</tr>
<tr>
<td>SDLC</td>
<td>System Development Lifecycle</td>
</tr>
<tr>
<td>SIM</td>
<td>Society for Information Management</td>
</tr>
<tr>
<td>Student</td>
<td>A person that is enrolled in an academic course work and is working towards completing an academic qualification</td>
</tr>
<tr>
<td>TEC</td>
<td>Tertiary Education Commission</td>
</tr>
<tr>
<td>US</td>
<td>United States (of America)</td>
</tr>
<tr>
<td>WIL</td>
<td>Work Integrated Learning. This term has been used throughout this research document and embodies alternative terms used in various research articles</td>
</tr>
<tr>
<td></td>
<td>These include:</td>
</tr>
<tr>
<td></td>
<td>- Work-based Learning (WBL)</td>
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<td></td>
<td>- Industry-based Learning (IBL)</td>
</tr>
<tr>
<td></td>
<td>- Cooperative Learning; Coop Learning; cooperative education</td>
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</table>
1 Introduction

The New Zealand government’s digital strategy strongly recognises Information Technology (IT) as an enabler for the whole national economy (New Zealand Government, 2008). It is a multi-faceted strategy looking at different channels of IT development and investment. However, there is evidence that there is a supply and demand issue in the number of student enrolments versus the number of people employed in IT professions (McCullum, 2006). In support of a New Zealand knowledge-based IT workforce, programmes are available that link academic graduates with industry. In order to achieve an internally sustainable IT workforce, many organisations promote and run graduate or internship programmes.

Discussions held indicated that “a disconnect exists between secondary schools, tertiary institutions and the IT industry” (Robertson, 2007). This suggests that this issue is systemic. The ‘organisation’ is one of a number of stakeholders that have a role to play in contributing towards desired outcomes. However, there is some evidence that students are broadening their preferences for IT career paths (Pauling & Komisarczuk, 2007), which may help with the alignment of role offerings in an organisation with student expectations. A ‘Regional ICT Internship Programme’ had been established in New Zealand to help address the issue (Young, 2008).

Pauling and Komisarczuk (2007) indicated that the employers they surveyed were satisfied with the student undertaking work experience. This indicates it could be a worthy proposition for an organisation to adopt a programme. “Roughly half of students indicated a preference to work within a single large organisation, but working in different areas or different projects. The other half preferred to gain work experience with a number of small companies instead” (Pauling & Komisarczuk, 2007).

If an organisation adopts a graduate or internship programme, there can be future potential benefits. Corich and McLay (2004) stated there is potential for an organisation to raise its profile through its relationship with an academic institution. Where the company competes for the ‘best place to work’, programmes that link it with an academic
institution could help contribute toward such goals. Other benefits include an example given by Watson & Huber (2000), where IBM and Federal Express had assigned students to specific projects that were important to the companies but had been on the “backburner”.

Bremer (2005) reported graduate student on-the-job training expectations. Differences between graduate expectations and organisation offerings were not well defined and were an opportunity for this research study to explore. This highlighted potential communication improvements between industry and academia.

Current research indicated that there is little known about the maturity of an organisation and its capability in supporting a programme and in turn supporting the graduate participants themselves. On the surface, it would seem that majority of research carried out in this area, is from the perspective of the academic institution or from the perspective of the IT graduate student. This research project investigated from the perspective of the organisation.

The purpose of this research was to look at a New Zealand organisation that was about to embark on its first IT graduate programme and determine its level of maturity to support such a programme. Measurement of IT employee perceptions was achieved through analysis of an online survey and face-to-face interviews. Their perceptions helped to determine the issues facing the organisation and helped to reveal how mature it was in supporting an IT graduate programme. Using results from interviews with IT managers and engineering graduates, coupled with a survey of all IT staff, the research set out to determine key factors thought necessary to support a programme within the organisation.

Similar research had been carried out in this area. For example, Brimblecombe and Peter (2005) looked at developing an explanatory model to illustrate the factors and influencing decisions involved in graduates taking up employment. Likewise, this research project modelled the factors, influencing decisions and maturity, in particular from the organisation’s perspective.

Having had the opportunity to grow professionally and develop an IT career within a New Zealand organisation, the researcher believed that replicating aspects of the
experience in a much shorter timeframe could be applied to a graduate or intern entering the IT workforce.
2 Literature Review

2.1 Literature Maps

Figure 1: Literature Ontology
Figure 2: Annotated Literature Map
### 2.2 Tabulated Literature Map

<table>
<thead>
<tr>
<th>Theme</th>
<th>Name</th>
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<tbody>
<tr>
<td>IT Industry</td>
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<tr>
<td>2.4 National Strategy</td>
<td>(Becker &amp; Thompson, 2009)</td>
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<tr>
<td></td>
<td>(Business NZ, 2006)</td>
</tr>
<tr>
<td></td>
<td>(New Zealand Government, 2008)</td>
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<tr>
<td>2.5 Resource availability</td>
<td>(J. Howard &amp; Atkins, 2006)</td>
</tr>
<tr>
<td></td>
<td>(McCullum, 2006)</td>
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<tr>
<td></td>
<td>(Wills &amp; Sutcliffe, 2005)</td>
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<tr>
<td>Academic Institute</td>
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<tr>
<td>2.6 Recruitment and retention of students</td>
<td>(Akbulut &amp; Looney, 2007)</td>
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<td></td>
<td>(Akbulut &amp; Looney, 2009)</td>
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<td></td>
<td>(Becker &amp; Thompson, 2009)</td>
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<td></td>
<td>(Betts, Lewis, Dressler, &amp; Svensson, 2009)</td>
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<td></td>
<td>(Bremer, 2005)</td>
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<td></td>
<td>(Brown, 2007)</td>
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<td></td>
<td>(Dick, Granger, Jacobson, &amp; Van Slyke, 2007)</td>
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<td></td>
<td>(Firth, Lawrence, &amp; Looney, 2008)</td>
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<td></td>
<td>(Heldman, 2008)</td>
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<td></td>
<td>(Koch, Fuller, Van Slyke, Watson, &amp; Wilson, 2009)</td>
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<td>(Lasen, 2009)</td>
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<td></td>
<td>(Lomerson &amp; Pollacia, 2006)</td>
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| 2.7 Curriculum and Assessment | (Achacoso & Svinicki, 2004)  
|                             | (Biggs, 2003)  
|                             | (Bremer & Mann, 2003)  
|                             | (Chard, Clark, Lloyd, Ponting, & Tongariro, 2009)  
|                             | (Dressler & Keeling, 2004)  
|                             | (Gibbs & McLennan, 2008)  
|                             | (Groenewald, 2004)  
|                             | (Groenewald, 2009)  
|                             | (Haddara & Skanes, 2007)  
|                             | (Hernon, Dugan, & Schwartz, 2006)  
|                             | (Hodges & Ayling, 2007)  
|                             | (Jafar, Anderson, & Abdullat, 2008)  
|                             | (Knight & Yorke, 2003)  
|                             | (McKenzie, Trevisan, Davis, & Beyerlein, 2004)  
|                             | (Ram, 2008)  
|                             | (Rowe, 2002)  
| (Orrell, 2008)              |  
| (Pollacia & Lomerson, 2006) |  
| (Scott, 2006)               |  
| (Van Slyke, Case, Dick, & Granger, 2007) |  
| (von Hellens, Clayton, Beekhuyzen, & Nielsen, 2009) |  
| (Watson & Huber, 2000)      |  
| (Wieck, 2003; Young, 2008)  |  
| (Zhang, Raghavan, & Martz, 2009) |  
| (von Hellens, Clayton, Beekhuyzen, & Nielsen, 2009) |  
| (Watson & Huber, 2000)      |  
| (Wieck, 2003; Young, 2008)  |  
| (Zhang, Raghavan, & Martz, 2009) |  
| (von Hellens, Clayton, Beekhuyzen, & Nielsen, 2009) |  
| (Watson & Huber, 2000)      |  
| (Wieck, 2003; Young, 2008)  |  
| (Zhang, Raghavan, & Martz, 2009) |  
| (von Hellens, Clayton, Beekhuyzen, & Nielsen, 2009) |  
| (Watson & Huber, 2000)      |  
| (Wieck, 2003; Young, 2008)  |  
| (Zhang, Raghavan, & Martz, 2009) |  

19
| 2.8 Linking with industry | (Todorova & Mills, 2007)  
|                          | (Van Slyke et al., 2007)   
|                          | (Chard et al., 2009)       
|                          | (Corich & McLay, 2004)     
|                          | (Eakins, 2000)             
|                          | (Groenewald, 2004)         
|                          | (Haddara & Skanes, 2007)   
|                          | (Kamoun & Selim, 2007; McDermott, 2008) 
|                          | (Reinhard, Osburg, & Townsend, 2007) 
|                          | (Smith, Mackay, Challis, & Holt, 2006) 
|                          | (Smith, Mackay, Holt, & Challis, 2008) 
|                          | (Venables & Tan, 2009)     |
| 2.9 Preparing students for industry | (Bates, Bates, & Bates, 2007) 
|                                     | (Betts et al., 2009)       
|                                     | (Bidois, Clear, Gates, & Talbot, 2004) 
|                                     | (Bridgeman, 2003)          
|                                     | (Doel, 2009)               
|                                     | (Fielden, 2004)            
|                                     | (Hodges & Burchell, 2003)  
|                                     | (P. Howard, 2009)          
|                                     | (Keogh & Venables, 2009)   
|                                     | (Macgregor & Nesbit, 2008) 
|                                     | (McLay, Corich, & Millman, 2005) 
<p>|                                     | (McLay &amp; Skelton, 2007)    |</p>
<table>
<thead>
<tr>
<th>IT Workplace</th>
<th>(Patten &amp; Keane, 2009)</th>
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<tr>
<td></td>
<td>(Pauling &amp; Komisarczuk, 2007)</td>
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<td>(Reddan, 2008)</td>
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<td></td>
<td>(Smith et al., 2008)</td>
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<td></td>
<td>(Snell, Snell-Siddle, &amp; Whitehouse, 2003)</td>
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<td></td>
<td>(Swinarski, Noce, &amp; Parente, 2008)</td>
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<td></td>
<td>(Venables &amp; Tan, 2009)</td>
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<tr>
<td></td>
<td>(Wieck, 2003)</td>
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<td>(Wilkinson, 2008)</td>
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<tr>
<th>2.10 Competencies and skills required</th>
<th>(Bartlett, Horwitz, Ipe, &amp; Lui, 2005)</th>
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<tr>
<td></td>
<td>(Bullen, Goles, &amp; Kaiser, 2006)</td>
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<tr>
<td></td>
<td>(Coll, Zegwaard, &amp; Hodges, 2002)</td>
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<tr>
<td></td>
<td>(Corich &amp; Williams, 2005)</td>
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<td></td>
<td>(Gibbs &amp; McKinnon, 2009)</td>
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<td></td>
<td>(Groenewald, 2009)</td>
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<td></td>
<td>(Hodges &amp; Burchell, 2003)</td>
</tr>
<tr>
<td></td>
<td>(Litecky, Aken, Prabhakar, &amp; Arnett, 2009)</td>
</tr>
<tr>
<td></td>
<td>(McNeil, Hughes, Toohey, &amp; Dowton, 2006)</td>
</tr>
<tr>
<td></td>
<td>(Nesbit, 2009)</td>
</tr>
<tr>
<td></td>
<td>(Rainsbury, Hodges, Burchell, &amp; Lay, 2002)</td>
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<tr>
<td></td>
<td>(Zaffar &amp; Winter, 2008)</td>
</tr>
<tr>
<td>2.11 Learning development</td>
<td>(Bates et al., 2007)</td>
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<tr>
<td></td>
<td>(Börjesson, Pareto, Snis, &amp; Staron, 2007)</td>
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<td>(Bremer, 2005)</td>
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<td>(Bullen et al., 2006)</td>
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<td>(Carson, Tesluk, &amp; Marrone, 2007)</td>
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<td></td>
<td>(Collier &amp; McManus, 2005)</td>
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<td></td>
<td>(Curtis, Hefley, &amp; Miller, 2009)</td>
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<td></td>
<td>(Li, Jiang, &amp; Klien, 2009)</td>
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| 2.12 Culture, commitment and retention in the workplace | (Asgarkhani & Wan, 2008) |
|                                                        | (Avison, 2007) |
|                                                        | (Bates et al., 2007) |
|                                                        | (Cukier, Yap, Holmes, & Hannan, 2009) |
|                                                        | (Curtis et al., 2009) |
|                                                        | (Fagnot, Guzman, & Stanton, 2007) |
|                                                        | (Guzman, Sharif, Kwiatkowska, & Li, 2006) |
|                                                        | (Mann, Smith, Shephard, Smith, & Deaker, 2009) |
|                                                        | (Morley, McDonnell, & Milon, 2009) |
|                                                        | (Stanton, Guzman, & Fagnot, 2006) |

Table 1: Tabulated Literature Map
2.3 Literature Introduction

This literature review describes the themes associated with the research question: What are the factors in developing an effective IT graduate or internship programme within a New Zealand organisation?

Using search terms related to IT graduates or interns in internet-based searches resulted in being directed to academic-institute’s web sites and course or curriculum offerings. Modification to the search terms revealed some research papers, which in turn provided alternative search terms to help locate further published research studies. A classification of the literature was used to derive the literature ontology shown in Figure 1. Research papers were associated with a primary category as shown in Figure 2, however many papers contributed across groupings as seen in Table 1.

From the literature collected, three major stakeholders emerged who are instrumental in the development of an IT graduate. They are institutions teaching information technology (IT) curriculum, the IT industry as a whole including the government and industry-based organisations that possess an IT capability.

This literature review is presented in subject areas that relate to each stakeholder. As shown in Figure 1 and Table 1 the subject areas of this literature review are:

- National Strategy
- Resource availability
- Recruitment and retention of students
- Curriculum and Assessment
- Linking with industry
- Preparing students for industry
- Competencies and skills required
- Learning development
- Culture, commitment and retention in the workplace
2.4 National Strategy

This section focuses on a single literature artefact – The [New Zealand] Digital Strategy 2.0. The review discusses the purpose, structure and content and key messages of the document. For the purposes of this review, the New Zealand Digital Strategy is abbreviated to ‘NZDS’.

The NZDS had its initial draft published in the year 2004 and has evolved into the 2008 version 2.0, through public and private sector submissions and consultations.

The purpose of the NZDS is to support the lifting of the nation’s productivity with information and communication technology (ICT), which is a key goal of the New Zealand government. The digital strategy supports the New Zealand government’s goal by defining the vision, outcomes, enablers and actions to be undertaken. Figure 3 shows the linkages between the components of the digital strategy.

The Digital Strategy 2.0 cites issues identified in a report on New Zealand productivity perspectives. One of the key issues identified is “Human elements” covering “skills, education, governance and managerial capability” (Business NZ, 2006). This issue relates directly to the capability enabler shown in Figure 3 above.
Table 2 shows the priorities and proposed actions associated with issue highlight above. These statement are directly quoted from New Zealand Government (2008).

<table>
<thead>
<tr>
<th>Priority</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure universal digital literacy</td>
<td>Ensure all students leave school digitally literate, through appropriate early childhood, primary and secondary curricula and teaching. (Foundations for Discovery, the e-learning Action Plan for Schools and the New Zealand Curriculum 2007) Accelerate the rollout of the Aotearoa People’s Network and an ongoing Community Partnership Fund.</td>
</tr>
<tr>
<td>Strengthen the workforce for the local ICT industry</td>
<td>Implement professional standards and qualification equivalency. Work with the New Zealand Computer Society to implement a framework of professional standards and international benchmarks for ICT qualifications. Attract more skilled ICT practitioners to New Zealand. Undertake a series of employer seminars/workshops targeting the ICT industry, to promote immigration as an employment option and highlight the value of employing skilled migrants. Implement the Digital Technology Guidelines for teaching years 11–13, to ensure that more students leave secondary school with specialist digital technology skills to start them on the ICT practitioner career pathway. Promote digital careers and skills though the National ICT Skills Collaboration Initiative. Match tertiary courses to industry needs. The Tertiary Education Commission’s nationwide stakeholder engagement and regional</td>
</tr>
</tbody>
</table>
facilitation processes are ensuring tertiary education organisations work more closely with business, iwi and community to recognise and meet ICT skill needs and sector trends.

New Zealand Skills Strategy includes ongoing work to address skills issues, including in the ICT sector, and the need to better use and develop ICT skills in the workplace.

A range of initial partnerships between firms, tertiary institutions and others are being investigated to explore building management and leadership capability in firms. One partnership is likely to involve the ICT sector, with a possible focus on increasing the capability of senior management in small high-tech businesses clustered within a region.

Table 2: Digital Strategy Priorities and Actions

New Zealand Government (2008) indicates that most, if not all, actions have been allocated funding and are underway.

The researcher believes it is valuable to highlight the following key quotes from the New Zealand Digital Strategy because it provides a foundation and motivation for which this study is based.

“People are the bedrock of Digital Strategy 2.0.”

“Digital technologies are constantly changing the way we live, work and play. All New Zealanders will need new skills to participate fully in this digital world. As well as digital literacy and technical IT skills, our education system needs to engender creativity in all students.”

“ICT practitioners are essential to our digital future. They are highly mobile and are in short supply globally. We need to promote, develop, attract and retain ICT professionals, such as network architects, application developers and security specialists, to perform high-value and creative digital work. We also need
technicians to develop and maintain our ICT systems. Without enough skilled ICT practitioners, our digital development will be seriously compromised.”

The New Zealand government has set ambitious targets for improving its digital capability by wanting to increase the fill-rate of IT-related jobs from 53% in the year 2007 to 75% by the year 2012 and by increasing the number of graduates entering digital careers by 100% one by the year 2012.

New Zealand is not the only nation predicting IT growth, making it a global issue. In the United States (US), IT is identified as one of the fastest projected growth sectors by the year 2012 (Becker & Thompson, 2009).

Whilst the NZDS is a catalyst for the development and placement of skilled IT resources in the New Zealand workforce, New Zealand businesses have a role to play in developing their existing employees and creating opportunities for those entering the workforce. “It is not solely the role of government, business or labour organisations to improve New Zealand’s productivity record. Some issues are best addressed by business, some are best addressed by government and some by employees.” (Business NZ, 2006).
2.5 Resource availability

IT human resources/people include both those working within an IT-related company and those that work for or with a department supporting other types of businesses. The lack of availability of skilled IT people is a global issue. Prior to the global economic recession in 2008, there had been a number of research papers published, reporting an IT skills shortage and decline in the number of student enrolling in IT academic programmes. High employment and international competition for skilled IT people were impacting New Zealand’s IT skill base (Wills & Sutcliffe, 2005). The results reported by McCullum (2006) also indicated that New Zealand needed to compete internationally for IT skilled workers. McCullum (2006) cited the Department of Labour’s IT job fill-rate of 53% which was also reported in the New Zealand Digital Strategy 2.0. Productivity and the economy of the US were heavily affected by the lack of skilled IT people in the industry (J. Howard & Atkins, 2006).

It is not only a lack of students entering the IT discipline and the increase of IT job roles. The supply chain for the development of IT people is lacking in a number of areas. A national curriculum, qualified and supported IT teachers and access to up-to-date industry standard hardware and software, are all areas identified as being needed by the industry (J. Howard & Atkins, 2006). One of the issues identified is the need for a teacher to spend a significant amount of time keeping their knowledge of IT systems up-to-date (J. Howard & Atkins, 2006).

Wills and Sutcliffe (2005) state that businesses need to be prepared to either defer or delay projects or be prepared to source IT people from alternative places to deliver solutions to shorter-term, lower-level requirements. Wills and Sutcliffe (2005) recommend businesses adopt either an intern programme or a scholarship programme. Another strategy is to adopt a training programme that takes people employed in business and give them IT training and a new career opportunity – an approach that was used during the skills shortage around Y2K (Wills & Sutcliffe, 2005).

Longer term however, businesses need to involve themselves in the promotion of IT careers and build tighter relationships with education providers.
2.6 Recruitment and retention of students

There was a variety of factors influencing the decline in IT enrolments. Pollacia and Lomerson (2006) stated a lack of interest in computers and a lack of adequate information regarding the IT discipline whilst others surveyed stated ‘there are no jobs’, ‘my parents told me not to go into that field’ and ‘it is too hard’ (Van Slyke et al., 2007). Whilst students are typically familiar with computers, they do not make the connection between general career expectations and a potential career in IT (von Hellens et al., 2009). Additionally, the economic recession in 2008 led to a decline in the number of companies hiring IT graduates and recruitment agencies were cautious in the way in which they invested in sponsoring events (Koch et al., 2009). Firth, Lawrence and Looney (2008) assembled a twelve-step programme to improve student enrolments and non-empirical or anecdotal evidence suggested the programme had contributed to increased IT enrolments. It is also suggested that the decline in IT enrolments is cyclical (Dick et al., 2007; Wills & Sutcliffe, 2005) and that that enrolments will naturally increase. In a discussion forum, Koch et al. (2009) identify three phases of student’s lifecycle within an IT academic programme - attracting students to the IT major, retaining the students and placing the students.

2.6.1 Attracting students

Career choices and “career-related behaviours are shaped by personal and environmental factors” (Akbulut & Looney, 2007). For younger students, these begin early in educational development. Pollacia and Lomerson (2006) found that inaccurate or inadequate information was provided to high school students regarding computer-related majors and found student dissatisfaction with their career counselling experience. Whilst declining enrolments by females in secondary school IT subjects was a trend of concern, it was found that “repetitive tasks facilitated by teachers who lacked necessary expertise and passion” was more of an influencing factor on students’ interest in IT (Lasen, 2009). Whilst personal likes and dislikes are something that cannot necessarily be improved (Lomerson & Pollacia, 2006), it is necessary to align secondary school education
providers with tertiary education providers using “educational pathways” to encourage students into the field of IT and IT-related programmes (Becker & Thompson, 2009).

Becker and Thompson (2009) proposed a project that focuses on changing the way secondary and tertiary schools attract and prepare students for the IT workforce. In order to achieve the goals and objectives of the project, Becker and Thompson (2009) stated that a coalition of secondary educators, post-secondary educators, professional organisations and business / industry is required to study, design and implement the various strategies, with quarterly evaluations.

Promotional events are thought to provide short-term benefit to the recruitment process (Van Slyke et al., 2007). Brown (2007) proposed a strategy to market IT to entry-level university students in an effort to channel them into taking IT as their major. Methods employed included Information Systems introductory courses, testimonials from past graduates and senior students, and presentation from the faculty and staff about the course curriculum.

Both virtual and human interactions are essential in the engagement with prospective IT career seekers (Zhang et al., 2009). Information on flash drive, podcasts, webinars, text messaging and online communities such as ‘Second Life’, ‘YouTube’, ‘Facebook’ and ‘MySpace’ are some of the ways technology can be used to attract young people to the IT discipline (Orrell, 2008). In New Zealand, a collaborative group known as ‘Accelerating Auckland’ was created to bring industry and education together to attract students into a career in IT (Young, 2008). An educational pathway DVD was developed and then presented at a number of ‘Accelerating Auckland’ events, which was well-received by high school career advisors (Young, 2008) which indicates that advertising and promotion is also a key activity in marketing of the IT profession.

Building IT sophistication into academic course curricula that reflects current industry practices was also seen as an influencing factor for attracting students (Akbulut & Looney, 2007, 2009). This helped to build self-confidence and increase outcome expectations. Exposing students to innovative and interesting technologies was one of
the twelve steps Firth et al. (2008) identified for also helping to reduce the trend of declining enrolments and to attract additional students to the IT discipline.

2.6.2 Retaining students

Figure 4 shows the different factors that affect the retention of students in IT courses. Zhang et al. (2009) presented a framework of the factors and assessment needed to identify students that are at risk of leaving an academic institute.

![Figure 4: Retention factors (Zhang et al. 2009)](image_url)

Personal reasons, as opposed to academic, were found to be the main reason for students leaving university (Heldman, 2008). Assessment and ongoing coaching are seen as critical to improving the retention and experience of students (Heldman, 2008). These factors could apply to retention of IT employees in the workplace.
2.6.2.1 Placing students

Betts et al. (2009) stated “career placement and advancement are based on education, training and the ability to apply knowledge, skills and the experience within dynamic work environments”. Student placement with an industry-based organisation is not a new concept in New Zealand. For example, the University of Auckland has had industry projects since the mid-80s (Watson & Huber, 2000) and it is widely recognised that IT degree final year projects are a positive influence in the student learning experience (Bremer, 2005; Scott, 2006; Wieck, 2003). The review of this topic is discussed further in ‘Preparing students for industry’.

Despite the decline of enrolments recovering in a natural cyclical manner, the demand for IT resource will continue to outweigh the number of enrolments. Strategies are required to help reverse the trend and support the increased supply of skilled IT people. The opportunity exists early in secondary education. Challenges such as parent perceptions, individual likes and dislikes, teacher efficacy with technology, and computer and career mentoring impact on a student’s decision to enter the IT discipline. Promoting the IT discipline using different media, sponsoring events and using industry-used sophisticated technology to build confidence are just some of the ways of attracting people into the IT industry. There are multiple factors that influence the retention of a student in the academic course. Providing additional mentoring and coaching is seen as a way of increasing retention; therefore increasing the likelihood of continuing in the IT discipline. Work-integrated learning as part of an academic course is a key activity in placement of students in the workplace. This enables future opportunities for both the student and the industry-based organisation.
2.7 Curriculum and Assessment

Evidence indicates that students entering tertiary education are more confident with using computers, however the competence level is equal to that shown by survey participants eight years prior, which indicates there is still a gap (Gibbs & McLennan, 2008). This suggested that tertiary level introductory computing courses are still, and are likely to continue to be, required. As also discussed in the previous section, introductory computing courses were seen as a major tool for generating interest and a base level of knowledge in the Information System discipline.

Keeping abreast of changes in technology can be challenging for academic education providers. Whilst some fundamental aspects of curriculum stay the same, tools employed by industry tend to vary by product type and by version. Jafar, Anderson, and Abdullat (2008) provided a framework for technology choices aligned to curriculum. Whilst in some cases, where there were several technology toolsets that could be employed to meet the curriculum requirements, the choice depended on the culture of the academic education provider, the experience and expertise of its faculty and the demands of the industry it serves (Jafar et al., 2008).

Negotiated contract learning gives students the opportunity to lead a project and develop learning objectives, learning plan, assessment criteria and timeframe with a supervising lecturer, beyond the structured courses offered (Bremer & Mann, 2003). This encourages self-directed learning but more importantly is an exercise in negotiation between the student and supervising lecturer. This could have benefits for a graduate in the workplace as they could have the opportunity to negotiate the areas of work they want to experience and define the learning objectives. The outcome is self-direction and ownership (Bremer & Mann, 2003).

Information and communication technology is used throughout most other, non-IT, academic courses. Developing IT skills often requires academic partnering between departments to create IT literacy amongst its students. A short-term approach identified in Van Slyke et al. (2007) is the building of partnerships with other academic programmes to support increasing enrolments in the IT discipline. Initially this only sets
out to enable students to take IT related courses to supplement their own academic programme. Building a longer-term strategic approach would require academic faculties to redesign and integrate their courses to be able to benefit from a “jointly-offered” programme (Van Slyke et al., 2007).

Literature has different terms for what is essentially on-the-job learning. Industry-based learning, work-integrated learning, vocational training or cooperative education is typically a final year project, where a student is placed with an industry-based organisation, and is the culmination and application of the skills and knowledge gained from the courses taken during the academic programme. Groenewald (2004) defines cooperative education as “a collaborative enterprise” in which students, employers and Tertiary Education Providers work together to produce work-ready graduates. Dressler and Keeling (2004) summarise the benefits of work-integrated learning as follows:

- Academic benefits – increased motivation to learn, increased ability to finance tuition, improved perception of benefits of study
- Personal benefits – increased autonomy, increased communication skills, improved time management
- Career benefits – increased employment opportunities, career clarification, international opportunities.

However, there are inherent difficulties associated with work-integrated learning. Complexity and ambiguity are a result of the course usually being problem-based or experimental in nature (Chard et al., 2009). It is seen as important to apply structured assessment to direct learning, however a US-based study revealed the majority of assessment is focussed on the end product as opposed to the process (McKenzie et al., 2004).

The way an assessment is designed can have a direct effect on the learning behaviour, learning experience, learning outcome. Biggs (2003) stated that “education literature recognises assessment as the single most important factor affecting learning outcomes (depth of knowledge and skills)”. It is important for the assessment to fit the learning objectives because it had been found to have a positive impact on the learning outcome of
Outcomes Assessment is the “developmental process related to critical thinking, problem solving, communication skills, becoming a responsible global citizen, and so on” (Hernon et al., 2006, p. 1). Students tend to alter their approach and learning behaviour based on how they are assessed. Authentic assessment enables students to “replicate real world performances as closely as possible” and “demonstrate a wide range of skills” (Achacoso & Svinicki, 2004, pp. 23-24). Changing assessment tasks can alter the student learning behaviour, but it was found that there was little research into the effect of individual assessment types on learning outcomes (Todorova & Mills, 2007). In a study conducted by Groenewald (2009), formative and reflective assessment was found to be a useful method for monitoring remote learners. As it was equally applicable to work-based learning, Groenewald (2009) stated that “unexpected learning should be accommodated and learning evidence should not be restricted to prescribed outcomes” (p. 96).

Ram (2008) identified a number of contributing factors when it came to assessment of industry-based learning. Qualification and experience of the workplace supervisor, experience of the student in assessing his or her own work, the academic supervisor’s qualification and experience and overall agreement between the three parties, contribute to the quality of the student’s overall assessment. There is also a perceived gap between the actual work output by the student, information reported back to the academic supervisor and the workplace supervisor not knowing what the student has achieved. Ram (2008) went on to discuss that in order to achieve accurate measures in assessment, a portfolio-based assessment method, including authentic assessment, was required to ensure the learning outcomes had been met. As described by Hodges and Ayling (2007), a portfolio-based approach involves the student in setting the assessment criteria as well as assessment of the student’s cumulative work by the academic educator. This provides both formative feedback and evidence-based summative assessment (Hodges & Ayling, 2007). Haddara and Skanes (2007) recommend that rather than students only enhancing their work experience, they should be given reflective assignments in order to extend their learning experience. Evidence from the workplace can be used to assess work-integrated learning utilising authentic assessment to determine if the student has achieved the learning objective (Knight & Yorke, 2003, pp. 85-86).
In summary, initial confidence does not translate into competency. Introductory IT courses in secondary school and tertiary are still required to establish a base self-efficacy in computing.

Although challenging, academic education providers need to keep abreast of technology developments. They tend to align themselves according to their backgrounds and faculty expertise. Getting a broad understanding is just as valuable as specialising in one particular product or technology, e.g. Microsoft products.

Allowing students to have a choice and input into a course outline, can help to evolve their interest in a particular IT subject area. However, this requires negotiated and collaborative planning and assessment. This could be a factor for an organisation to consider as a graduate or intern may express the desire to experience a variety of disciplines within IT and evolve their specific career path.

Some “other” academic majors incorporate IT courses into their curriculum, but it is unclear to the researcher how much tertiary education faculties are working together to establish learning partnerships to help their students develop their IT competencies. IT is used beyond the traditional bounds of the IT department therefore learning partnership can help encourage people from other vocations into the IT discipline.

Work-integrated learning benefits the student, academic education provider and the industry-organisation, however there are trade-offs in the effort required to facilitate, manage and assess an individual or group of students.

Assessment is an important factor in order gauge the increase in knowledge and ability of an individual. Due to the dynamic nature of work-integrated learning, it is important to employ reflective and portfolio-based techniques to measure and grade the student's progress. Narrow assessment practices tend only to look at the project deliverable produced by an individual student or group. An organisation can also consider portfolio or reflective assessment techniques to help the development of a graduate or intern and measure the progress / success of a programme.
2.8 Linking with industry

Smith, Mackay, Challis, and Holt (2006) stated that an academic learning organisation and the workplace learning organisation needed to function together as a single learning organisation to facilitate a student’s learning. As discussed previously, ‘Accelerating Auckland’ is just one initiative aimed at bringing businesses and academia together to encourage people into the IT discipline and foster the transition of IT students into the IT workforce. A number of authors identified work-integrated / cooperative learning placements as one of the main linkages between academic institutions and industry (Corich & McLay, 2004; Eakins, 2000; Groenewald, 2004; Haddara & Skanes, 2007; McDermott, 2008; Smith et al., 2006). The benefit of integrated industry-based learning is the ability for students to apply theory to real world practical situations (Corich & McLay, 2004). In a literature review by Haddara and Skanes (2007), benefits for an organisation participating in cooperative education / work-integrated learning included:

- the opportunity to attract and employ motivated, enthusiastic people
- develop a recruitment pool for “special” projects
- the ability to screen candidate employees
- improve corporate profile
- reduce operational cost
- create a dynamic work environment.

Industry-based mentors are considered central to the relationship between the academic institution and the company (Smith et al., 2006). Interest and commitment by work-based supervisors are considered influential factors in ensuring that students experience quality supervision (McDermott, 2008). Smith et al. (2006) argued that academic educators tend to make common assumptions about the role, commitment, skill level and competency of an industry-based mentor. Venables and Tan (2009) stated

“The role of workplace staff is vital in providing quality supervision of students. Their task is to foster an environment conducive to learning, facilitate learning
opportunities connected to day-to-day practice in the workplace, and promote self
direction and independence in their charges.”

Whilst Smith et al. (2006) identified eight key areas pertaining to an industry-based
programme, three particular areas were chosen for the study because they pertained to the
industry-based perspective. The study revealed several factors that influence an
organisations ability to host work-integrated learning. These factors might also have the
same influence on a graduate or internship programme. The factors are summarised as
follows:

2.8.1.1 Pragmatic motivation:

- Companies want to operate as good corporate citizens and contribute towards
  society by investing in the development of people.
- Participating in a programme provides a return on investment for sponsored
  scholarships. The company has access to resources that allow permanent staff
  members to focus their efforts elsewhere and facilitate the creation of a
  commercially valued product.
- Participating in a programme enables access to talented people in the future.
  Graduates can become part of a pool of talented casual resources or even
  permanent employees.

2.8.1.2 Value-added motivation:

- Building a link between the tertiary institute and industry enables a company to
  understand and input what is happening in academia and provides confidence to
  industry that support is available to an individual when they need it
- The programme produces the right types of work-ready graduates with industry-
  relevant experience.

Smith et al. (2006) recognised that not all participants were able to articulate the
value of an industry-based learning programme and that the motivations need wider
consideration when designing and implementing a programme.
2.8.1.3 Seven mentor skills:

*Process-oriented skills*

- An industry-based mentor requires knowledge of the process and skills for transitioning a student(s) into a work-integrated learning placement.

*Content-oriented skills*

- An industry-based mentor needs to have necessary skills and knowledge to be able to provide appropriate levels of support and guidance on relevant technologies, but recognise that directing a person to solve a problem on their own will lead to a richer self-learning experience.
- An industry-based mentor needs to be knowledgeable in the organisation’s business processes and be able to facilitate interaction with business people.
- An industry-based mentor needs to be able to facilitate the development of generic skills such as problem solving and understanding the organisation’s culture.

*Futures-oriented skills*

- An industry-based mentor needs to provide career development assistance to the student.
- Potentially an industry-based mentor needs to act as a role model to the student.
- An industry-based mentor needs to support the student’s personal development and encourage social interaction within the organisation in order to build confidence and self-esteem.

2.8.1.4 Features of meaningful / satisfying placement:

- The type of work a student performs should be meaningful to the organisation and not a wasteful activity that may devalue their experience.
- A student should be able to attribute ownership to the work they undertake in order to make the placement meaningful and valued by them.
- A student should be able to experience a variety of work types in order to make the placement meaningful and valued by them.
• A student should be able to exercise and extend their technical abilities in order to make the experience meaningful and valued by them
• A student should have the opportunity to develop their knowledge of business processes and culture. This relates to both the skills required by the mentor and exposure to a variety of work types
• A student should be able to develop their generic skills including soft-skills like communication
• A student should be able to explore the ability to take risks. This could result in a failure; providing it is not catastrophic, it will most likely result in learning taking place
• The placement should increase the employability of the student post graduation.

To summarise an industry perspective, Smith et al. (2006) stated some individual business participants were able to articulate their motivations for being part of the educational process. Mentors needed to possess certain skills in order to support the learning experience of the student and there are particular features that make the learning experience meaningful and valued by the student.

Industry has the opportunity to contribute to the funding of academic activities. However, there seems to be a lack of literature that identifies the specific funding opportunities or structures for New Zealand businesses. Reinhard, Osburg and Townsend (2007), categorised the different generic types of sponsorship into Philanthropic sponsorship, Human resource marketing, Third-party research support and Public private partnership was made. ‘Sponsorship’, at a holistic level, describes “supporting activities, donations, gifts, research contracts…” and the majority of voluntary donations are considered as contributions towards the tertiary institute’s goals (Reinhard et al., 2007). Different examples presented range from the funding of a scholarship that covers the student for their entire degree, through to only funding transport cost during the industry-based placement (Smith et al., 2008). Funding or remuneration needs to be fair and transparent to both the students and the industry-based organisation, and the student needs to understand and feel that they are being treated “equitably” (p. 78).
There are varying degrees of relationship between industry and academia, which could relate to the nature and size of the industry organisation. For example, Reinhard et al. (2007) discussed the experience of Intel Corporation and their educational public-private partnership. This is similar to the local New Zealand example from Corich and McLay (2004) where close collaboration with Allied Telesyn enabled the development, review and refinement of specific course curriculum.

Communication between the academic education provider, the student and the work-based supervisor is a key relationship component. McDermott (2008) set out initially to investigate the satisfaction levels of work-based supervisors in regards to co-operative documentation and the quality of student performance in the workplace. Using the results from this study, McDermott (2008) then set out to inform and enhance the support systems for the relationships with work-based supervisors. As a result, the student’s work-based learning contract was revised to better define the learning aims and strategies for achieving them. Work-based supervisors providing confidential feedback about the student, was trialled and had the benefit of increasing the level of communication with the academic co-operative placement coordinator. It was reported that there had been some confusion around providing feedback; therefore having clearly defined communications guidelines ensures that all parties understand their obligations and the benefits of providing feedback. Leveraging award-based ceremonial events also helped to affirm the relationship between the academic education provider and work-based supervisor. Communication channels and training were also improved by enhancing a co-op website where academic supervisors, employers and students could obtain information. McDermott (2008) also found a willingness by work-based supervisors to be involved in co-op introductory workshops, which would establish the communication early on in process.

One of the techniques for developing and strengthening linkages between industry organisations and tertiary institutes is to invite business representatives to speak as guest lecturers. Kamoun and Selim (2007) present and discuss a framework for assessing the learning outcome of guest speaker events. The main goal of the industry guest speaker session is to provide practical real world knowledge transfer, ensuring that the topic
covered is aligned with the course syllabus (Kamoun & Selim, 2007). In addition, Kamoun and Selim (2007) recommend that the guest speaker also present new perspectives outside the prescribed curriculum. This is because the IT industry is changing so rapidly and a guest lecturer provides the opportunity to discuss emerging technology trends, new solutions and paradigms that are not covered in the course texts.

The researcher considers that this factor may also be reciprocal, in that research and development within tertiary institutes can be shared with industry-based organisations. Kamoun and Selim (2007) remarked that funding for guest speaker events is often overlooked. Costs for facilitating these events need to be factored into initial setting of the budget. Assessing the learning outcomes from guest speaker events needs to formative in that the results need to be fed back into improving the guest speaker events and in turn improving the learning outcomes, therefore making it a cyclic process.

The result of Kamoun and Selim’s study confirmed that inviting guest speakers from industry benefited the learning outcomes and experience of the students. It increased the practical IT knowledge and helped build confidence with career planning.

In summary, work-integrated learning offers a number of benefits for an organisation, but the organisation is required to provide appropriately qualified and motivated staff to guide and support an individual in their placement. This is to ensure the individual has the best opportunity to learn and gain experience. The work undertaken should be meaningful to both the individual and the organisation and enable the individual to attribute ownership and build confidence whilst the organisation gains production compliant output at cost effective rates.

There is a variety of ways an organisation can sponsor an academic education provider or student and contribute to the development of IT skills and knowledge. It was unclear to the researcher which sponsorship models are most common in a New Zealand context. However, work-integrated learning and the use of Capstone projects seem to be the most well established practices. The value and success from a sponsorship is dependant on having a strong relationship between the academic education provider and the organisation.
2.9 Preparing students for industry

The literature reveals a few techniques for preparing students for industry including:

- Defining learning outcomes
- Pre-placement activities
- Capstone projects - including service-based projects
- Internships / Work Experience
- Case Studies.

Bates et al. (2007) stated that, as the use of work-integrated learning becomes more predominant in academic programs, it is becoming necessary to better define the curriculum and learning outcomes. One aspect is the use of a curriculum statement as a means of documenting the responsibilities of each participant and learning expectations, without impeding the need for flexibility. As stated by Pauling and Komisarczuk (2007), “The work experience coordination need to focus the student on these learning objectives” (p. 127). Bates et al. (2007) identified the three participants responsible for preparing a student for industry as the academic education provider, the industry-based organisation and the student themselves. In order for the student to become competent through the experience of work-integrated learning, each participant is accountable for different aspects of the engagement. Bates et al. (2007) recommended that explicit definition of responsibilities is captured in a curriculum statement. A summary of these responsibilities includes the coordination and assessment of students and the guidance and support available to the student. They also stated that an active and intentional partnership must exist between the academic education provider and the workplace organisation in order for the student to obtain support when it is required, as this is often their first work-based career experience. Pauling and Komisarczuk (2007) added that the Career Service within the academic education provider plays a role in helping students develop skills in finding employment.
Beyond base academic knowledge, students require experience in order to be marketable in the workplace. Some students are remunerated for the work they undertake in cooperative work placement. In order for an organisation to have confidence they will gain value from the student, it is necessary for the student to be prepared prior to engagement. Snell, Snell-Siddle, and Whitehouse (2003) and Pauling and Komisarczuk (2007) identify CV writing and the interview process as important learning opportunities and Howard (2009) discusses the use of preparatory courses such as résumé writing, interview skills, ethics, health and safety and industrial relations, in order to develop “generic attributes” that are commonly sought after by industry-based organisations (p. 178). Betts et al. (2009) stated that learning simulation through role-plays, psychodrama, socio-drama, gaming and reflection helped to prepare students for work-integrated learning and ultimately career placement, advancement and transition. Using representatives from industry and a recruitment agency, students were able to get an understanding of the recruitment and interview processes, have the importance of soft skills reinforced and have the qualities employers look for reinforced (Snell et al., 2003). Using job-search seminars and mock interviews was found to benefit the student preparing for the industry working environment (Reddan, 2008). Some of the main benefits of the interview process were:

- the ability for a student to identify weaknesses they could improve on
- the ability to practice answering interview questions
- the ability to better prepare themselves
- the ability for a student to identify their strengths
- the ability to improve self-confidence and
- the ability to handle stress better (p.120)

CV writing and role-playing mock interviews are seen a key contributors to building a student’s self-confidence and preparing them for the workplace. These activities need to be timed when the student is ready for them; towards the end of a degree course and not as part of a communication paper at the beginning of the course (Snell et al., 2003).
The Capstone project featured prominently throughout the literature reviewed as a well-recognised and practised course in the IT curriculum. Bridgeman (2003) described the Capstone project as the opportunity for a student to use “tools and skills learnt earlier in theory classes, to create a pragmatic plan and implement a timely, cost effective solution” for a client who has a real world problem to solve (p. 211). There is a variety of factors studied in regards to the design, development, implementation, monitoring and assessment of work-integrated learning and Capstone projects for preparing students for industry. Of the research articles reviewed pertaining to preparing students for industry using Capstone projects, the areas discussed were:

- purpose and value
- compulsion
- duration
- life cycle
- documentation
- flexibility and
- evaluation

The purpose of an IT Capstone project is to provide students the opportunity to develop an appreciation for the workplace and enhance their skills through experience and exposure to tools and provide a step toward final accreditation (Pauling & Komisarczuk, 2007). Whether the course is mandatory or optional depends on the availability of industry participants and the students finding suitable placements. If given the option, students tended not to take the opportunity to participate in industry-based learning, probably due to a lack of confidence (Smith et al., 2008).

Whether is it is a year-long placement or two sixteen week periods of placement, it was found that “timing was highly dependent on students having sufficient technical knowledge to make a worthwhile contribution” (Smith et al., 2008, p. 76).

Bridgeman (2003) described five phases of a student project life cycle in order to support the industry and academic processes. He stated a student’s success depended on their ability to demonstrate the skills to manage the technical output of the product delivery as
well as the planning and management of the academic processes and relationships between the two.

Keogh and Venables (2009) argued that using industry-related project management documentation would help to increase the “…industrial-strength authenticity for students”. The active use of a project management plan for defining and managing tasks associated with learning activities was informally found to result in students achieving better outcomes than if they had not used one and therefore increasing the work-readiness of the student (Keogh & Venables, 2009). The use of the documentation was also seen to increase the level of confidence of students managing projects in the workplace.

McLay, Corich and Millman (2005) discovered that it is not always possible to follow a prescriptive approach when using a capstone project to deliver a client’s requirement. Flexibility needs to feature in the way academic education providers establish and assess a capstone project. What this example also demonstrated was the student themselves was flexible based on a challenging project brief. Being flexible and responding to the changing needs of industry and students, McLay and Skelton (2007) developed and reported on an ‘internship’ approach. Flexibility in employees was a top-ten competencies preference found in an employer survey (Hodges & Burchell, 2003).

In a small survey, Wieck (2003) reported the Capstone project improved confidence and competence in students. A wider set of survey results indicated that industry and students were satisfied with work-based learning and placements (Pauling & Komisarczuk, 2007).

Two papers retrieved and reviewed (Patten & Keane, 2009; Swinarski et al., 2008) proposed to look at the benefits of community-based, service learning projects. The findings had not been published at the time of this literature review but the proposition was for a student to develop social awareness and civil responsibility whilst delivering an IT solution for a not-for-profit organisation. In both cases, the aim was to investigate the impacts service projects have on the collaboration between academic education providers, students and the community-based organisation.

A key set of activities is the managing, coordination and supervision of the Capstone project. Using Curtis, Heffley and Miller’s 1995 “People Capability Maturity Model” (P-
CMM), Fielden (2004) was able to develop a Capstone project maturity model (CPMMM) to assess the management practices across a number of New Zealand academic education providers. Using the CPMMM tool made it easier for academic education providers to reflect and act on improving their Capstone project management practices (Fielden, 2004).

Internships are another method for students gaining industry experience. However, an IT internship differs from a capstone project in the way that it is run and the way it is assessed. An internship is less structured in the type of work performed and experienced compared to that of a project. Instead of a traditional project proposal, analysis and delivery approach, students are required to keep a running logbook of work or task-based problems and solutions, in order to be able to reflect and learn from the experience (Doel, 2009; McLay & Skelton, 2007; Pauling & Komisarczuk, 2007). The benefit of an internship is the opportunity for a student to enhance their technical skills, problem-solving and business communication skills as well as improving their employment prospects (Venables & Tan, 2009). Another benefit of an internship programme is that the person is on site, which makes communication, sharing of ideas and the monitoring of progress easier for the employer (McLay & Skelton, 2007). McLay and Skelton (2007) found that an internship is only an alternative and not a replacement for a capstone project, as the internship did not suit every student. Pauling and Komisarczuk (2007) recognise that employing an intern over the summer period is not ideal, due to the reduced activity, staff taking holidays and fewer supervisors available to support someone. Therefore, work experience may need to be gained at other times of the year. Venables and Tan (2009) proposed two internship models. One model inserted an internship between years two and three, increasing the academic qualification duration to four years. The alternative model proposed the internship in the last semester of the three-year programme. Both options have their implications on faculty staff, students and industry partners. Costs, duration and accreditation all require consideration. One opportunity explored by Wilkinson (2008) was enabling students to maintain a connection with internship coordinators through the use of communication technology and video diaries. Whilst adopted well by the students, internship coordinators preferred traditional methods, such as written reports, to observe progress.
Case studies involve a real-world problem or a requirement students need to meet, within the bounds of the academic institute. Macgregor and Nesbit (2008) reported on a situation where students developed products as they would if engaged in a Capstone project, using four real-world examples as case studies. It was found to be a comparative approach in achieving similar learning outcomes. The case study process was believed to have worked due to student engagement, teamwork and student ability; approval by academic management; and tutor interest and engagement (Macgregor & Nesbit, 2008, p. 143). However Bidois, Clear, Gates and Talbot (2004) found that in their experience of using lecturers as clients there had been role confusion as the lecturers had to perform multiple stakeholder roles and found that students did not perceive the lecturers seriously as clients. In addition, time constraints meant that there was not the anticipated development of both technical skills (i.e. the product output) and soft skills (i.e. project management and process learning). Bidois et al. (2004) proposed to split the class-based offering into two separate modules (p. 26). Technical and soft skills were considered for a work-based supervisor running an undergraduate project, internship or graduate programme. Apart from initial indicators reporting the case study process a success, Macgregor and Nesbit (2008) mentioned that the intensity surrounding the tutor’s workload increased, although ultimately some time was freed up, presumably by not having to manage a full-scale capstone project. This is another factor for consideration in an industry-based organisation context.

In most cases, the articles reviewed recognised ‘reflection’ as a key activity for students to learn from their experiences. Learning from experience does not occur unless the student actually thinks about the experience and takes responsibility it (Doel, 2009, p. 172). Reflective learning can be measured by students “sharing their learning and experiences” through collaborative group work and presentations. These in turn provide stories to fellow students and facilitate even further learning (P. Howard, 2009, p. 184). During a cooperative project “reflection activities include written and verbal weekly status reports, verbal reflection during team meetings, monthly individual written reflections, and written feedback and reflection through the peer review process at the end of the project” (Patten & Keane, 2009, p. 6). These activities culminate in the assessment of the learning and course grade awarded to the student.
Beyond the core technical skill development, preparing students for industry initially begins in the classroom with development of generic skills through CV writing and mock recruitment / interview practice. This helps to build confidence and identify any existing strengths a student may have, or weaknesses that need working on. IT Capstone projects or IT internships, also built confidence as well as developing soft and hard skills whilst gaining on-the-job experience. Consideration of duration, the work areas to be experienced, documentation and assessment is required to support the learning experience in an IT Capstone project. Where an industry-based partnership does not exist, then a class-based case study is an alternative option for achieving similar learning outcomes. The definition of the learning outcomes and objectives using curriculum statement is as important as having a degree of flexibility built into the programme. Additionally, a key consideration is the ability for an organisation to measure a graduate or internship programme. This could be achieved by using techniques like People Capability Maturity Modelling.
2.10 Competencies and skills required

Based on a literature review, Rainsbury, Hodges, Burchell and Lay (2002) found that an individual’s attributes fell into two categories – cognitive skills and behavioural skills. These were considered hard-skills and soft-skills respectively. The ability to deliver outcomes can leverage both cognitive and behavioural aspects. Technical knowledge, analytical skills and problem solving skills are used to identify problems and develop solutions. Whereas organisational skills, interpersonal skills and relationships are used to deliver solutions, for example, through organisational networks (Rainsbury et al., 2002).

2.10.1 Skills sought after

Businesses will require certain competencies when employing a graduate or intern. Across three studies, two focussed on business graduates and one focussed on science and technology graduates, Rainsbury et al. (2002), Coll, Zegwaard, and Hodges (2002) and Hodges and Burchell (2003) found a willingness to learn was the most important competency for an individual to possess in the workplace. Other key competencies found were computer literacy, customer service orientation, self-confidence, initiative and teamwork. Rainsbury et al. (2002) found that although hard and soft skills are equally important and should be treated holistically, graduates were found to consider soft skills more important than hard skills in the workplace. This was in contrast to Coll et al. (2002) who found that science and technology employers perceived hard skills to be more important than soft skills. This is supported by Bullen, Goles and Kaiser (2006) who found that as well as “client facing skills”, IT management were “still looking for technical skills in their mid-level hires” (Bullen et al., 2006, p. 3218). However, Zaffer and Winter (2008) stated that there had been a constant call for more soft skills in IT workers.

In collecting a summary of graduate profile attributes, Corich and Williams (2005) stated that it was easier to find graduates profiles on University web sites than on Institute of Technology web sites. Common attributes a graduate was likely to possess regardless of
degree, were communication skills, business environment knowledge, cultural and ethical awareness, problem solving ability, information and computer literacy and personal skills (Corich & Williams, 2005).

Using a web-based information mining tool, across US-based job advertising web sites, Litecky, Aken, Prabhakar, and Arnett (2009) were able to categorise, rank and display the key skill sets employers are looking for. Based on findings from the Society for Information Management (SIM) 2005 data gathering, Bullen et al. (2006) also listed the top skills sought for in-house positions. A comparison in Table 3 has been used to show the top five skills sought after from Litecky, et al. (2009) and the recruitment attributes sought after in the SIM research findings.

<table>
<thead>
<tr>
<th>Category</th>
<th>Top 5 skills sought</th>
<th>SIM Entry-Level</th>
<th>SIM Mid-Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business skills</td>
<td>• Managing / Supervision</td>
<td>• Project Management skills</td>
<td>• Business Domain Knowledge</td>
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<td></td>
<td>• Finance</td>
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<td></td>
<td>• Business Process Design / Re-engineering</td>
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<td></td>
<td>• Business Strategy</td>
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<td></td>
<td>• Project Management</td>
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<td></td>
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<tr>
<td>Soft Skills</td>
<td>• Leadership</td>
<td>• Communication</td>
<td></td>
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<tr>
<td></td>
<td>• Problem Solving Skills</td>
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<td></td>
<td>• Responsibility</td>
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<td></td>
<td>• Innovation</td>
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<td></td>
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<td></td>
<td>• Written Communications</td>
<td></td>
<td></td>
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<tr>
<td>General Technical Skills</td>
<td>• Systems integration</td>
<td>• System Analysis</td>
<td>• Systems Analysis and Design</td>
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<td></td>
<td>• Security</td>
<td>• Systems Testing</td>
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<td></td>
<td>• Testing</td>
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<td>• Certification</td>
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<td></td>
<td>• Office Applications</td>
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<td></td>
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<tr>
<td>Programming Languages</td>
<td>• HTML / XHTML / DHTML</td>
<td>• Programming Skills</td>
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<td></td>
<td>• SQL</td>
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<td></td>
<td>• Java / J2EE / J2P</td>
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<td>• Visual Basic</td>
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<td></td>
<td>• C/C++</td>
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<tr>
<td>Database Management Skills</td>
<td>• SQL</td>
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<td></td>
<td>• Oracle</td>
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<tr>
<td></td>
<td>• Generic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Microsoft Databases</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Database Administration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
System administration
• Microsoft operating systems
• UNIX operating systems
• Operating Systems
• Computer Servers
• Web Application Server

• Voice/Data
• Telecommunications
• Desktop Support/Helpdesk

Table 3: Summary of Skills (Bullen et al., 2006; Litecky et al., 2009)
The implication of these results is directed towards the academic education provider to identify where courses should perhaps focus, as opposed to an industry-based organisation that may have existing investments and technology choices. Using a review mechanism as shown in Table 3, is a way industry and academic education providers can understand both the skills sought after and the predominant technologies in the marketplace, therefore defining a common direction for skill development.

Nesbit (2009) took a similar approach to data gathering and analysis, but took a narrower view, specifically looking at Project Management attributes. Of the key aspects derived from advertisements, ‘building relationships with stakeholders’ and ‘leadership and management skills’ were found to be the most often sought after skills. Whilst there is some alignment with Litecky et al.’s (2009) business skills categories, there is a variation in the skills sought after based on the segment type or job role that an organisation has on offer. Therefore the generic skills identified by Corich and Williams (2005) may form a basis for initial recruitment of a graduate or intern but may not result in a graduate or intern being employed for a specific job role or task set.

Albeit focussed on business graduates and not IT graduates, Gibbs and McKinnon (2009) found that employers expected university graduates to posses a ‘good’ level of computing skills. Based on experience, employers felt they needed to lower their expectations of graduate’s computing skills in order to avoid disappointment. This was coupled with employers not knowing what level of computing skills to request (Gibbs & McKinnon, 2009).
2.10.2 Competency versus Capability – The Chicken or the Egg?

Rainsbury et al. (2002), Coll, Zegwaard and Hodges (2002) and Hodges and Burchell (2003) presented the differences between competency and capability based on literature reviews. What is unclear is what comes first. It was argued that an individual required a base level of cognitive ability, in the form of technical knowledge and skills, in order to perform a base level task, and would not become fully competent in a task until the individual had gained experience (Rainsbury et al., 2002). On the other hand, individuals need the ability take effective action using the integration of the cognitive and behavioural skills in familiar, or unfamiliar, tried, or untried, circumstances (McNeil et al., 2006; Rainsbury et al., 2002). An individual’s capability may be applied where an outcome or solution may not be certain. Groenewald (2009) found that competency and capability are two parts of the same continuum and not direct opposites. He found that there are different approaches to assessment depending on the attribute or assessment item being measured and which end of the continuum it falls. Despite the fine differentiations between competency and capability, a willingness to learn is the most important workplace factor and in order to remain capable an individual needs the confidence to continue to enhance their attributes through education and learning (Coll et al., 2002; Hodges & Burchell, 2003; Rainsbury et al., 2002).

2.10.3 Certification and qualification

With the increased demand for workplace skills and knowledge, there had been a growth of industry-based credentials and certifications (Bartlett et al., 2005). Industry-based certifications are “qualifications that are tailor-made for specific skills in specific employment settings” (Bartlett et al., 2005, p. 52). “An industry-based certification can create alternative career paths for an individual in the IT industry” (Bartlett et al., 2005, p. 53). Although technology and trends are continuously changing, industry-based certifications can act as indicators to a prospective employer of the skills possessed by a prospective employee and also indicate a commitment to life-long learning. Possessing an industry-based credential was perceived by employers to influence the recruitment
process by reducing the cost of recruitment and improving the ease and efficiency of the recruitment process (Bartlett et al., 2005). It was suggested that certification should play a part in preparing for or changing a job role (Bartlett et al., 2005). Bartlett et al. (2005) recognised that whilst employees having industry-based certificates influenced their employability, further research is required into the relationship between certification and an individual’s performance. Additionally, the need to look at the influence on industry-based certification types and providers is also required (Bartlett et al., 2005).

Bullen et al. (2006) stated that whilst IT management were “looking for undergraduate degrees in business, computer science/EE and MIS/IT”, internships were also found to be a popular method of recruitment (p. 3217).

From the competency and skills literature reviewed, there appears to be confusion as to the skills and attributes an employer looks for most in an IT worker. However, it is likely that a combination of hard skills (cognitive ability) and soft skills (behavioural skills) makes a prospective employee attractive. It is not clear whether the type, provider or grade of either an industry-based certification or academic qualification is a leading factor in the recruitment of an IT graduate or intern.
2.11 Learning development

Learning development is about the ongoing commitment to developing skills and knowledge once employed in the IT workforce. Life-long learning and continuous professional development (CPD) are thought to be expensive, however in the effort to keep workplace knowledge up to date, different approaches are taken towards CPD. Bullen et al. (2006) found that despite reports of reduced IT budgets and lack of in-house training investments, their participants indicated a strong commitment to developing their workforce through education and training. A literature review carried out by Börjesson, Pareto, Snis, and Staron (2007) found the following approaches to CPD:

- Short courses
- On-line courses
- Tailor-made courses
- In-house courses
- Postgraduate level part-time courses
- Work-based learning
- Facilitated work-based learning
- Problem-based learning
- Professional workshops
- CPD clubs

Professional Integrated Learning (PIL) was one approach that organisations and universities could use to overcome stalled careers and a stagnant knowledge base (Börjesson et al., 2007). This involved a joint venture between an organisation and an academic education provider that mixed industry-based professionals with ordinary students in project courses. Börjesson et al. (2007) presented a PIL model for life-long learning and argued that knowledge loses its value over time and that an injection of higher education helps to keep an existing employee competitive amongst subsequent generations who are valued for their new knowledge. Through a profession-oriented, project- and problem-based curriculum in cooperation located with industry, the benefits
were shared (Börjesson et al., 2007). Employed professionals updated and increased their knowledge and skills and students saved time in understanding how industry worked. By using this approach, IT professionals deepen their knowledge and reduce the threat from new generational knowledge, but it does not preclude graduates entering the workforce.

In a “snapshot” study of students’ training expectations in the transition from study to workplace employment, Bremer (2005) found that although there can be unrealistic training expectations, a good approach can be to encourage self-directed learning and problem solving. In this brief study, students were found to expect on average seven days of training within the first year of employment, with a tendency towards formal delivery. However, a higher preference was found towards workplace learning through shorter instructional sessions (Bremer, 2005).

The organisation can itself facilitate continued professional learning. Li, Jiang, and Klien (2009) hypothesised that team learning, based on Social Interdependence Theory, positively related to team leadership and team performance. Leadership and learning within an IT team was more likely to occur through shared experience. Having a shared purpose, social support and external coaching with an internal team environment were found to be predictive indicators of shared leadership (Carson et al., 2007).

One supplementary learning strategy as described by Collier and McManus (2005) is to employ learning partnerships, where graduates or interns meet occasionally to support each other’s learning by sharing experiences and promoting problem solving and reflection. Organisational culture and the way learning partnerships are set up can influence the effectiveness of a programme (Collier & McManus, 2005). Collier and McManus (2005) found that those that embraced the learning partnership approach enhanced their professional practice, strengthened their networks inside and outside the immediate workplace and benefited overall from the experience.

Mentoring is another avenue in which a graduate or intern has the opportunity to learn. Acting as a mentor is just one responsibility a supervisor can undertake in helping a graduate, intern or employee become competent (Bates et al., 2007). “The purpose of
Mentoring is to transfer the lessons of greater experience in a workforce competency to improve the capability of other individuals or workgroups” (Curtis et al., 2009, p. 39). As discussed previously in the Linking with industry section, a mentor requires process-, content- and future-oriented skills in order to provide the best possible experience for a graduate or intern.

The researcher personally appreciates the concept of "Lifelong learning" and the commitment it can require. The example by Börjesson et al. (2007), showed that an employer and academic education provider worked together by creating a course and enabled employees to refresh or gain new skills at the same time as cross-pollinating industry experience with students. Mentoring is an opportunity and another way for existing employees to develop themselves further by sharing their experiences and knowledge with those junior to them. However, based on the literature reviewed in this study, a support programme needs to accompany a mentor so both they and the student achieve the desired learning outcomes.
2.12 Culture, commitment and retention in the workplace

As stated in Bates et al. (2007), workplace culture is “the traditions, rules, sanction systems and expectations that new professionals are asked to accept and respect” (p. 121). According to Curtis et al. (2009) “culture of an organisation is reflected in the shared values and resulting patterns of behaviour that characterise interactions among its members” (p. 5).

Bates et al. (2007) stated

“Work efficacy runs deeper than just knowledge and skills; it involves the sense of belonging to a particular profession and of having adopted successfully the cultural and behavioural norms associated with ‘membership’. These include details like the dress codes and the rules and sanctions systems that are often unspoken as well as the assumption that the individual shares a common set of values, attitudes, skills, esoteric knowledge and jargon often inaccessible to those who are outside the profession.”

Cukier, Yap, Holmes and Hannan (2009) used the term “visible minorities” to categorise non-Caucasian people. These are often immigrants with IT skills who are used to fill an employment gap where local graduates cannot meet the supply and demand needs (Cukier et al., 2009). There was a negative gap found with visible minorities in regards to IT career satisfaction, commitment, relationship with managers, diversity and inclusion practices and educational attainment. Guzman et al. (2006) found that adaption to an “IT occupational culture” was a indicating factor for workplace commitment (p. 168). Guzman and Sharif (2006) assumed that cultural difference and language were contributing factors. However, Asgarkhani and Wan (2008) found a high willingness to learn and an interest in the topic were more likely to make a candidate successful than language or cultural difference being a barrier.

One IT research study showed men as the predominant participants indicating that the IT workplace is dominated by the male gender (Mann et al., 2009). Whilst there was a minor gap in workplace perceptions between Caucasian males and Caucasian females.
(Cukier et al., 2009), there had been conflicting results in gender specific attitudes towards careers in IT (Fagnon et al., 2007). Morley and McDonnell (2009) found that men and women shared the same attraction to IT such as innovation and intellectual challenge. However, women believed they had to reaffirm and keep their technical skills up to date in order to remain credible, where as men relied on their technical background as inferring credibility (Morley et al., 2009). Recognition was also a factor for women but not for men. Men were found to have a higher self-efficacy than women and men tended to integrate IT into their leisure activities more than women did (Stanton et al., 2006).

As stated by Cukier et al. (2009), in order to support visible minorities, women and other under-represented groups the following need to be considered when developing a programme:

- “Supportive relationships with managers and colleagues
- Open and transparent recruitment and promotion policies
- Organisational support for diversity
- Senior executive support for diversity
- Utilisation of skills and
- Recognition of foreign credentials.”

Referring to the literature review by Guzman and Sharif (2006), occupational commitment refers to the attachment, motivation and relationship an individual has to their occupation and to the organisation they are employed by. More negatively, occupational commitment refers to retention or turnover associated with an occupation (Guzman et al., 2006). As indicated by Asgarkhani and Wan (2008), those with a lack of skills, competence and commitment were unlikely to be successful with their work.

Negative stories told in business about various failures of IT implementations were found to be a contributing factor towards negative impression of the IT industry and its low status in comparison to other career disciplines (Avison, 2007).
These aspects of culture within an IT workplace are factors a graduate or intern needs to be aware of when entering a new workplace environment. However, a willingness to learn and an interest in what they are doing help to assimilate into the environment. Gender difference does not seem to affect the attraction to IT. Social relationship, recognition of equality and the ability to climb the corporate ladder are seen as challenges for women in the IT workforce. Therefore, the dynamics between men and women in the IT workplace could also be a factor for a graduate or intern. Whilst negative stories have permeated from the IT industry and affected the attraction aspect, the researcher considers that story telling is a useful mechanism for existing industry-based team members to share experiences with a graduate or intern.
2.13 Literature Review Summary

The New Zealand government has indicated that IT is a key element to ensuring a healthy environment, a high-value economy and a vibrant group of communities and cultures (New Zealand Government, 2008). Of the four enablers the New Zealand Digital Strategy identifies, this research focussed on the “Capability” aspect. This is about attracting, developing and retaining people in the IT industry.

A large quantity of literature reviewed were studies undertaken by academic researchers and collectively the focus tended towards the three phases of the student life cycle in an IT academic programme as presented by Koch et al. (2009). This was attracting students into IT academic courses, preparing them for industry and placing them in industry. Whilst there was some research into what employers were looking for in a graduate and what role an IT industry-based employer could perform to support student learning development, there was a gap from an industry-based employer’s perspective. What happens beyond graduation for an IT graduate and the factors for an industry-based employer, were not studied in depth compared to the factors influencing an academic education provider.

Evidence in the literature showed that there had been decreases in the number of enrolments in IT academic programmes. The literature also showed that there were increases in the number IT job roles with a prediction that this was likely to continue to rise. It was suggested that the number of enrolments was cyclic (Dick et al., 2007; Wills & Sutcliffe, 2005) with Firth et al. (2008) indicating some enrolments were back on the increase. With the increasing demand for cost effective resources the impact on business could lead to some initiatives place on-hold or delayed.

Being able to meet the demand of the IT industry went beyond the increase in enrolments and developing of IT students. There is a need to develop the academic educators to keep their skills current, improve retention and improve the quality of teaching, coaching and career guidance. Developing education pathways between secondary schools, tertiary education providers and industry is one important factor in improving the sustainability
of IT careers into the future. Additionally, promotion of the IT discipline helped to adjust perceptions and attract people into the IT industry.

Curriculum and assessment are the important factors for building skills and competencies and gauging learning through feedback. IT introductory courses were still relevant for helping to build confidence. This approach is a consideration for an IT graduate or intern entering the workplace. Enabling students to have a choice and input into a course outline to evolve their interest in a particular IT subject area, is another consideration for an industry-based IT graduate or internship programme. Negotiated learning requires collaborative planning and assessment by both the academic education provider and the student.

Developing learning partnerships between academic faculties was a way of increasing student’s knowledge of IT, which presented the opportunity of attracting people into IT from other vocational backgrounds. Partnership or sponsoring were ways in which an organisation and an academic education provider could both benefit from student work-integrated learning placements. Sponsoring events such as award ceremonies was one of the ways an organisation could contribute towards the relationship with an academic education provider.

A significant amount of literature focussed on the study of work-integrated learning and Capstone projects. Work-integrated learning played a significant role in the learning process, as a student transitioned from the academic classroom to the workplace. Capstone projects or internships, helped to build confidence as well as soft and hard skills. However, effort was required to maintain relationships between industry-based partners and academic education providers and to monitor the progress of students. Reflective and portfolio-based assessments were an important method for gauging and measuring student learning during work-integrated learning or Capstone project.

An organisation was required to provide appropriately qualified and motivated staff to guide and support an individual in their placement. This ensures the individual has the best opportunity to learn and gain experience. The work undertaken should be meaningful to both the individual and the organisation and enable the individual to
attribute ownership and build confidence whilst the organisation gains production compliant output at cost effective rates.

Prior to students entering the workplace, CV writing and mock recruitment / interview practice were undertaken by students to develop their generic skill set. Again, this helped to build confidence and identify any existing strengths a student may have, or weaknesses that need working on. Duration, the work areas to be experienced, documentation and assessment were all considerations for Capstone projects or internships in order to support the learning experience. An alternative to a Capstone project or an internship was the use of a classroom-based case study. This was an alternative option for achieving similar learning outcomes, where an industry-based partnership did not exist.

The definition of the learning outcomes and objectives were equally important with the use of curriculum statements and a degree of flexibility built into the programme. Additionally, a key consideration is the ability for an organisation to measure a graduate or internship programme. Capability maturity modelling was used to assess selected New Zealand academic educators’ Capstone project frameworks. Using a maturity model for assessment enables improvements from ad-hoc approaches to optimised practices.

Whilst a willingness to learn stood out as the most significant skill a graduate or intern could have, there were mixed results in what other specific skills employers were looking for. Graduates tended to have unrealistic expectations when it came to additional technical training in the transition to employment.

As shown by Börjesson et al. (2007), an employer and academic education provider can work together to create courses that enable employees to refresh or gain new skills at the same time as cross-pollinating industry experience with students.

Teamwork and mentoring are ways for existing employees to develop themselves further by sharing their experiences and knowledge. However, based on literature findings, it is evident that a support programme is needed to accompany mentor development in order to ensure that both the graduate / student and the staff member achieve the desired learning outcomes.
Culture (being the shared values, beliefs and traditions of the group) is a consideration for a graduate or intern entering a new workplace or work area. The literature suggests that gender is not a factor in the attraction to the IT discipline. However, there are perceived challenges for women in the way they advance their career in a predominantly male-oriented industry. Other non-Caucasian minorities groups also faced challenges in the establishment and advancement of a career in IT. A willingness to learn and an interest in what they are doing will help graduates/interns to assimilate into the environment.
3 Methodology

This section describes the approach taken towards carrying out the research study in order to answer the research questions. The methodology and method are discussed as well as the considerations given towards world-views and ethics. The research process was divided into three phases, as follows.

3.1 Phase 1 – Method and Design

Phase 1 was concerned with determining the research method appropriate to the research area. The following steps were taken:

1. Define the gap in the existing research literature and frame the issue (scope) and objectives with the research question(s);
2. Define the research design including the approach and method. This research project was a qualitative case study of a New Zealand organisation; and
3. Determine the sampling including data collection methods (survey, interviews), identification of candidate participants, location and engagement.

3.1.1 Research questions

The research questions set out to determine the strengths and weaknesses (maturity) of the organisation and the benefits, constraints and opportunities the organisation faces when considering the implementation of a graduate or internship programme.

The main question is:

What are the factors involved in developing an effective IT graduate or internship programme within a NZ organisation?
The sub questions are:

Do current employees have a positive attitude towards an IT graduate or internship programme?

What are the perceived benefits by management of implementing an IT graduate or internship programme?

How mature is the organisation in supporting an IT graduate or internship programme?

3.1.2 Qualitative Research Method

The research project is a qualitative case study of a large New Zealand utility organisation. This study is social-oriented research because it is concerned with the perceptions and attitudes of people - employees, managers and the supporting organisation.

The procedure for a qualitative study includes advancing the assumptions of qualitative designs, indicating the specific type of design, reflecting on the researcher’s role, discussing the data collection, developing data recording procedures, identifying data analysis procedures, specifying verification steps and delineating the narrative outcomes of the study (Creswell, 1994, pp. 143-144).

3.1.3 Researcher World View

Reasons behind undertaking a qualitative research study, are the researcher’s job role and interest in both IT leadership and management. Biases, values and judgements (Cresswell, 1994, p. 147) coupled with relationships play an integral part in this qualitative study. Creswell (2009) states the researcher’s personal experience can influence the research method and approach. At the time of this research study, the researcher was employed by the subject organisation and had been [employed] for ten
years. The researcher’s motivation can be considered as an “interest in culture and politics of organisations to see what change is feasible and in gaining commitment from participants to agree courses of action” (Jackson, 2003, pp. 22-23). However, the intention of this research is to enable the views of the participants to emerge in a transparent and unbiased manner.

3.1.4 Case Study Design

A case study involves the examination or evaluation of a single unit or instance (Denscombe, 2003), whether it is one or more individuals, a programme, event, activity or process (Creswell, 2009).

Graduate work placement and employment is a “real-life context” (Yin, 2003, p. 1), therefore Case study research has been chosen. This case study looked at the perceptions of managers and employees within a particular organisation which are the “contextual conditions” (Yin, 2003, p. 13) under which it gives rise the data collection and subsequent analysis. The process had five components of research design planned into it as defined by Yin (2003). They were:

1. The study’s questions
2. The propositions
3. The unit of analysis
4. The logic linking the data propositions, and
5. The criteria for interpreting the findings

3.1.5 Organisation Operational Procedures

The case study organisation’s HR department was consulted prior to the commencement of the data-gathering phase. Approval was sought and granted to proceed with the study.
Their only proviso was that the company name remain anonymous. Adherence to company policies and guidelines was observed at all times.

3.1.6 Ethical Considerations

Consideration was given to time and cost to the case study organisation. All participants were very accommodating with their participation. Because this study surveyed and interviewed participants, there were ethical considerations when it came to their rights and potentially what the research represented. Because this study did not propose any direct change, it was assumed that the implications were minimal. Because of the researcher’s existing relationship within the organisation, there were no anticipated ethical concerns with this research project. However, in any case, each interview and survey participant received anonymity. Interviewees were asked to sign a Consent Form prior to the interviews taking place.

Consideration was given by the following:

- Participants received communication prior to the release of the online survey or booking of face-to-face interviews.
- Individual consent and acceptance for the online survey were solicited via the survey tool. Participants were only able to proceed with the survey after accepting and giving their consent.
- Interviewees received advance notice of the intent to use an audio recording device during the session. The researcher transcribed the interviews and data was kept secure in password protected file stores. This included any backups made of the information.
- The face-to-face interview and online survey were optional and participants had the right to refuse to participate or to pull out up to two weeks after the data collection.
- All participants remained anonymous. Where necessary, codification was utilised.
The face-to-face interview questions were distributed to participants prior to the interview sessions. A suitable time was then scheduled with each participant.

3.2 Phase 2 – Data Gathering

At the time of this research project, the researcher was employed at the case study organisation. There were no issues encountered with access to, or availability of, the data. The two main considerations for data collection are “what is to be recorded? And how will it be recorded?” (Cresswell, 1994, p. 149)

“A combined method study is one in which the researcher uses multiple methods of data collection and analysis” (Cresswell, 1994, p. 174). As stated by Gray (2004) “the case study requires the use of multiple sources of evidence” (p. 129). The use of multiple collection methods and data sources was intentional in order to triangulate the results. This helped to determine patterns in the results, correlate responses and find commonalities in data.

3.2.1 Sampling

At the time of this research project, the company had an existing graduate programme that catered for a limited number of electricity engineering graduates and a single gas-engineering graduate. The IT department had approximately 45 employees that covered all facets of IT delivery and support, from helpdesk functions to project management and from network security to enterprise architecture. There were no predetermined criteria for selecting candidates. In order to gain a cross section of perceptions, IT management staff and engineering graduates were interviewed and a survey of the wider IT department was carried out.
3.2.2 Primary Data

3.2.2.1 Online Survey

“Questionnaires are research tools through which people are asked to respond to the same set of questions in a predetermined order” (Gray, 2004, p. 187). A web-based online survey involving the company’s IT employees was carried out. Initially it was envisaged that the company’s own online survey tool, a tool provided by Zoomerang, would be used to collect the survey data. This survey mechanism was familiar to most employees in the organisation. Due to licensing limitations and unavailability of anyone to publish the online survey on the researcher’s behalf, SurveyMonkey.com was used instead. Once developed, the survey was tested by two colleagues before being released to the target survey audience. An email sent with the link to the survey embedded in the body of the message.

It was anticipated by the researcher that the survey would result in between 30 and 40 responses; in fact, 24 of 45 possible responses were received. A contributing factor to the 53% response rate may have been an outsourcing exercise the department was going through. This was evident in the absence of particular job roles in the survey demographic results and this can be seen in the Findings section of this report.

A Likert scale was used on particular sets of questions when soliciting perception data. The Likert scale was used to measure negative or positive responses (attitudes) from participants (de Vaus, 2002; Rea & Parker, 2005). Questions were formulated to solicit their level of agreement or disagreement. A header question was asked at the beginning of each group of questions and then each individual question was posed as a statement for them to answer in either a positive or negative light. These questions were assembled in a grid like manner so the participant did not feel overwhelmed by the number of questions being asked. At the end of each section of questions, verbatim answers were solicited to increase the depth of the perception data, in case either the section did not cover everything or the participant felt particularly strongly about a topic. There were on average nineteen responses when a verbatim question was asked. Where a Likert scale was not used, response alternatives were kept to a minimum so as not to confuse the
participant (Rea & Parker, 2005, p. 63). For example of the questionnaire, refer to Appendix A: Survey Questions.

### 3.2.2.2 Interviews

Interviews were carried out with all seven members of the company’s IT management team and with four of the seven graduates who were situated in the engineering area of the business.

The interviews lay somewhere between semi-structured and open-ended types. In order to achieve rich data, the interviewees were given the flexibility to talk freely (Noel & Wincup, 2004, as cited in Silverman, 2006, p. 110), but were relatively contained to the topic through the questions themselves. With all participants, the respective question sets were issued prior to the interviews in order to provide an opportunity for a participant to understand the line of questioning that they were about to be exposed to and allow them to think about how they might answer the questions. The interviews were recorded using a portable electronic recording device and later transcribed word for word.

All seven members of the IT management team were interviewed individually. This provided the opportunity to gain insight into the leadership and management thinking within the IT department of the case study organisation. This was also intended to help triangulate the results of the Online Survey.

The purpose of the interviews with the engineering graduates was to gain insight into their experiences and to see if any parallel can be drawn between their programme and one that might be proposed for the IT department.

For examples of the questionnaires, refer to Appendix B: IT Management Interview Questions and Appendix C: Engineering Graduate Interview Questions.
3.2.2.3 Literature

A literature review was carried out throughout the data gathering and data analysis phases of the study. An annotated bibliography was kept, in order to reference and link information throughout the written report.

EndNote was used to store information about each piece of reviewed literature. Groups were created and documents assigned to them, which formed the basis for the literature ontology map shown in Figure 1.

3.2.2.4 Field Notebook

Additional subject matter material was tracked using a field notebook. This contained notes taken from any meetings or conversations around the office, during the working week and throughout the data gathering and analysis phases. This information was used to clarify or triangulate the more formally solicited information. It was pertinent to log or qualify under what circumstance the additional information was gained so the context was maintained.

3.2.3 Secondary Data

Initially there was an intention to review results from the organisation's past “Gallup survey”. At the time of data collection, the organisation was undergoing a restructure and it was decided not to introduce this as a dataset.
3.3 Phase 3 - Analysis Process

By examining multiple viewpoints, a common view of the truth or set of common or opposing threads could be obtained, for example, to see if the IT manager’s perceptions are the same or opposing to the IT staff members. This was also a way of ensuring reliability in the study (Gray, 2004, p. 257) and reducing the risk of associated bias with a single data collection method (Maxwell, 2005, p. 93 & 112).

The analysis is not intended to test an existing theory, but to let a pattern or new theory emerge as a result of the data gathering and analysis process (Cresswell, 1994, p. 94). The analysis was an iterative process (Marat, 2008) as the data were reviewed from different perspectives.

The data analysis approach loosely followed the steps as outlined by Marat (2008):

| Data reduction                  | • First level coding: Summarising segments of data |
|                                | • Second level coding / Pattern codes: Grouping summaries into sets, themes, constructs |
|                                | • General themes, memos vignettes are considered |

| Data display                   | • Interim case summary to synthesise the case / research, indicative of what the researcher knows and what remains |
|                                | • Emergence of new theory / theories, refining theory based on : new codes, new categories and new patterns |
### 3.3.1 Data reduction

As recommended by Silverman (2006, pp. 194-195), it is important to work with a limited set of data in order to make text-based analysis effective. Text-based analysis has been confined to the interview datasets and the verbatim responses collected from the online survey questionnaire.

The first step was to transcribe the recorded interviews (Bauer & Gaskell, 2002) into a form that could be manipulated. Performing the transcription was originally going to be a task for a third party, however it was decided after the interviews that the researcher would transcribe them himself. On reflection, this proved to be a valuable step in the analysis process as it enabled the researcher to recount the discussions whilst listening to participants during interviews. The desirability of the researcher transcribing their own interviews is a view shared in Bauer and Gaskell. (2002, p. 16). Capturing each response into single cells in a Microsoft Excel workbook meant that each answer could be broken down into autonomous textual units. Transcripts were then broken down line by line to derive meaning from a single sentence.

The survey results were summarised automatically at a basic level by the online survey tool. For example counts of responses to a question or average value of Likert scale responses. The survey results were downloaded from the survey provider’s website into separate Microsoft Excel workbooks, where additional review of the data was carried out. Demographic, numeric and verbatim data were further summarised to find common groupings or generalisations.
3.3.2 **Categorisation and Coding**

The main variables in the study are the perspectives of IT employee, IT manager and engineering graduate. Underlying these perspectives are their relationships to individual, team and organisation. As reported by Cresswell (1994), there are a series of steps that can be applied to coding unstructured data.

3.3.2.1 **First level coding: Summarising segments of data**

Having transcribed each individual interview response into separate cells, text reduction and paraphrasing was applied (Bauer & Gaskell, 2002) at the same time as grouping and categorisation. At first the grouping and categories followed the subject of the questions, but as further verbatim data were analysed, additional or alternative categories emerged. This process was applied to the IT managers’ interview data sets first and then repeated on the engineering graduates’ interview data sets. Because categories had already been established for the managers’ data sets, the graduates’ data sets were fitted into similar categories.

3.3.2.2 **Second level coding / Pattern codes: Grouping summaries into sets, themes, constructs**

In certain circumstances, performing a second level of pattern analysis allowed the researcher to gain a deeper level of understanding. Typically, this was where there was a matrix of answers to a common related subject to a set of questions. For example, the IT managers were asked if they had a preferred minimum grade, academic institute or qualification.

The IT employee survey used a 1 to 5 Likert scale. Analysis of the values related to each question set was performed by determining the mean and mode of the ‘scores’. These were explored to see if any determining factors could be revealed.
3.3.3 General themes, memos & vignettes

3.3.3.1 Conceptual Frameworks

According to Silverman (2006), a conceptual framework is an ontology of elements perceived from a real-world situation. A conceptual framework is used to explain the factors, constructs or variables and the presumed relationships between them in a graphical or narrative form (Miles & Huberman, 1994, p. 18). Considering the conceptual framework or model as an entity of the whole can be used to characterise a system of hierarchical structure, emergent properties, communication and control (Checkland, 1981, p. 318).

3.3.3.2 Capability Maturity Models

The Capability Maturity Model was originally introduced to improve software development practices for developing products and services. The People Capability Maturity Model (P-CMM) was developed in 1995 and was based on Carnegie Mellon’s Software Engineering Institute’s (SEI) Capability Maturity Model for Software (SW-CMM). Version two of P-CMM is aligned with Capability Maturity Model Integration (CMMI) (Curtis et al., 2009). P-CMM provides a framework for organisations to implement workforce practices, with its primary objective of continuously improving the organisation’s capability for performing competency-based processes (Curtis et al., 2009). These practices are specifically concerned with “attracting, developing, organising, motivating and retaining” workforce personnel (Curtis et al., 2009, p. 3) in alignment with the organisation strategy and objectives. The P-CMM version 2.0 is a comprehensive technical report that enables organisation to adopt and implement the prescribed framework and processes. Figure 5 highlights the process threads, process areas and maturity improvement path through each level of the P-CMM.
3.3.4 Developing a Conceptual Model

Jackson (2003) defines conceptual models as “qualitative models used to make explicit the particular mental models held by parties interested in a decision” (p. 56). A conceptual framework was developed to explore the data collected where the ‘reductive analysis’ was not able to reveal the real-world problem in its entirety (Checkland, 1981, p. 100). Initially vignettes were captured in the form of rich pictures to understand the entities, activities and the relationships between them. Using Checkland’s ‘Soft Systems Methodology’ to identify the key elements and relationships helped to encapsulate the subject area. CATWOE is a mnemonic for ‘Clients’, ‘Actors’, ‘Transformations’, ‘Weltanschauung’ or ‘world-view’, ‘Owners’ and ‘Environment’. A combination of the CATWOE characteristics, components identified in the literature review and elements that emerged from the data analysis process culminated in the resulting conceptual framework.
4 Conceptual Framework for Programme Assessment

4.1 Conceptual Framework Described

The framework shown in Figure 6 is concerned with the participants and the factors involved with the recruitment, development and retention of an IT graduate or intern. It demonstrates the linkages involved in transitioning from learning in the classroom to learning in the workplace. IT academia, the industry-based organisation, or the individual themselves can facilitate development of an IT professional’s capabilities and competencies. Each component within the conceptual framework represents a tangible element that forms the foundation for improving people-oriented IT capabilities. Each component, or set of components, influences one another in their ability to perform.

Learning outcomes are the result of the learner having been through a learning exercise. These in turn serve as inputs back into the ongoing learning processes. For example, having graduated from an academic course, individuals then use their skills, experience, knowledge and competencies as base capabilities in a graduate programme or specific rotation.

Key stakeholders influence or have a stake in the outcomes of the programme. The “IT Industry” and government are concerned with the prosperity and growth of the national economy and recognise the need to establish programmes in order to support their strategies. “IT Academia” is the tertiary education provider that is dependent on students...
passing through its courses and during that time, is responsible for facilitating the partnership between the education provider, the student and the industry-based organisation (Bates et al., 2007). The academic education provider concerns itself not only with course development and execution, but also with the recruitment, retention and motivation of the student. The “IT student” or graduate is the individual that this sits within this construct. Providing opportunities enables them to learn. However, it is the student that is ultimately responsible for the learning experience (Bates et al., 2007).

A key undertaking for the individual is the engagement in work-integrated learning. Depending on the course or academic programme, the student may work on an undergraduate project, as a paid intern, or as a postgraduate. In each case there exists the potential to work and study at the same time.

The “IT workplace” is the industry-based organisation and represents the environment that facilitates the learning experience and growth of the student’s competencies outside of the classroom. The IT workplace is a structure or framework, which supports the development of an individual as they engage and work within the organisation. There are significant factors that influence employing a student, graduate or intern. Initially it is the process of recruitment. However in order to ensure that the experience is a positive one, consideration needs to given to areas of career development, culture and work environment, funding, capacity, supervision and management. How a specific programme is organised is also important. Rotations are time-boxed focused areas that individuals participate in during their time as a graduate. Consideration is given to the length and number of rotations.

The arrows represent the influences one entity has on another. For example, an IT workplace has an existing capability maturity and may operate a set of processes that influence how funding, resourcing and supervision are allocated to a graduate or intern. These components in turn influence the graduate and intern programmes. The specific work areas and tasks an individual can perform depend on the support of management and funding.
4.2 Data Display

By applying each individual data set to the conceptual framework, themes, points of view and capability maturity emerge. These form the basis for discussion. The colour coding shown in Figure 7 represents the different levels of capability maturity. Applying these to the conceptual framework enables the various facets to take on visual representation.

![Figure 7: Capability Maturity Level Key](image)

Participants have different views and perspectives based on their own background and worldviews. These views can be partial or full in regards to any given topic. For the purposes of this study, the view or perspective in regards to a particular component in the conceptual framework is referred to as a viewpoint.

Using a line style and weighting, as shown in Figure 8, enabled visualisation of the significance an individual places on a particular facet of the model. The model begins with a default base line style and by commenting on a component, the line style is changed.

![Figure 8: Viewpoint Key](image)
5 Findings

5.1 Participant Summary

An alias was applied to simplify participant identification for the research analysis writing. Table 4 shows the alias mappings applied to the research participants. Whilst it is undesirable to disclose the identities of the research participants (Yin, 2003), only the participant employee roles from the case study organisation have been disclosed.

<table>
<thead>
<tr>
<th>Participant Group</th>
<th>Participant Alias</th>
<th>Participant Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT Management</td>
<td>ITM1</td>
<td>GM IT</td>
</tr>
<tr>
<td></td>
<td>ITM2</td>
<td>Infrastructure Manager</td>
</tr>
<tr>
<td></td>
<td>ITM3</td>
<td>Information Delivery Manager</td>
</tr>
<tr>
<td></td>
<td>ITM4</td>
<td>Investment and Planning Group Manager (Chief Architect)</td>
</tr>
<tr>
<td></td>
<td>ITM5</td>
<td>IT Service Manager</td>
</tr>
<tr>
<td></td>
<td>ITM6</td>
<td>Applications Manager</td>
</tr>
<tr>
<td></td>
<td>ITM7</td>
<td>Group Manager IT Projects</td>
</tr>
<tr>
<td>Engineering Graduates</td>
<td>EG1</td>
<td>Engineering Graduate – 1</td>
</tr>
<tr>
<td></td>
<td>EG2</td>
<td>Engineering Graduate – 2</td>
</tr>
<tr>
<td></td>
<td>EG3</td>
<td>Engineering Graduate – 3</td>
</tr>
<tr>
<td></td>
<td>EG4</td>
<td>Engineering Graduate – 4</td>
</tr>
<tr>
<td>IT Employee Survey</td>
<td>ITE1</td>
<td>Various</td>
</tr>
</tbody>
</table>

Table 4: Participant Alias Mappings
5.2 IT Management Interview Findings

5.2.1 IT Management Demographics

The subject organisation’s IT department structure was a “General Manager of IT” with six ‘direct report’ managers. All IT managers interviewed were responsible for providing resources to support their respective work areas of accountability. Figure 9 and Table 5 indicate that collectively there was a variety of IT management experience and the IT management team had not been working together long.

![Figure 9: IT management experience](image)

<table>
<thead>
<tr>
<th>Code</th>
<th>Role</th>
<th>Time Current Role Held</th>
<th>Years in IT Management</th>
<th>Number of ‘Direct Reports’</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITM1</td>
<td>GM IT</td>
<td>1 year</td>
<td>11 years</td>
<td>6</td>
</tr>
<tr>
<td>ITM2</td>
<td>Infrastructure Manager</td>
<td>1 1/2 years</td>
<td>3 years</td>
<td>4</td>
</tr>
<tr>
<td>ITM3</td>
<td>Information Delivery Manager</td>
<td>1 1/2 years</td>
<td>1 1/2 years</td>
<td>4</td>
</tr>
<tr>
<td>ITM4</td>
<td>Investment and Planning Group Manager</td>
<td>1 1/2 years</td>
<td>13 years</td>
<td>3</td>
</tr>
<tr>
<td>ITM5</td>
<td>IT Service Manager</td>
<td>2 years</td>
<td>2 years</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 5: IT Manager Demographics

<table>
<thead>
<tr>
<th>ITM6</th>
<th>Applications Manager</th>
<th>1 year</th>
<th>6 years</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITM7</td>
<td>Group Manager IT Projects</td>
<td>2 1/2 years</td>
<td>20 years</td>
<td>7</td>
</tr>
</tbody>
</table>

5.2.2 ITM1

ITM1 is the head of the IT department, who at the time of this study, led a team of six direct reports, but had accountability for 56 staff. He is responsible for leadership, change management and the development of staff to meet the needs of the changing organisation. Although his experience spanned ten years, he had only been in the role one year.

The organisation has a relationship with more than one academic institution for the recruitment and subsequent development of students within its engineering graduate programme. The company’s HR department performs the first level of filtering of candidate graduates. Whilst ITM1 would prefer a graduate from a well-recognised academic institute, he stated that, “it is only a filter” and “not the only criteria for selection”. Academic grades were an indicator only and a top grade was not a prerequisite. He would employ someone with limited experience working in IT who had “soft skills” and shows a willingness and openness to learn.
An IT graduate had already been employed at the time this study was carried out therefore a maturity level of one was attributed to the Graduate Programme component shown in Figure 10 for ITM1. This represents both a lack of process and a lack of formal IT graduate support framework. ITM1 stated a process was required, where a graduate could both add value, and test her/himself. This process needs to present a challenge but not one where the graduate or team can “cause a lot of damage”. ITM1’s view is that a new graduate team member would not bring value on day one and acknowledges that learning by failing is also a possibility. However, ITM1 viewed the programme and learning development as a long-term investment for the organisation and came with a sense of social responsibility.

ITM1 stated that active engagement by the academic institution is also required after the placement of the graduate. “You don't expect them to be there every week but there needs to be constant feedback / communication channel.” It had been ITM1’s experience, through participating in an assessment review panel of undergraduate project work, that there is little or no communication with the project sponsor organisation, once the student or students have completed their onsite project work. This meant that there was no feedback loop back to sponsoring organisation to determine opportunities for
improvement. For this, IT academia is shown with a maturity level of two indicating only a basic practice of engagement exists with the organisation (Curtis et al., 2009, p. 62).

ITM1’s strong view was that “learning comes from the individual’s own will” and that “everyone needs to manage their own career path”. He can only assist the individual in achieving their career goals and sometimes barriers to learning come from within the individual. “For example, I have provided coaching courses and paid for it for some people. It really stretched some of their boundaries and they felt uncomfortable with it; and they need to work through that learning experience themselves.” Bates et al. (2007) also shared this view and stated whilst the workplace organisation is responsible for providing a suitable project and a health and safety conscious environment, it was ultimately the student’s responsibility to learn and that educators and supervisors could only provide the enabling opportunities (p. 126). As part of a graduate programme, ITM1 suggested that it would be advantageous to review a five to ten year career plan every six months, because as the person is exposed to new areas of IT, what they have learnt may have changed their perception and “influence where they want to go” in the future.

Whilst the organisation does have a career development framework, ITM1 only manages some of his staff’s career development plans. A level two maturity is generously reflected in the model for ITM1. Taking responsibility for some of his staff’s career development plans is part of the organisation’s wider repeatable process. In order to achieve a level three maturity, individuals would need to have been “actively pursuing competency opportunities” in accordance with development opportunities created by the organisation (Curtis et al., 2009, p. 35). This was not evident. Whilst the company provided career development support, when organisational change or funding restrictions occurred, the primary objective was to “keep the shop open” and “unfortunately training is the first thing that is pushed out of the door”. This could influence an individual’s career development plans by limiting the availability of supplementary courses, either internally or externally provided by the organisation. The funding component is
therefore is shown as a level one maturity to suggest that funding is administered in an ad-hoc manner or at the discretion of management.

ITM1 stated that an IT graduate or intern needs to come into a work area where they will be supported but not treated like any other normal staff member. Treated “like a toddler between the teams”. Exposing a person to as many areas of IT as possible also requires pairing with a staff member who understands the learning development needs.

The culture of the organisation or a team seemed to be a misnomer to ITM1. When asked whether there were any cultural considerations, the question was turned back on the researcher to define what culture means. His view is that a new individual can change the dynamics of a team and as part of an induction exercise, ITM1 would have the graduate observe, interview and document what culture they find with a particular work area.

In summary, the maturity levels identified for ITM1 indicate that some repeatable process exist for the recruitment and career development of both graduates and permanent staff members. An initial maturity level for ITM1 in respect to Funding, Supervision and an IT Graduate Programme, indicates that there is a lack of consistency applied to these components and that whilst the estimating of effort is difficult, he places a large amount of onus on graduate or staff member to manage their development themselves.
5.2.3 ITM2

ITM2 managed the operational infrastructure team that included helpdesk, desktop support, server support, networking and security. He was responsible for between four and eight staff and his teams were one of the main work areas being affected by an outsourcing exercise.

![Diagram of IT industry, academia, workplace, and student/graduate relationships with a maturity view]

**Figure 11: Viewpoint and Maturity from ITM2**

It was ITM2’s view that there should be a “probation period” as part of the recruitment filtering process. The objective would be to avoid taking on someone who was not suited to the organisation or IT and not having to facilitate a non-suitable candidate for two years of a programme. The expectation of the level of academic grade or qualification is not a critical factor for ITM2. A certificate level qualification would be acceptable to ITM2 and he would even consider “pulling a person off the street”. This response is based on ITM2’s view that a person can be taught and can “learn on the job” and is reflected in Figure 11 by the influencing arrow from IT workplace to Learning Outcomes with a maturity rating of one. ITM2 does temper this with a view that a degree could be
more appropriate for a wider background in IT if the graduate is going to experience different work area across the IT environment.

Whilst ITM2 was unsure how long a graduate should spend in any one particular work area, he suggested that a helpdesk role could be as short as two weeks and a period in the server work area could be one month. A graduate “should definitely experience the customer facing side of IT”, hence the recommendation of spending time on the helpdesk. However, two weeks could be in contradiction to how much “customer facing” experience a graduate would gain. ITM2 stated that there is a lot to consider when a person moves through the various IT work areas and suggested that one option was to move through the infrastructure work area, which could lead into the IT Architecture area. Beyond the details for the programme structure, ITM2 stated that the experience needed to be positive for the individual. ITM2 recognised New Zealand is small country and has a small IT industry. ITM2 also explored the possibility that the graduate or recipient of the programme would leave the organisation or even the country. He believed that providing the experience was positive, the graduate would be more likely to share his/her experience with others in the IT community.

ITM2 believed that graduates would bring dedication to the team through their academic course work or training. He believed that a graduate would benefit from the experiences of their tutors and would be exposed to new technologies. Graduates would also bring new ideas to the team and organisation. ITM2 stated that a graduate needed to possess troubleshooting skills, people skills and the “ability to learn quickly” but stated that “business acumen would come with time”.

ITM2 responded “No” when asked whether the company provided support in managing career development of his staff. Figure 11 shows the influencing arrows on the factors and the programmes as a maturity level of zero. Given the choice, ITM2 would prefer to invest his time in his own staff rather than a graduate, as his perception was that his team members had been neglected when it comes to receiving training from the organisation. The Career Development factor in Figure 11 is shown as a maturity level of one and Funding shown as level zero. Whilst ITM2 took an interest in training his people, he has had to take advantage of vendor-offered training credits or absorb the cost of training.
through some infrastructure project implementations. This would have been provided in an ad-hoc manner or as the opportunity arose. A graduate would have to “work in with my staff”.

ITM2’s view is that a graduate needs to have an awareness of what technical people are like and that a sense of humour is important to have when coming into an IT workplace. The culture revolved around a “dedicated group”, predominately male-oriented that “almost live together”. ITM2 suggested that part of the infrastructure work area being predominately male, is partially due to requiring heavy lifting of IT equipment and stated this is not a sexist standpoint but “just the way it is”; a matter of fact. There was no perceived issue with a new person entering a team and there was a learning curve for the individual to go through and that the culture would invariably change. Being adaptable would help with assimilation into the team.

With a global recession having an effect on the job market, ITM2 is concerned that the organisation could see a graduate as a “low cost resource”. Besides that, the movement of a graduate through the infrastructure work area “unfortunately didn’t occur” due to outsourcing activity that was going on at the time of the interview.

In summary, support for training and the development of graduates and staff was at the non-existent maturity level according to ITM2. Learning development had been ad-hoc through ITM2’s own efforts, by negotiating with vendors to provide training or training credits as part of other specific IT purchases and an alternative to a lack of funding provided by the company through formal channels.Whilst ITM2 was positive towards employing and developing a graduate, he preferred that effort be invested in developing the capability of his own team first.
5.2.4 ITM3

Business Intelligence reporting with approximately four staff was the area of responsibility for ITM3. Figure 12 shows the Management component attributed to ITM3 with a maturity level of one. After eighteen months, ITM3 had experienced a decline in the number of staff reporting to him and felt he was still developing in the role and as a manager.

ITM3 stated that the recession presented an opportunity to recruit a suitable candidate. ITM3 would prefer a degree level academic qualification but does not have a preference for where it is obtained and claims his own university degree would be no better than one obtained from seemingly lesser-recognised academic institution. The preference was to develop someone who had “good mix” of both IT skills and business acumen. For example accounting, where a large portion of the data in the Information Reporting team was heavily focussed on numbers.

ITM3 recognised there was a risk of developing and investing in a person, only to lose them later. Mainly when an individual had built up their skills in a particular role and had taken ownership and accountability of an area of IT.

Figure 12: Viewpoint and Maturity from ITM3
ITM3 had not received material or support from the company in managing his staff’s career development plans and suggested the HR team themselves were reasonably young in that they have only recently come together as a team. Therefore, the influencing arrow shows a maturity level of zero, but it is anticipated that this maturity level would rise quickly as the HR team forms and produced their work outputs. ITM3 commented that there were career development plans, but he managed some but not all plans. For the career development plans that existed, they were twelve-month plans which ITM3 with his staff. He recognised he was there to help them achieve his staff’s learning goals over a twelve months period, but found weakness with placing the onus on the employee to complete the [template] plan. The employee initially fills out the career development plan and then the manager helps to complete it. However, if the employee does not “take the first step”, ITM3 finds that six months later there are issues with boredom, motivation and lack of challenges. The Career Development component in Figure 12 is shown as maturity level one. Curtis et al. (2009) stated that it is at the repeatable maturity level of two, where the most common cause of staff turnover, poor relations with their boss, is addressed (p. 22). Therefore, it is ITM3’s view that the initial career development plan needs pushing by the manager. This is in contrast to ITM1’s view that it is up to the individual to drive his or her own career plans.

ITM3 was planning a meeting with his “HR department to discuss… what work activities they can get involved in, an overview of what the area does and what learning opportunities there might be”. Figure 12 shows ITM3’s proactive approach at a level one maturity in the influencing arrow moving from the factors towards the capability maturity of the IT Workplace.

ITM3 advised that the IT graduate programme needed to be “collaborative” amongst the other IT leaders and that the programme needed to be accompanied by “guiding principles” for supporting and developing a graduate.

Experiencing the culture of the organisation, how the business operates and conducts itself, were two areas a graduate should experience which they would not have in an [academic] institution.
ITM3’s team was younger in their cultural dynamics and therefore carried a reduced level of maturity compared to other teams. Whilst Figure 12 shows a level one maturity for the Culture / Work Environment factor, ITM3 desired his team to become more “autonomous” in the way they instinctively identified and executed work packages.

In summary, whilst ITM3 focussed on the career development of his team and had a degree of support from within the company, it was the results of the team attrition and lack of interest in career development that led to the Supervision and Management components showing an initial maturity level of one. Level one maturity also indicated the initial proactive approach he was willing to take to investigate the activities ITM3 could have a graduate perform.
5.2.5 ITM4

ITM4 had nearly fifteen years of varied IT management experience and had three ‘direct reports’ who were themselves senior in their experience. With nearly two years in his current role, ITM4 had strong views on the adoption of a graduate or internship programme. Whilst ITM4’s views were initially perceived as negative, the researcher has interpreted these views as strong feelings towards the current state and the change required. ITM4 stated if a programme or person was to be offered a learning opportunity within the organisation’s IT workplace, then a change in attitude amongst the IT leaders is required.

Within the IT department, ITM4 stated there was “a variety or number of different roles to experience”. Deciding what to expose a graduate to depended on how the role applied to a particular work area. ITM4 stated that the person is “mainly going to learn how to operate IT”. This is in respect to ITM4’s own area of Architecture, where there is less hands-on technology and more focus on strategy and planning. Business Intelligence is as an example of where a person would gain experience from applying tools and technology to business requirements. Specifically, the organisation does not perform software development. Projects facilitate IT changes based on business requirements that provide an individual an opportunity to experience. ITM4 stated that without presupposing the work area a person should experience, consideration is required to “the type of graduate and the type of career they are looking for”. ITM4 believed that this indicated a need for career development planning in conjunction with the individual. Underpinning the work area learning experiences, ITM4 stated that the individual also gained “a strong understanding of business and commercial aspects” and an appreciation for “where the money comes from and goes to and understands why”.

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ITM4 stated that within the IT department, “there is a willingness to allow people to move into new roles. However the opportunities are not always available”. In regards to undergraduate opportunities or projects, ITM4 believed that the IT department’s current capacity is more suited towards supporting an individual, as opposed to a project group. For that reason, Figure 13 shows the Management component for ITM4 as maturity level zero. If support were available, a group would be considered.

ITM4’s view is that a recession affects the company’s attitude and leads to a “leaness”. Consequently, learning opportunities are less readily available and ITM4 stated that the company “continue to ask more of [our] people than the hours allow”. Restructure or redundancy can result in the loss of a capability. ITM4 stated there is a lack of understanding of where the effort is required for filling the gap and is “left to those that are left”. This is also reflected in the zero maturity level for the Management component for ITM4.

ITM4’s preference is for a university graduate, or a more mature student from a well-recognised institute. However, he stated, “it’s not about raw ability” and is about attitude and the “desire” or “passion to learn”. More specifically the ability to think logically and
have a reasonable knowledge of IT, are prerequisites ITM4 would be looking for in a graduate or intern.

Whilst IMT4 admitted to taking a passive approach to the career development planning of his team, he had a strong willingness to support or mentor an individual. He acknowledged that his team members operated at a level similar to that of a ‘direct report’ to a general manager or executive. The seniority of his team would be conducive to delegation of the mentor role to its members, which is why the Supervision component in Figure 13 for ITM4 shows a maturity level of one. By enabling existing team members to take on a mentoring role, ITM4’s view was that it “will lead to mentor growth”. A mentor support programme is required, however “a mentor needs to be prepared to learn themselves and be motivated”.

It is ITM4’s current perception that there was “little tolerance” for things going wrong and comments “this could be an opportunity for learning about risk”. However, whilst ITM4 and ITM1 both accept that sometimes “you learn by things going wrong” there could be an opposing view about the current state and the ability to support or cope with a negative learning experience, like something going wrong. ITM4 then stated, “if things go right, then repeat”. In regards to employing an IT intern, a perceived advantage is the ability to “repeat with the same individual over other holidays”. “If the intern ends up joining the company then that is a good measure of the company and the programme”.

However, establishing a programme appeared to be difficult for the organisation at the time. ITM4 stated, “people are not perceived as assets”, in as they should be. The current structure was perceived as prohibitive towards career growth and “things are too tight given the type of investments made on people and IT change”. Whilst Intellectual Property was in-sourced, projects are outsourced. It was ITM4’s view that creating a programme or learning opportunity “would require some passion from the leaders and it would require discretionary effort” because the perception was that the “current corporate behaviour is not supporting it”, “managers are on their own” and supporting a programme would have to be carried under business-as-usual activity. There was a need to be able to “create space” in order to support a programme. ITM4 suggested that those involved in the support needed to understand the learning experience. A focus was required on the
support team dynamics, the attitudes towards the programme and Intellectual Property management.

In summary, ITM4 believed attitudes and views of the IT management team needed to align and a support programme needed to develop, before a graduate could have a comprehensive learning experience. For this reason, the ITM4’s Management component and influencing arrow showed a non-existent maturity level. Areas such as Career Development, Culture / Work Environment and Supervision were at the initial maturity level for ITM4 because work was available and his team operated at a senior level that could help take responsibility for the learning outcomes of a graduate.
5.2.6 ITM5

IT Service Management relates to the processes of managing IT services to a quality level agreed with the IT customer (Van Bon, de Jong, & Kolthof, 2007, p. 31). ITM5 stated that IT Service Management was about a “keeping the lights on approach” and managing “IT's reputation and expectations from the business”. ITM5’s role included keeping “customer satisfaction levels up, call volumes under control and that IT we're not having a negative or cascading or detrimental effect on IT”. In addition to managing the customer facing IT processes, ITM5 was responsible for managing a new outsource agreement, which encompassed helpdesk, desktop support, server support, networking and security. As well as being in the role approximately two years, ITM5 also had a background in Project Management. Although he was not directly responsible for the outsource staff members, he had three internal staff reporting to him.

There is a difference between ITM5’s view and ITM2’s view of how long a graduate should spend in a particular work area. For example, ITM5 thought that someone should spend longer in a hardware-oriented work area as opposed to the software applications area. ITM5 provided examples of the types of graduate backgrounds that might be suited to particular work areas. Whilst ITM5 indicated another type of graduate could be classed as an IT “generalist” and experience multiple work areas, he stated that the IT department would be “specifically looking for people in [a particular] environment or [a particular] type of skill set or [a particular] type of training, because this is where we’ve got the work at the moment”. This comment aligns with ITM3’s view that the career path needs consideration when choosing a candidate. However, the comment is in contrast with ITM1’s view about using multiple checkpoints to determine the career path of an individual. ITM5 stated that a framework was required to understand the goals and commitments of a graduate programme.

ITM5 believed that there was enough change going through the environment that a low-level initiative, that the business would be willing to support, could be used to trial an undergraduate project. ITM5 presented as an example the release approval process that would enable a person to experience the dynamics and interactions between stakeholders and to understand change management processes. Whilst this can be technical in nature,
ITM5 stated that it was an opportunity to “take information and interpret it into impact to services, impact to IT, impact to users and be able to create a schedule of change and communication plan to go out to the business”.

With ITM5 already managing, mentoring and guiding his own staff, adding a graduate would take additional discretionary effort. ITM5 stated that his team was relatively junior and that the ability to take on a graduate could create a capacity issue. ITM5 believed that a graduate was better suited entering a team with “senior people who can share that mentoring responsibility” and that with his team, the learning could be limited. ITM5 anticipated that a graduate would require more mentoring and guidance, and should not simply be placed on an IT project and be expected to deliver results. However, he stated, “investing only time might net the biggest return”.

ITM5 had past experience with graduates and had tended to find them more theoretical than practical. He stated, “the practicalities of the real world are much more time and cost driven”. On the other hand, ITM5 recognised the benefits of theory or philosophy and that a graduate could employ problem solving and analytical skills they have developed at University to question why things are being done or done in particular way. However, ITM5 also stated, “sometimes you just want them to just get it done”. His number one desirable competency was communication skill and he stated that it was important for feedback purposes. ITM5 stated that it was important for a person’s learning development to ensure they were not placed in a work area in which they were not interested. He also stated that most people needed to learn business communication. The type of individual ITM5 looked for was someone who had analytical and statistical competencies and who, not only “has a general interest in IT”, but also had a “technology savvyness” and “incorporates it into their everyday life, for example, social networking”. Whilst ITM5 was currently employing people with little or no experience, a certificate level qualification would be his minimum preference and experience of the ITIL framework would be advantageous. ITM5 was uncertain what the grades from an academic qualification represented but focused on competencies rather than a top academic grade. He also had a preference for employing someone for a set period of
time and not someone who was part-time and had course work and other similar commitments.

Figure 14: Viewpoint and Maturity from ITM5

Figure 14 shows the Career Development component for ITM5 at a defined maturity level three. ITM5 was managing his staff’s career development plans and had found a variety of material to support him. The influencing arrow on Career Development is shown in Figure 14 with a maturity level of two because ITM5 stated that supporting material was “not well publicised or advertised”. Level two indicates that while material did exist, ITM5 had to either find it himself or know to whom to talk to find it. However, ITM5 added that once the right HR adviser had been identified, good support and guidance was provided for the career development planning of his staff. SMART goals, individual career development plans and a leader’s information pack were some of the items ITM5 had found. He stated that the leader’s information pack included useful material such as “white papers and templates and discussion points, like how to be a good listener and basic things like that in leadership and providing guidance”.

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ITM5 had a willingness to mentor a person or support an undergraduate project. The Supervision component is shown in Figure 14 as a maturity level of two because ITM5 has had the opportunity to mentor in the past, which saw a team member advance their career within the department. He was now repeating the process with another person because his work area “is seen as an entry point into IT where you get exposed to IT more generally”. ITM5 accepted that his team was an entry point into IT and that within two years he would expect them to be looking for new opportunities within the department.

ITM5 stated that a support programme, in conjunction with the graduate programme, was required. It was dependent on the duration of work area placements, tasks and learning expectations of the IT department.

ITM5 would prefer a group of up to four members if an undergraduate project were offered. This would enable him to assess the communication and interactions with staff members as well as within the project team and to see “how they build a culture”.

ITM5’s experience was that “cultural change management of staff was difficult because you’ve had such a long retention of staff”. He saw a graduate programme as an opportunity to start capturing tacit knowledge held by longer standing members of the team and to use the exercise to help a graduate learn about a particular subject area.

Another cultural observation from ITM5 was the dynamic between males and females. The team consisted of socially interactive women. ITM5 employed an outgoing male for his relationship building and customer focus. The female team members had difficulty with his personality. It was later discovered that the females were introverts and new male was an extrovert and that the female he had replaced had also been an extrovert and that they had been inclined to follow her, but struggled with the introduction of a male into the same role. Therefore, it is important to have an awareness of the work area and to understand how the introduction of a graduate or intern and their personality can influence the dynamics of the existing team.

In summary, a repeatable maturity level two is shown for ITM5 for the support he received, the effort he put into career development and the degree of mentoring and
guidance he provided for his staff members. This is in line with the P-CMM description for maturity level two that a manager accepts personal responsibility for the performance and development for those performing work (Curtis et al., 2009, p. 21)
5.2.7 ITM6

ITM6 had nine people reporting to him, which was the largest number of ‘direct reports’ of the IT managers. ITM6 had six years of IT management experience covering programme, project and portfolio management and originally came from a finance background. ITM6 had also recently been designated as the person to lead an IT graduate induction into the organisation.

ITM6 identified the need for a framework that contained a number of modules, which were selected once the decision was made to employ a particular candidate. ITM6’s view of matching a graduate’s area of interest was in line with other IT manager’s views. It is about determining the work areas to experience based on the graduate’s experience, competencies and career plans, according to ITM6. ITM6 stated that initially, the individual would learn about the “business community” rather than learning about a specific system.

ITM6 stated that a summer internship created an opportunity to “see what talent is coming through”. This is similar to a comment made by ITM1 about having a filtering process. Whilst this was not a specific Human Resource activity, the insights gained from an internship could help with the decision to employ a person for an IT graduate programme. ITM6 also stated that a graduate programme “is a great opportunity for the company to return back to the IT community” and to highlight that the company is supporting the growth of the IT community.

IMT6’s perception was that a graduate programme did not need to be any more than two years long. His view was that an individual could gain a “good understanding of the organisation and the context in which you work” and that if a permanent employment opportunity had not presented itself within this time, graduates would begin to enquire elsewhere.

One of the main constraints perceived by ITM6 for supporting a graduate programme was the availability of support resources and the ability to trust a group of people to share in a common goal.
ITM6 did not insist on an academic degree, but rather on some form of tertiary education beyond secondary school. His view was that there was not much difference between an “A” or “B” academic grade and that selection of a candidate was about personality traits and enthusiasm. ITM6 looked for a person with strong interpersonal skills. He was interested in how someone got to where they were and what ‘life experiences’ they had had along the way, for example, on a project. In regards to personality, he looked for what they did outside of the work environment and was interested in how an individual acted in the community.

IMT6 identified that a benefit of a new graduate was “that they're not at the level where they've become so specialised that they can't look around and see opportunities”.

![Figure 15: Viewpoint and Maturity from ITM6](image)

Figure 15 shows the Career Development component and influencing arrow as maturity level two for ITM6. Whilst ITM6 was only managing half of his staff’s career development plans, he spent time investigating where an individual wanted to develop him or herself. He recognised that “some people are happy where they are” and that he could not always create a career path for every staff member. The company provided some support and had a programme associated with career development planning. His
perception was that the career development programme was more complicated than it needed to be. He also questioned the company’s commitment to the programme because training was typically the first affected when a budget cuts were imposed. When this occurred, ITM6 treated training needs as part of a specific requirement for supporting the systems for which he was responsible and utilised other budget areas for funding. He stated, “it is about enabling the individual to learn and grow, in a context where the cost of doing so is not exposed as training costs”. At present, projects had specific gates and that it was ITM6’s perception is that these were “laborious”. A graduate framework needed to be less about these gates and focussed more on a support model, where a person could go to an IT work colleague if they had concerns or could document, design or develop a solution and describe how the delivery to the business should be. Having supervised and mentored graduates and undergraduate projects in the past, with a strong willingness to adopt an IT graduate programme, ITM6 had a Supervision maturity level of two.

ITM6 perceived a lack of exuberance in most of the IT teams and that most of the teams were under work pressure. His concern was that a graduate would not receive the support they needed to develop.

In summary, whilst ITM6 does not actively mange all career development plans, he does seek to make training happen for his team member. With ITM6’s background in managing and mentoring staff and views on the benefits a graduate would bring to the team, Career Development, support from the organisation and Supervision are shown in Figure 15 as maturity level two.
5.2.8 ITM7

ITM7 had an extensive IT career and had been in his current role two and a half years. His seven ‘direct reports’ were made up of project manager, portfolio managers and business analysts.

ITM7 stated that projects tended to increase and decrease the resource pool with the use of external contracted people. ITM7 suggested that the IT projects area would be able to sustain having a graduate in the work area. A shared view with ITM6 was that a graduate programme should be two years in duration.

ITM7 suggested there were two approaches to work experience. One was placement on a project and the other was a rotation through the other IT work areas. His view was that rotation encompassed the five or six main work areas of the department and that there was enough work in those areas to give to a graduate. One of the perceived challenges for ITM7 was how to leverage the outsourced operations area. ITM7 commented that the work area was bound by service levels and that the risk of the service levels not being met could be a reason for not being able to accommodate a new person coming into the outsourced work area. However, ITM7 believed that an agreement could be reached with the outsource partner with a work area like the Service Desk.

Like ITM5, the perception held by ITM7 was that supporting resource was a constraint and that the graduate would need to have a good understanding of a subject area before placement on a project.

ITM7 was looking for someone who was enthusiastic, with an interest in the company, its context and the industry within it operates. The person would be someone who could bring new, fresh ideas and a new perspective. ITM7 stated, “it’s about attitude and real interest in the business more than deep technical skills in one area because in a graduate programme you move them through a bunch of roles and expect they'll find one they like”. However, ITM7 also stated, “they need to line up with what we have on offer”. This was interpreted as meaning some degree of technical focus, background or interest must exist and that the availability of a particular work type might contribute to the
decision of who to employ. ITM7’s preference was for an academic degree “or work towards one”, from a well-recognised university.

Figure 16: Viewpoint and Maturity from ITM7

ITM7 had past experience in supervising graduates and had project managers reporting to him who were capable of performing a mentor role. Therefore, Figure 16 shows the Supervision component for ITM7 with a maturity level of two. ITM7 had prior experience and knowledge from other organisations’ programmes. This is shown with the influencing arrow on the IT workplaces capability maturity in Figure 16 as maturity level one. ITM7 did not actively manage his staff’s career development plans, but organised PRINCE2 project management training and certification for some of his staff. This showed the Career Development component for ITM7 as maturity level of one in Figure 16. ITM7 stated that this was more for satisfying the company’s requirement to have skilled or qualified staff, rather than it being about developing an individual. This perceived compliance factor for ITM7 was similar to ITM3’s comments that people in the organisation “are not being perceived as assets” and that in a risk adverse environment, there was “little tolerance” for things going wrong. ITM7 stated, “some are quite focussed on their careers going forward, others really don’t have the self motivations to do their own plans. And for some people that’s the choice and is happy
where they are and not really that interested”. This comment was echoed by ITM1, ITM3, ITM5 and ITM6, when it came to supporting the career development of their staff.

ITM7 also suggested that although there was supporting material from the Human Resources area, “it needs to be reviewed in light of graduates”. In regards to an undergraduate project, ITM7 recommended a “peer programming” approach, working to their individual strengths, rather than a waterfall approach and trying to experience all aspects of a project lifecycle.

ITM7 identified the lack of funding for training as a perceived barrier. He also commented that the direction and the structure of the organisation were constantly changing which made planning difficult. The IT department had older members and ITM7 referred to the organisation as “staid”. ITM7 believed that an issue that needed to be pondered was how to keep things interesting for a graduate and how to keep them engaged. One concept discussed with ITM7 regarding learning development support, was the ability to form a group with other graduates within the organisation. However, there were not a large number of graduates that the IT graduate could “buddy up with” and ITM7 suggested that it might be necessary to collaborate with other companies running similar programmes to enable the graduates to share their learning experiences. What a graduate could bring to IT department was a sense of fun and ITM7 had found in the past that graduates tended to form or join a social club and organise social activities. He stated that this was lacking within the organisation.

In summary, ITM7’s ad-hoc approach to career development lead to an initial maturity level one. However, his wealth of experience with graduates was indicated on the Supervision component as a repeatable maturity level two and the influence on the business capability maturity as initial maturity level one. ITM7’s knowledge and experience could be leveraged to help frame the graduate programme.
5.3 Engineering Graduate Interview Findings

The company runs a three-year engineering graduate programme for its Electricity and Gas distribution network lines of business.

Table 6 shows the time the engineering graduates’ had spent in the organisation’s graduate programme and whether they graduated from university or another type of academic institute.

<table>
<thead>
<tr>
<th>Code</th>
<th>Time on Graduate Programme</th>
<th>Graduated University</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG1</td>
<td>6 months</td>
<td>Yes</td>
</tr>
<tr>
<td>EG2</td>
<td>2 years</td>
<td>Yes</td>
</tr>
<tr>
<td>EG3</td>
<td>1 year</td>
<td>Yes</td>
</tr>
<tr>
<td>EG4</td>
<td>1 year</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 6: Engineering Graduate Demographics

For the purposes of the engineering graduate interview analysis, the conceptual framework was modified to remove the “IT” label from the components.
5.3.1 EG1

EG1 had been on the company’s graduate programme for six months since graduating from his academic engineering degree. Initial employment into the organisation was through a summer internship programme and continued working part-time and studying to complete his academic degree. EG1 applied and was accepted for a graduate programme position whilst working in another department. Although EG1 applied from within the company, he advised he still would have applied from outside the organisation, because the company advertised for summer university students and he would have used that channel. Because the company advertised, Figure 17 shows a Recruitment maturity level of two for EG1.

![Figure 17: Viewpoint and Maturity from EG1](image)

EG1 stated that the number of rotations were common across all engineering graduate participants. There were four rotations lasting nine months each. One of the rotations was divided into two shorter rotations. Because there was a repeatable graduate programme, it shows in Figure 17 as maturity level two. EG1 stated that it typically took one to two months to understand a role and a further six months to deliver [a project]. Whilst EG1 commented that the duration was about right, it was providing a position was
stimulating enough. Otherwise, EG1’s perception was that nine months could have been too long to experience in one position.

EG1 stated that the rotations gave the opportunity to experience different work areas of the business, which enabled him to evaluate where he saw himself working beyond the graduate programme. EG1 also stated, “Managers encouraged graduates to make the most of their placements by exposing themselves to as much learning as possible, for example, accompanying other employees on site visits”. The Management component in Figure 17 is shown as maturity level two because it was evident that managers were identifying and coordinating learning opportunities for the graduates, in which they could become involved.

Curtis et al. (2009, p. 21) stated “units are able to balance their commitments with available resources”. The ability to sustain multiple graduates, within the organisation, is shown in Figure 17 by a maturity level two for EG1’s Management component.

Whilst EG1 was content with his learning experience, he stated that he “expected more of a technical challenge”. Although EG1 performed work tasks that he had not experienced before, he perceived the tasks as non-challenging. EG1 speculated a possible cause for the lack of work-based task challenge was due to being assigned to a functional team, which was in transition because of a restructure and process transformation. One of the main attributes EG1 had applied to the workplace had been his troubleshooting skills and he had only applied minor theoretical elements. Whilst the application of theory to work tasks had been minimal, EG1’s had underestimated the exposure to commercial aspects of the business and the development of professional and management skills.

Supervision for EG1 is shown as maturity level three in Figure 17 because P-CMM stated “at the Defined Level, mentoring and coaching is informal and the knowledge and skills imparted by mentors are defined more by their experience and judgment than by a documented combination of knowledge, skills, and process abilities to be imparted” (Curtis et al., 2009, p. 39). EG1 had a mentor and commented that the mentoring programme had only recently formed. EG1 stated “managers have lots of knowledge to impart and can expand beyond an initial problem. They will talk around it and about the
peripherals and backgrounds”. He recognised that meeting every fortnight, as planned, was too frequent and was currently meeting informally on a monthly basis.

The influencing arrow from the workplace capability maturity to the main factors, shown in Figure 17, had a maturity level of two for EG1 because the company had provided courses such as Negotiation Skills and Working Efficiently with Outlook. EG1 stated that while he was able to learn new skills and implement them in the workplace, sometimes “remedial tasks were assigned that offered no learning opportunity” and “that sometimes [graduate] were treated as an additional resource”. The influencing arrow from the Workplace component to the Learning Outcomes component in Figure 17 shows an initial maturity level of one, which reflected the ad-hoc nature by which this learning took place.

EG1 had experienced different managerial styles and witnessed a wide variety of team dynamics but not experienced any cultural issues.

In summary, EG1’s view was that the company had an established graduate programme, which operated at a level two maturity. EG1 recommended, “Keep the role interesting and challenging. A variety of experiences, so graduates may find where their interests lie would be really good”.

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5.3.2 EG2

EG2 had been on the company’s graduate programme for two years (longer than any of the other engineering graduates interviewed for this research project).

Figure 18: Viewpoint and Maturity from EG2

EG2 started with the company as a summer intern at the end of his engineering academic degree. EG2 had seen an intern role advertised in the local newspaper and was employed by the company after two phone interviews with the recruiting manager. Whilst P-CMM level two requires “formal selection process is established”, it was the manager’s responsibility to recruit for the position with support from organisation’s recruitment function (Curtis et al., 2009, p. 31). EG2 later accepted a position on the company’s graduate programme after his contract was extended beyond the summer internship period. This indicated a filtering process had occurred. The internship also enabled EG2 to determine whether he wanted to develop further with the organisation. Both the Recruitment and the Internship components in Figure 18 are shown as maturity level two for EG2 because this indicated that mechanisms existed for transitioning people into new positions (Curtis et al., 2009, p. 31). EG2 recommended that talking to candidates was an
important factor in recruitment and that it was not about a graduate having an A or B academic grade.

The Management component is shown in Figure 18 with a maturity level two because EG2 commented that whilst his first manager was very helpful and imparted a lot of knowledge, there were other managers that were also capable of facilitating the entry point into the graduate programme. This demonstrates a reasonable work environment competency with the availability of multiple support resources. As well as Management, the Graduate Programme is also shown in Figure 18 as maturity level two because EG2 stated “in regards to risk, the processes are so nailed down and so standard and there's always cover. If things start to go wrong they can always be recovered.”

EG2 explained that the graduate programme was a three-year programme consisting of four work area rotations, of which one rotation was split between a two to three month internal work area placement and an external work area placement. This structure was the same graduate programme structure that EG1 had described. The additional comment was that a graduate would spend a six-month period outside the employing organisation and EG2 provided examples of where two of his graduate colleagues had been seconded to external affiliated organisations. The graduate programme manager facilitated the external work experience in conjunction with other engineering-based organisations, with which he had a relationship. This factor also led to the Management component in Figure 18 being shown at the managed maturity level for EG2. EG2 shared a similar view to EG1 about the nine-month duration for the graduate programme. EG2 stated that was an appropriate length of time because a single rotation or placement allowed tasks to be defined and worked through and that it was “better than taking over someone’s project or starting one and then having to hand it over”. EG2 shared the experience of friends who had been on graduate programmes with other organisations where the rotations were six weeks long. EG2 stated that his friends had told him “they never get to sink their teeth into anything”. This left his friends feeling “like they were just being processed and in some cases knew some who have left it before finishing”. This factor is important when considering retention of a graduate or future employee.
EG2 had experienced an undergraduate project as part of his electrical engineering degree course. This was a single person assignment. The Work Integrated Learning (WIL) component is shown in Figure 18 with a maturity level two for EG2, because the process of project selection, execution and assessment were managed well. Project selection was from a list of approximately seventy topics of which student chose their top ten preferences. Providing the student’s academic grades were good, then they would typically obtain a project of their choice. Links with industry were good although, EG2 did not deliver an externally sponsored project. EG2 did however receive approaches from organisations after the academic project was complete. The two influencing arrows between Work Integrated Learning and Internship and Graduate Programme are shown in Figure 18 as maturity level two for EG2 because the awareness of the company came about through his engineering courses. EG2 stated the company was “a gold or premium sponsor” which also entails the company’s logo appearing on brochures. This indicated a level of engagement with the academic institutions.

EG2 recommended that an IT graduate would benefit from spending time within the business to experience how business people work and what they do. EG2 stated that a person learned more by establishing relationships, which could be created by interacting in a social context, for example, “the pub and the soccer field”.

The influencing arrow from workplace capability maturity to the main workplace components is shown in Figure 18 with a maturity level two for EG2 because he had received training whilst on the graduate programme.

Supervision is shown in Figure 18 between maturity level two and three for EG2. Formal mentoring meetings had only been held twice since EG2 began his graduate programme but he stated that meetings were more frequent and less formal. It was EG2’s impression that “nothing was documented” as part of the mentoring process, although he did state that a mentoring programme had been established six or seven month prior to the research interview.
Culturally, EG2 had not experienced any issues in the workplace and most people had been very helpful. EG2 shared an experience about a personality clash within the team, which had resulted in “lower morale”.

In summary, EG2’s responses indicated that processes had been established and were being managed. There were people and processes in place that allowed for things going wrong, which as stated by ITM1, allowed learning to occur. EG2 stated that moving around had been good for the graduates and recommended that it would be good for an IT graduate.
5.3.3 EG3

EG3 was employed initially as a summer intern. EG3 conducted a research project with the company in order to complete an honours academic course.

EG3 gained employment by responding to an advertisement the company had placed with the university where EG3 had been studying. Repeat advertising is reflected in the Recruitment component in Figure 19 having a maturity level two for EG3. He stated that the company’s visibility had gone from, “never heard of or seen them”, to being reasonably involved with university.

Figure 19: Viewpoint and Maturity from EG3

Although EG3 stated he wanted to experience some shorter rotations, the Rotations component in Figure 19 is shown as maturity level two because EG3 stated that what was be to learnt and what tasks were to be performed were clearly understood. However, when it came to external placement, EG3 found it difficult to know “when or where” and his perception was that graduate programme manager was “secretive”. However, EG3 deduced that the graduate programme manager most likely did not want to commit until the placement was certain with the external host organisation.
Coupled with Recruitment, the Under Graduate Programme component in Figure 19 is shown as a maturity level two for EG3 because he performed the project with the case-study company. The company had sponsored a project in a previous academic year and EG3 stated that in his final academic year the company “had started a bigger drive towards students”. This indicated a level of commitment and facilitation by the company. The Internship component in Figure 19 is shown with a maturity level two for EG3. This represented the ability for EG3 to continue to work part-time and complete his electrical engineering academic degree after the summer period had finished. Coupled with Recruitment, the Management component is shown as having a maturity level between one and two for EG3 because he made the comment there was a variety of management styles and not every manager would be an appropriate place to start the graduate programme. EG3’s experience was that his current manager was “hands-off” and he would have found it difficult coming into the organisation. However, EG3 stated that this style was beneficial and gave him freedom in the way he performed his work and that he got help when he asked for it. EG3 also stated there was a difference in structure between university and the workplace. University had more defined timeframes and learning expectations. However EG3 stated he had become accustomed to the different learning environment and that he had got used to the “the programme being fluid”.

EG3 stated that being proactive was required to ensure that a graduate did not find himself or herself in a situation where the tasks did not facilitate learning.

Like EG1 and EG2, EG3 explained the same three-year, nine-month rotation structure so the Graduate Programme is shown in Figure 19 as having a maturity level of two. EG3 stated that he would “like to experience shorter stints where you're just there to learn about what other people do like GIS, call centre, especially the contractors being out in the field”. Supervision in Figure 19 is shown as having a maturity level between two and three for EG3 because, although he met his mentor monthly, EG3’s perception was that information was not shared between his mentor and the graduate programme manager and that he found the situation “confusing sometimes” as to what his next prospective learning experience would be.
The influencing arrow from Capability Maturity to the main workplace components is shown in Figure 19 as having a maturity level between one and two for EG3 because he had only received a “Time Management” course during his time on the graduate programme. EG3’s comment was the company was “always talking about courses but they never deliver” and that he had sourced his own course to attend outside the organisation. EG3 stated, “Although through the graduate programme I had very little training, it is there if you go and sort it out yourself”.

A final comment from EG3 was that a graduate wanted clarity about what he or she was going to be doing and what they were going to learn. EG3 recommended that more feedback was required so that the graduate knew how they were progressing and that it was important for learning development. EG3 stated that critical feedback was something the company was not good at providing. The feedback about a graduate’s progress was the inverse to ITM5’s comment about graduates being communicative in their feedback so the manager could assess how they were progressing and whether the graduate programme was facilitating the learning experience effectively. Either way, a feedback or assessment process is required. It was unclear whether a career development plan was used for planning and assessing engineering graduates’ learning development.

In summary, undergraduate projects, internships and the graduate programme practices were established and were repeatable. Recruitment and canvassing for candidates were repeated through continued advertising with the universities. EG3 recommend that a graduate “not tie themselves down early” as he had not wanted to specialise immediately after leaving university. EG3 suggested that other graduates felt the same way and that multiple rotations would help guide their decision.
5.3.4 EG4

EG4 had been at the company two and a half years and was one of five students employed as summer interns.

Figure 20: Viewpoint and Maturity from EG4

The Recruitment component in Figure 20 is shown as having a maturity level two for EG4 as she had responded to an advertisement, which indicated a repeatable process. While on the graduate programme, EG4 had participated in the interviewing of other prospective graduate candidates. This allowed someone who had experienced the programme and organisational culture to assess the suitability and “fit” of a new graduate. For this reason, the influencing arrow from the main workplace components to the Capability Maturity component is shown in Figure 20 as maturity level one. EG4 stated that selection was not about academic grades and that someone who studied in their spare time was not what the company was seeking.

It was EG4’s perception that the duration of the graduate programme and number of rotations were appropriate and that if they were shorter the competency level would not be as high. The specific work area placements were dependent on either where the graduate’s interest lay or where the work was required. EG4 stated that although the
graduate had full input into where they were to be placed, placement depended on where business needs were. EG4 recommended completing at least two placements, before placement at an external organisation and then one final placement internally before the end of the graduate programme. Smith et al. (2007) found that “timing was dependant on having sufficient technical knowledge to make a worthwhile contribution” (p. 76).

When asked about misconceptions with moving into employment, EG4 had found that work experience was more practical than theoretical. This was an experience shared with EG1. Practical solutions based on cost implications were preferred to seemingly more expensive “ideal” solutions. However, EG4 stated that university experience enabled innovation in order to challenge something that perhaps had been done in a particular way for a long time.

EG4 stated that graduates held a monthly meeting where a person from a different department gave a talk about their specific work area. This enabled graduates to get a holistic view of the organisation and what functions it performed.

The undergraduate project component is shown in Figure 20 as having maturity level two because EG4 had conducted her project with the case study organisation. Work Integrated Learning is also shown in Figure 20 as having maturity level two because EG4 explained the selection process for obtaining an undergraduate project. The Internship component is shown in Figure 20 as having maturity level two for EG4. At the end of the summer internship period, EG4 had to present back to the organisation what she had done and what she had learnt indicating a form of assessment by the company.

Like EG3, EG4 had experienced a variety of management styles. The Management component in Figure 20 is shown between maturity level one and level two. Whilst every manager was supportive during the work area placement, EG4 stated that it was “dependent on the manager as to how long it would take to become competent at what you were doing”.

EG4 had been proactive in obtaining a mentor. She had approached her preferred mentor and asked them if they would perform the role. EG4 stated that there had been workshops held for mentors and that she believed mentors had received notes.
Supervision is shown in Figure 20 between maturity levels two and three because EG4 stated that her mentor meetings were an informal “chat”. Like EG3, EG4’s mentor meetings occurred once a month.

Funding was an area that EG4 felt was a challenge for managers. The Funding component is shown in Figure 20 as maturity level one because it was at the manager’s discretion whether to spend their operational budget on a graduate who would potentially leave the area after a short period. EG4 stated that a separate budget for graduate training and courses would be beneficial and these discussions were being held between the Graduate Programme Manager and the HR department.

The influencing arrow from the workplace Capability Maturity component to the main workplace components is shown in Figure 20 as a maturity level one and two. Like EG3, EG4 had only received one non work-specific course. EG4 stated that for technical level training, it was up to the graduate to canvas managers for funding of training courses.

EG4 had found that political influences were more prevalent in the organisation than previously experience with her academic education provider. It was EG4’s perception that a graduate was treated the same as any other employee and worked just as much, but was paid less. EG4 had not experienced any cultural issues and commented that the lack of females in the electrical business was an advantage. Socialising, talking to people and completing the work were factors that EG4 thought helped obtained more work and therefore more experience and learning opportunity. EG4 stated that as an intern a large amount of responsibility was given to the student to manage themselves and their projects. EG4 was also able to achieve work outcomes by interfacing with other staff members and in some cases having another staff member complete a task on her behalf. This indicated EG4 had good behavioural skills as discussed in Rainsbury et al. (2002).

In summary, EG4 indicated that the company’s undergraduate project, internship and graduate programmes were well established and managed. There was a willingness to teach a graduate which indicated a commitment to develop the skills required to perform the work (Curtis et al., 2009, p. 22).
5.4 IT Employee Survey Findings

5.4.1 Response Rate

There were 24 responses received out of 45, giving a 53% response rate. Figure 21 shows that people with Desktop, Infrastructure and Network & Security job roles did not respond. The most likely cause of this was the outsourcing of these functions to a third party organisation at the time of this survey. This meant some employees were transitioning to another company and others were taking voluntary redundancy. It was considered by the researcher that a response from the exiting employees could have influenced the results negatively.

Figure 21: Survey participant IT job roles

‘Other’ job roles included above that were identified in the verbatim data were:

- Portfolio Manager (IT Investments)
- IT Service Manager
- Information Security and Risk Manager
- Analyst
- IT Trainer
5.4.2 ITE1

ITE1 indicated that entry into IT was not always directly from an IT academic course. Figure 22 showed that 75% started their career in other vocations. Of those participants who did start their career initially in IT, some had not completed an academic qualification. This indicated that it would be possible to select a graduate candidate from another vocation or academic background.

![Figure 22: Employees that started in IT](image)

When asked how frequently an IT role change had occurred ITE1 indicated that between two and three years was the average as shown in Figure 23. This aligns with the duration of the graduate programme the engineering graduates had discussed.

![Figure 23: Frequency of IT role change](image)

ITE1 verbatim results strongly stated that it was important to have clear objectives, outcomes and scope for an IT graduate programme. One response received was “gaining
exposure to processes and challenges including the SDLC” would be the greatest perceived opportunity for a graduate or intern.

Participants were asked about their perception of management and leadership. Based on the spread of Likert scores, the researcher observed that whilst there seemed to be reasonable support for the managers, perception suggests that IT management are not ready to support an IT graduate programme. The Management component is shown in Figure 24 with the maturity level of one indicating IT managers needing to take responsibility for the capability (Curtis et al., 2009, p. 19). This perception is in line with ITM4’s comments about the IT management team needing to collectively understand the learning experience to be provided and needing to “create space” in order to support a programme.

![Figure 24: Viewpoint and Maturity from ITE1](image)

Figure 24 and Figure 26 shows the numbers of years IT employees had spent in the IT industry and how many different roles they had held. This indicated a significant amount of experience across the participants that could be applied to an IT graduates’ learning experience.
ITE1 highlighted a strong concern for the capacity required to support an IT graduate. This was both individually and as a team. Figure 24 shows a maturity level zero for ITE1. ‘Resource’, which included ‘Availability’, ‘Time’, ‘Workload’, ‘Capacity’ and ‘Budget’, was the highest perceived constraint by ITE1 with regards to implementing an IT graduate programme, mentoring and managing an IT graduate.

Across seventeen responses, the greatest perceived benefit to the IT department would be ‘Fresh ideas / thinking’. This was followed closely by and related to, statements about ‘Fresh resource’, ‘starting with enthusiastic and technically capable people’ and ‘new approaches and technologies’.

The Career Development component is shown in Figure 24 with a maturity level between one and two for ITE1 because the survey results indicated a split between IT staff members that had career development plans and those that did not, which indicated an inconsistency in practice (Curtis et al., 2009, p. 18).
Figure 27 shows the split of IT staff members that had career development plans and those that did not or were unsure.

![Figure 27: Career development plans](image)

Results of the individual-oriented questions indicated that some individuals tended to drive their career development rather than relying on their manager. 79% of survey participants had not received training in the past twelve months and this is shown in Figure 28.

![Figure 28: Received funding for training in last 12 months](image)

The influencing arrow from the workplace Capability Maturity component is shown in Figure 24 a maturity level one for ITE1. Whilst training had been limited, a number of participants agreed that the company’s HR department was required to help support the development of individuals.
The Supervision component is shown in Figure 24 with a maturity level between one and two and Management is shown with a maturity level of one. When asked about constraints to mentoring or management, across twenty responses, the greatest perceived challenges were “Time and Resource” and “Conflicting Priorities”.

The influencing arrow from the main workplace components to the graduate project, internship and graduate programme components is shown in Figure 24 with a maturity level between one and two for ITE1. ITE1 results showed that there was strong willingness to employ an IT graduate into the company’s IT workplace. The survey only posed two questions in regards to the organisational viewpoint. The result was a mean score of 4.17, which indicated a strong view that an IT graduate would be beneficial to the IT department and organisation and that the HR department was required to support an IT graduate programme.

In summary, there was a strong indication that the IT department and the organisation would benefit from having a graduate in the team. There were experienced people in the department that could impart their knowledge to graduates. However, current practices and approaches to career development, training and support, raised the concern that IT management did not have an IT graduate framework and were not ready to support such a person. This has been reflected in Figure 24 by the maturity levels zero to two. Across the responses the greatest perceived considerations for management were:

- Have the right people / mentors - need someone passionate about learning and helping others - supportive environment
- Have a clear development plan for the graduate
- Recognise effort required
- Having clear objectives / outcomes / scope of programme.
## 5.5 Conceptual Framework Summary

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<th>Participants</th>
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Figure 29: Conceptual Framework Results Summary
6 Discussion

6.1 Discussion Introduction

At the time of this research project, the case study organisation had both intern and graduate programmes that catered for electrical and gas engineering students but had only just embarked on recruiting an IT graduate. The combined IT management team had only been operating as a team for an average of one and a half years but had multiple years of IT management experience. Individually, each IT management participant had a view on the factors involved with adopting an IT graduate programme and in some cases shared the same or similar viewpoints with their colleagues. However, collectively as a team, an approach to IT graduates or interns had not been formulated. This research project commenced at a time when the case study organisation was in the process and final stages of outsourcing the support of its IT infrastructure functions. This included helpdesk, desktop and server support, networking and security disciplines. The IT employee survey had no responses from people who held roles in the IT infrastructure disciplines. It was considered by the researcher that responses from these people could have reflected a stronger emotive or negative effect on the results as their jobs were undergoing a period of transition and possible uncertainty.

Introna (2005) discussed the social and ethical implications based on the interpretation of IT phenomena. Where quantitative analysis tends towards the mechanistic or positivist view, this qualitative research study and analysis is situated around the social constructivist view. With the influence of cultural political and economic factors, an IT graduate or intern forms part of a technology outcome, which itself is part of a series of complex and social processes (Introna, 2005).
6.2 Resource availability

Literature highlights that there has been a fall in enrolments in IT academic courses and that there is a skills deficit (J. Howard & Atkins, 2006; McCullum, 2006; Wills & Sutcliffe, 2005). Among the IT managers and IT employees there was a strong willingness to adopt an IT graduate or intern into the IT department and IT teams. The feeling was tempered by the ITE1 findings where time and current workload were perceived as key constraints to supporting a graduate. The Capacity component in Figure 29 shows that the maturity level is between zero and one. ITE1 also mentioned a lack of cohesiveness and leadership in the IT department. The following are a collection of related statements:

- ITM7 stated an undergraduate project group team would be considered if support could be provided, but said that the capacity was suited towards hosting an individual.
- ITM6 stated that the issue was likely to be a lack of supporting resource rather than a lack of projects.
- ITM6 stated trust was required amongst the group of people sharing in a common [learning / graduate] goal.
- ITM3 had stated the IT graduate programme needed to be “collaborative” amongst the other IT leaders and that the programme needs to be accompanied by “guiding principles” for supporting and developing a graduate.

The researcher considers that the impact on staff could be reduced by the IT graduate’s self-directed learning objectives in becoming an autonomous learner through a Work Integrated Learning project or summer internship projects (Bates et al., 2007; McDermott, 2008). The engineering graduates experience indicated that they operated autonomously and were able to get help when they asked for it. As Howard and Atkins (2006) discussed support for teachers developing their skills and the researcher considers that existing industry-employees, that are to provide support for a graduate or intern, also require their own skills to be kept up-to-date to reduce the risk of the employee leaving the IT workplace or more significantly the IT discipline.
This research project did not explore the any direct linkages between the IT industry skills shortage and the accessibility of skill resources by the case study organisation. Future questions posed by the researcher:

- How do you typically source skilled resources?
- Do you perceive a limited availability of skilled IT resources?
- Is the recruitment of skilled IT resources difficult for you?
- Is there a cost impact on your organisation?

The researcher suggests there might not be a current perception of skills shortage within the case study organisation, but this would require investigation in conjunction with the age of the workforce.
6.3 Recruitment and retention

Staffing in an organisation is about the recruitment, selection of candidates and orientation of people towards new assignments (Curtis et al., 2009). Becker and Thompson (2009) proposed a collaborative project between secondary school, post-secondary and professional organisations to foster student interest in IT and to create an educational pathway. The combined research findings indicated that the case study organisation had relationships with academic institutes that were a common source and pathway for engineering graduates. The company advertised internship and graduate positions at these academic institutes. Reputation and knowledge of the company helped the engineering graduates in their decision to apply for a summer internship position. For one engineering graduate, knowledge of the company was gained through a technical lecture presented by an engineering employee. Akbulut and Looney (2007) found that teaching sophisticated IT in introductory IT courses influenced the uptake of IT as a vocation and helped to build self-confidence and increase outcome expectations. The researcher considers this as also a desired outcome of an IT graduate or internship programme. Attracting interest from prospective IT graduates could be achieved by advertising or demonstrating the company’s use of sophisticated and state-of-the-art IT through guest academic course lectures, such as indicated by the engineering graduate’s experience.

A benefit for employers is that an internship programme provides a source for resourcing and can operate as a filter for pre-employment on to a graduate programme. The company’s engineering internship programme allowed the organisation to assess the capability of the student and their ‘fit’ with the company. Graduates that had worked at the company as summer interns had progressed through to full-time employment on the graduate programme. This research project did not explore how many engineering students began their employment as interns with the organisation or how many engineering graduates were inducted each year. This could have indicated a conversion ratio or likelihood of employment on to the graduate programme if an undergraduate project or summer internship had been undertaken and whether the process served as a
filter of competent people. The research did not explore whether these institutes had an IT student and graduate capability that the organisation could target in the same way that engineering graduates were. It was unclear to the researcher whether these institutes were a potential source for IT students or graduates.

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Table 7: Prerequisite preferences for academic institution, qualification and grade

Table 7 shows there was no collective view from IT management that an academic grade or academic institute was a deciding factor in employing an intern or graduate. Only two IT managers indicated that they would require a ‘B’ minimum academic grade from an academic degree qualification as well as from a well-recognised or academic university. The IT management interview findings indicated a strong preference for an intern or graduate to have an appetite or passion for learning and that attitude was a factor in gaining employment. Haddara and Skanes (2007) reported that one of reasons employers participated in cooperative education was to hire motivated employees (p. 71).

When IT managers were asked what qualities or benefits a graduate would bring to the IT team, the collective responses were:

- New ideas and innovation
- Exposure to new technology
- Freshness; youth; vigour; enthusiasm
- A different approach / perspective – questioning / assessing why something was being done a particular way.
IT managers and engineering graduates acknowledged that many things could be taught and learnt on the job and that there were other attributes they would prefer. For example, ITM6 stated that he would be looking for someone who had “life experience” which was aligned to EG4 who said she would prefer graduate who had not spent all their time studying. This was also reflected by most of the IT managers and EG4 stating that they would not necessarily be looking for an “A” academic grade. Fagnot et al. (2007) found that an indicator of occupational commitment was the enjoyment of learning and keeping up with technology and integrating technology into leisure activities.

The findings showed that recruitment by the company had a managed maturity level of two based on the collective experience from the engineering graduates. To achieve a defined maturity level of three, the organisation would be developing specific workforce capabilities in order to meet specific strategic planning objectives (Curtis et al., 2009, p. 62). If increasing recruitment maturity were desired by the organisation, the development of a graduate’s skills and competencies through the graduate programme would need to align with strategic objectives of the company.

Van Slyke et al. (2007) had identified learning partnerships as pathway into the IT discipline and with the IT employee survey result indicating the 75% of IT employees had held role in other vocation prior, the researcher considers that people from non-IT related backgrounds also have opportunities in joining the IT discipline through an organisation’s IT graduate or internship.
6.4 Curriculum and assessment

The case study organisation had offered undergraduate projects to students enrolled in electrical engineering academic degree courses. Two of the engineering graduates interviewed had performed their projects with the company, one graduate had performed their project on topic provided by their university and the fourth had performed their project at another organisation. This indicated that performing an undergraduate project with the company was not necessarily a pre-determinate for further employment. The IT management interview findings indicated a preference towards hosting a group project as opposed to an individual assignment. The IT managers presented two different perspectives on group-based projects.

- Assess the individuals as prospective candidates
- Facilitate cross-collaborative learning.

ITM6 stated if the group were successful in their project outcome, it would provide the opportunity to assess the group with a view to bringing an individual into the organisation longer term. Whilst some IT managers questioned the department’s capacity and the ability to support a group-based project, ITM7 stated that members of a project group would be able perform different roles, learn from and support each other. Group-based projects also offer a positive team building experience (Rob, 2007). Three engineering graduates had participated in group-based undergraduate projects consisting of two students. The fourth engineering graduate had performed their project as a sole member. Of the three engineering graduates that had a group-based project, two had positive learning experiences with their project partners.

The case study organisation’s ability to support undergraduate project is reflected in Figure 29 (page 128) as a managed maturity level two because it demonstrated the company had the people and skills to communicate, coordinate and manage dependencies (Curtis et al., 2009, pp. 31-32). This maturity is interpreted as specific to the engineering area of the business only because ITM4 stated IT management “would require some passion from the leaders and it would require discretionary effort”. This view was shared by ITM3 who stated the ability to host a project group was dependent on “the amount of
effort required…and that you'd expect they'll need a lot more guidance and mentoring”. This indicates IT management’s ability to support an undergraduate project group is at a maturity level less than two.

All engineering graduates interviewed had the same response to the structure and duration of the graduate programme. All graduates felt positive about variety of work they had experienced during their time on the graduate programme. IT management’s expectations of four to six work areas was aligned to the number of rotations the engineering graduates were scheduled to complete as part of their graduate programme. However, there was a difference between IT management’s expectation of the duration of the graduate programme and the engineering graduates interview responses. IT management thought that the duration should be between one and two years, which was in contrast to the three-year duration of the engineering graduates programme. At the time this research project commenced, an IT graduate was about to be employed on the company’s three-year programme. Whilst the engineering graduates wanted to experience additional shorter-length work area placements, they stated that a nine-month placement enabled them to gain some initial skills in the first one to two months and then after six months, felt they were able to contribute fully. This would enable a graduate to complete a project in the six to eight month timeframe. The Graduate Programme and Rotations components shown in Figure 29 reflect collectively that there was a managed maturity level two. The organisation had the capability to support multiple graduates and multiple work area placements. ITM5 believed that there was enough IT change passing through the environment so that an initiative could be easily facilitated and supported by the business.

EG1 stated the company had provided courses to assist people in their jobs. All graduates had received training such as desktop productivity courses, but approximately one per year each. 79% of IT employee survey participants reported they had not received any training in the previous twelve-month period and the engineering graduates stated that managers had to fund specific technical training from their operation budget. ITM1 stated that the first priority is to “keep the shop open”, ITM2 stated there was no budget for courses and ITM6 stated that when budget cuts occur, training is one of the
first things highlighted to cut. Jafar et al. (2008) discussed challenges with an academic
education providers keeping abreast of changes in technology, however the researcher
considers that it is in the best interest of the student to obtain a broad exposure to a
variety of tools prior to entering the workforce in order to develop adaptability and
learning traits. Figure 29 shows that funding is at an initial maturity level one and the
influencing arrow can also be considered maturity level one indicating inconsistent
practices (Curtis et al., 2009, p. 18). Therefore, an IT graduate entering the organisation
should expect that performing on-the-job activities would be the primary form of learning
opportunity.
6.5 Linking with industry

The case study organisation had existing relationships with academic institutes that enabled the facilitation of undergraduate projects and the recruitment of summer interns and graduates. ITM1’s view was that an academic institute needed to be active in the placement of students and feedback of their project outcomes. “The partnership and communication between the educational institution, students and employers must be strongly established, so that the context of the work place and opportunities that it provides for the student learning are clearly understood by all parties” (Eakins, 2000, p. 66). Kamoun and Selim (2007) discussed the opportunity for industry-based people to present as guest lecturers. The researcher reflects upon a guest speaker experience that took place during a post-graduate course in the 2006 academic year. The guest speaker lectured this postgraduate class in IT Project Management, which entailed many real world experiences. This class event was a positive experience however; the assessment of the first assignment was surprisingly low for all members of the class. This was due to a misalignment of the topic to the course syllabus. The class members provided the course supervisor feedback, which was then factored into the overall learning outcome. Betts et al. (2009, p. 116) identified that gathering feedback and benchmarking data from students, employers, academia and lecturers was critical for the evaluation of academic curricula and course planning. The researcher considers that feedback and benchmarking as part of evaluation is critical to development of the organisation’s IT undergraduate project, internship or graduate programme.

“Corporate Citizenship” was one of five motivations found for a company committing to a cooperative programme (Smith et al., 2006). ITM6 stated that an IT graduate programme was an opportunity to “give back to the IT community”. The researcher interpreted this statement to mean that the opportunity for IT graduates to learn within the organisation in turn produced skilled resources for the wider IT sector in New Zealand. It is the researcher’s opinion that an opportunity exists for the case study organisation to participate in the “Accelerating Auckland” programme established by the Tertiary Education Commission (TEC) as described by Young (2008). Participating in an industry / tertiary relationship provides the opportunity for an organisation to promote
itself as a contributor to community, which can increase the company’s reputation and brand presence (Corich & McLay, 2004).

Literature was found to focus on the relationship between academic institutions and industry organisations for the purposes of ‘preparing students’ for industry using Work Integrated Learning (WIL), Capstone and undergraduate projects. There is a perceived gap in the literature where the learning is continued after graduation in New Zealand organisations outside of an academic institute. Staff development, learning and assessment become the responsibility of the organisation in which industry standard frameworks and processes like P-CMM could be implemented.
6.6 Preparation for industry

All IT managers offered suggestions as to what work areas an IT graduate should experience. Initial placement was about being able to interact and experience the company’s business customers. For example, ITM2 ITM3, ITM5, ITM6 and EG2 all suggested spending time in a helpdesk role. IT managers saw ‘understanding customer needs’ and the ‘type of work coming through the IT environment’ as an important aspect for an IT graduate experience before moving on to more technical roles. ITM5 and EG2 stated that having a graduate spend time within the business would be beneficial for creating relationships and getting to know how the business operated. Based on Smith et al. (2007)’s finding about needing sufficient technical knowledge, the implications of a new IT graduate spending time away from the IT department need further investigation. The work area placement “…should be a deliberately constructed experience which requires statements of its intent to work from practical and transactional goals towards emancipatory and transformational activity” (Bates et al., 2007).

The maturity assessment of the IT graduate programme and rotations was limited because the programme had not yet commenced. Based on the company’s existing graduate programme operating at the managed maturity level, IT management would be able to learn from their business colleagues and improve from an initial maturity level one to a managed maturity level two in a short period.
6.7 **Competencies and skills required**

IT managers were asked what attributes they would look for in an IT graduate. The collective responses were:

- Soft / people / interpersonal / communication skills; a willingness to engage with business people; ability to identify and communicate solution options
- Ability / open / passion to learn; prepared to ask questions
- Good attitude; willing to compromise and listen; adaptable; open minded; open to change; real interest in business
- Logical thinker; problem solving skills; analytical / statistical ability; decision making skills
- Enthusiasm / General knowledge of IT

Graduates and employers perceived the ability and willingness to learn was the most important workplace competency (Coll et al., 2002; Hodges & Burchell, 2003; Rainsbury et al., 2002). Analytical thinking and technical skills also were identified as key skills for an IT graduate to possess. ITM6 had stated that integrating systems was a skill that a graduate was likely to possess. The literature did not reveal that this specific skill set was being taught however, it did align with Litecky et al.’s (2009) study that identified system integration as one of the high general technical skills sought after by employers who had advertised job roles.

The IT managers’ interview responses indicated a desire for expose a new IT graduate to business at the earliest possible opportunity. Development of business communication skills and interaction was seen as an important factor but ITM5 stated that business acumen was something that would be learnt with time.

The capability maturity of student / graduate competencies was not identified during this research project. The relevance of such a factor and the application to the conceptual framework would require future investigation.
6.8 Learning Development

The researcher has used the term ‘Learning Development’ to reflect the opportunity for an individual to extend their knowledge and skills through career planning, mentoring training and experience. Training and development of an individual is about identifying and removing the gap between the current skills and the skills required to perform tasks to support the objectives of the organisation, department or team (Curtis et al., 2009, p. 32).

6.8.1 Learning

EG1 and EG2 stated that their graduate programme had not been as technical as they had expected. EG1 had learnt about commercial aspects of the business and EG2 stated that he had learnt from building relationships. EG4 also shared these same experiences. EG4 stated the experience had been more practical than theoretical, although the theoretical background was useful when challenging the way things were performed by company, which was an attribute the IT managers were looking for in an IT graduate. EG3 had organised an external course that was technically-oriented and outside of the organisation’s learning regime suggesting the company was not able to provide the learning expectations of EG3. All engineering graduates had been exposed to ‘general’ training courses that had been made available to staff across the business. A research project conducted by Bremer (2005) found that training expectations tended to be higher than what was received. It was suggested that lack of formal training and a higher level of self-directed learning might contribute to recruit dissatisfaction (Lee, 2004). When the engineering graduates were asked if they had any misconceptions or were happy with their career progression, there was a mixed response. All acknowledged that they had learnt a lot from the experience, but it did not necessarily align to their original expectations.

Sharing accumulated work experience is not only about sharing experiences, but about learning how to use other workers for the purposes of learning (Collier & McManus, 2005, p. 8). ITM7 discussed his experience with graduates taking a proactive approach to additional learning opportunities by collaborating with other graduates within the
business or with graduates from other organisations. Learning could occur by sharing experiences as well as inviting senior managers to talk about their area of subject matter expertise. This was taking place amongst the case study company’s graduates. EG4 stated that the graduates gained knowledge of the company by holding monthly meetings and inviting guest managers to speak about their business areas. EG3 had also acted proactively in order to enhance their learning experience. EG4 described an instance where EG3 had organised a visit to major industrial site the company operated. EG1 also recommended that IT graduates involve themselves with departments outside IT and mix with the other graduates in the company.

EG2 stated there was a lack of critical feedback on the graduate programme in order for an individual to know where to focus their learning development. EG4 stated that as a summer intern, students had to present their project experience back to the organisation. The researcher considered that presentation of the learning after each rotation could be a valuable exercise and opportunity to collect critical feedback to assist them in their next work area placement.

6.8.2 Career Development

There was a split between IT managers actively managing their staff’s career plans and those who were not. ITM1 commented that the career plan is the responsibility of the employee and the individual needs to drive it. This supported by the P-CMM which stated that developing knowledge and skills is the responsibility of the individual and that the “manager is responsible for ensuring that their people have the skills required to perform their work and for providing opportunities to develop these skills” (Curtis et al., 2009, pp. 19-20). Assessing the collective Career Development component maturity in Figure 29 shows that the IT managers are operating between the initial and managed maturity levels. This aligns with the P-CMM statement that at managed maturity level two managers “accept personal responsibility for the performance and development of those who perform the unit’s work” (Curtis et al., 2009, p. 20). ITM3’s response highlighted that managers initially needed to take responsibility for the career
development plan of their staff because if a career development plan did not exist, there was a risk a staff member could become disenfranchised. P-CMM stated that achieving a managed maturity level two helped to address this issue. Only ITM5 was operating at a defined maturity level three. Figure 29 indicates a clear difference in maturity between the collective IT managers’ responses for the influencing arrow from the workplace Capability Maturity component to the main workplace components. Based on ITM5’s response and indications from ITM1 and ITM6, supporting material provided by the HR department would seem to exist. Not all IT managers were aware of this and had not proactively sought it out like ITM5. The researcher believes that the organisation’s HR department needs to provide additional information about the career development process and supporting material to the IT management team.

6.8.3 Mentoring and Supervision

In this research project, the Supervision component in the conceptual framework represented mentoring. Mentoring received by the engineering graduates equated to a defined maturity level three because, while P-CMM identifies Mentoring as a predictable level four process area, it stated that informal mentoring occurs at the Defined Level (Curtis et al., 2009, p. 39). Supervisors tended to impart knowledge and experience in an informal manner and there was no evidence that the engineering graduates obtained this from documentation. However, overall the engineering graduate Supervision component shown in Figure 29 is between maturity level two and maturity level three. The benefits of informal mentoring were tempered by a variation in supervisor inputs. Some supervisors were proactive in their teaching whilst others needed to be approached by the graduate.

Figure 29 shows Supervision for the collective IT managers as between the initial maturity level one and managed maturity two. Whilst most of the IT managers stated they were willing to mentor or support a graduate, intern or undergraduate project, only some described their experience in performing prior mentoring roles. The IT managers identified ‘mentor development’ as a requirement. Engineering graduates stated that a
mentor support programme had been established approximately six months prior to this research project commencing which is assumed would be leveraged by the IT group. EG4 stated she thought mentors had been provided notes and all engineering graduates found the mentoring process informal, which indicated the mentor programme had not been well communicated.

6.8.4 Management

The literature highlighted that negotiated learning required collaborative planning and assessment by both the academic education provider and the student. The researcher considered that this approach could take place in a workplace context. Engineering graduates stated they had input into the work areas they wanted to experience prior to their placements. However, this was dependant on where the work activity was required by the organisation. The researcher deduced from the engineering graduates’ responses that a rotation occurred as planned. In EG2’s case, one placement affected his experience because of an organisational restructure that had happened just prior to this research project commencing. However, the coordinated rotation of work area placements shows collectively in Figure 29 as managed maturity level two. Where some indicate between maturity level one and two, this was due to the perceived lack of visibility around external placements and the perceived lack of feedback between supervisors, mentors and the graduate programme manager. There was also no guarantee of employment beyond the graduate programme. EG2 stated he needed to start monitoring the vacancies for potential positions. The likelihood of employment was not explored in this research project, however EG2’s comments indicated that the organisation is not yet operating at a defined maturity level three because P-CMM stated that workforce planning at the defined level requires and aligns workforce activities to deliver the business strategy and objectives (Curtis et al., 2009, p. 34).
6.9 Culture, commitment and retention in the workplace

IT managers and engineering graduates were asked questions pertaining to culture, to see if it was an influencing factor in the way people were perceived or the opportunities they were given. The researcher found it surprising that there were no racial or religious issues in the responses. The majority of responses pertained to the working environment; however, dynamics between males and females emerged from the discussion.

6.9.1 Environment

One definition of culture is “shared values and resulting patterns of behaviour that characterise interactions among its members” (Curtis et al., 2009, p. 5). ITM1 believed that it would be useful for a graduate to initially observe the existing culture of the department and make an assessment. ITM5 saw the observation exercise as an opportunity to create explicit knowledge from tacit knowledge. ITM5, ITM6 and ITM7 identified the length-of-service or retention of existing staff as a cultural issue for a new graduate. They suggested that change management was a challenge when dealing with staff that had been employed in roles for a significant period. ITM6 also stated the IT teams were under work pressures, which was a possible cause of the lack of exuberance he mentioned.

A proposed research study by Fagnot et al. (2007) suggests that commitment to the IT profession, or the lack of commitment, could be influenced by exposure to negative aspects of IT organisational culture. ITM4 stated that the [current] dynamics of the team and focus and attitude of those participating and supporting the programme, would be a cultural issue. ITM4 stated that the collective IT team needed to understand the learning experience on offer. This suggests that if the IT team did not understand the learning experience well then there was a perceived risk of the experience being a negative one for the IT graduate and therefore posing a potential risk to occupational commitment. Another perceived issue was ITM7’s comment that the direction and the structure of the organisation were constantly changing which made planning difficult.
ITM2 raised the concern that a graduate could be seen as a “low cost resource”. EG4 stated that she was given as much responsibility and work as any other employee. This was something that ITM1 was conscious of and he stated a graduate should not be treated like any other staff member. This aligns with ITM4’s comment about the IT team understanding the learning experience the graduate would receive.

Figure 29 reflects an initial maturity level one for the Culture component across the IT managers. Curtis et al. (2009) stated “at the initial level organisations will usually have difficulty retaining talented individuals”. A low maturity highlights a risk that an undergraduate, intern or graduate could be presented with an environment that would operate in an ad-hoc manner in regards to their learning experience and other research suggests that the likelihood of occupational commitment could be affected.

6.9.2 Gender dynamics

Male and females have been found to share attractions to IT for similar reasons (Morley et al., 2009). ITM2 stated one possible reason for the lack of women in IT was that the infrastructure area required a degree of heavily lifting of equipment. No other IT-related gender issues were found in the responses from IT managers. EG4 found that being a female in a predominantly male work environment was an advantage for creating working relationships and getting others to assist in performing work.

ITM5 had experienced a significant change in team dynamics when a male staff member was introduced into an environment previously dominated by females. Gender was not found to be the primary issue, rather a difference in personality types. ITM1, IT2 and ITM5 stated that a graduate would possibly change the dynamics of the team. The change in dynamics was not perceived as a negative or positive influence, but a factor that managers needed to be aware of so that it could be monitored for impact on the team.
6.10 Discussion Summary

The researcher considers the New Zealand Digital Strategy as a catalyst for the development and placement of skilled IT resources in the New Zealand workforce. However, New Zealand businesses have a role to play in developing their existing employees and creating opportunities for those entering the workforce. There were many factors, both benefits and constraints, explored and discussed that play a part in developing IT people. Loosely modelling the maturity of people-oriented workforce practices enabled a ‘pulse check’. By comparison, the IT department was in the initial stages of maturity for developing its people and preparing to employ an IT graduate and could leverage and learn from the experiences of the engineering graduates who appeared to be operating at a managed maturity level. The perception from IT manager interviews and IT employee survey results was that the IT department was not yet ready to support an IT graduate but acknowledged that the IT teams would benefit from working with one.
7 Conclusion

7.1 Introduction

This research project was motivated by the researcher’s own previous work and career experience, empirical evidence that there had been a decline in the number of people entering the IT discipline and the prospect of a New Zealand organisation being able to sustain the development of existing and new employees.

This research project set out to explore the factors involved with a New Zealand organisation developing an effective graduate or internship programme. A perception study was carried out to inform the questions posed by the research topic.

Qualitative data comprising of a combination of interviews and a survey was collected from a case study organisation that had an established IT capability. A conceptual framework was developed based on elements identified in the literature review and the initial stages of the analysis of the interview and survey data. Concepts of the People Capability Maturity Model were applied to the elements in the conceptual framework to assess the maturity of the organisation. Viewpoints of IT managers, engineering graduates and IT employees were also applied to the model. The application of the conceptual framework made it easier to reflect on. A graphical summary table was produced to highlight similarities or differences in the collective responses.

7.2 Summary and Conclusions

Research Question 1: What are the factors involved in developing an effective IT graduate or internship programme within a NZ organisation?

Engagement with academic institutes was seen a primary mechanism for attracting talent. However, evidence from this research indicates that majority of people enter the IT profession from other vocations. Providing a graduate or internship programme was perceived by IT management as a way of contributing to the IT community. Advertising an internship or graduate programme was thought to have a positive effect on the company’s reputation. The researcher believes that a graduate or internship programme
would contribute to industry strategies to attract and retain more people into the IT discipline.

An ‘A’ academic grade student was not perceived as an ideal candidate. IT management would prefer other attributes like “life experience”, “a passion for learning” and having an exposure to new technologies. An undergraduate group project was seen as a mechanism for “filtering” or assessing the talent of individuals before offering a place on a graduate programme.

Four to six rotations with the inclusion of an external placement over a three-year period were seen as the most suitable outline to a graduate programme. The three-year timeframe aligned with the average time an IT employee tended to change his or her own job role. Getting to know how the business operated was seen as a key learning outcome. Time spent with the Helpdesk area and time spent working within the business were seen as a way to build relationships with business people and gain knowledge of the business operations. Interacting with other graduates in work and social contexts was also seen as an opportunity to facilitate additional learning.

IT employees saw time and effort as a major issue for supporting a graduate and their learning experience. However, a benefit was that a graduate tended to be able to work autonomously and carry a reasonable amount of responsibility. Whilst some guidance would be required, a graduate or intern would provide additional cost-effective resourcing to help with seemingly heavy workloads.

Although specific funding for graduates or interns was not available from the company for technical training courses, graduates had benefited from learning non-technical aspects of the business. On-the-job work experience was seen as the main learning mechanism. Career development planning was seen as an important activity in order to develop an individual’s skills that were required by the organisation in achieving its work objectives, however it was evident that a career path should not be determined prior to an individual being employed on the graduate programme. Assessment and feedback to a graduate were a necessity to provide an indication of the learning that had taken place, progression and areas to focus on.
Mentoring was a beneficial activity albeit informal, for sharing of knowledge and experience and providing guidance to a graduate. Employing an IT graduate or intern would require a mentor development programme and a formal framework for IT managers.

The researcher perceived that the case study organisation was having success with its graduate programme and its engineering graduates. Management commitment was critical in rotating a graduate through the organisation and providing the opportunity to experience an external placement as part of the programme. This enabled an individual to assess their career progression and determine where their interests lay in regards to permanent career placement.

Culture was not a strong factor in the employment of an intern or graduate. The male and female dynamic was explored but was considered a general aspect of any employment situation.

**Research Question 2: Do current employees have a positive attitude towards an IT graduate or internship programme?**

IT managers and IT employees were found to have a positive attitude towards the adoption of graduate or intern and a willingness to bring one into the IT work area. However, this was tempered by perceptions that the following would impact the experience:

- Current workloads created capacity issues in terms of the ability to support a graduate or intern
- IT management needed to establish a collective understanding and approach towards the learning experience of a graduate or intern

**Research Question 3: What are the perceived benefits by management in implementing an IT graduate or internship programme?**
IT management perceived the benefits of an IT graduate to be a cost effective resource that brings:

- New ideas and innovation
- Exposure to new technology
- Freshness; youth; vigour; enthusiasm
- A different approach / perspective – questioning / assessing why something was being done a particular way

Not only would an IT graduate develop their knowledge and skills, but it would also be an opportunity for existing IT staff members to develop as mentors. Building relationships with business was seen as a benefit by both IT managers and engineering graduates.

Research Question 4: How mature is the organisation in supporting an IT graduate or internship programme?

Using the People Capability Maturity Model enabled the assessment of aspects of the organisation’s workforce practices. The results indicated that the IT department was at an initial maturity level of one in regards to an IT graduate or internship programme, compared to the existing engineering graduate programme that was nearing a defined maturity level of three. Overall assessment suggests that the organisation is operating between the initial maturity level one and the managed maturity level two in regards to managing the development of its workforce. Evidence from the data collected indicated the organisation was performing some P-CMM workforce practices however, it is likely that the reorganisation and outsourcing that occurred just prior this research project commencing may have influenced some of the low maturity assessment results.

In summary, this research project has contributed to a perceived gap in the literature in understanding the factors involved in developing a graduate or internship programme.
within a New Zealand organisation. Employing an intern or graduate would benefit an organisation that has the work to offer. An organisation needs to have workforce practices in place in order to ensure the experience is a positive one and limit the risk of a person leaving the IT discipline.


7.3 Recommendations

Based on the outcomes of this research project the following pragmatic recommendations would assist in supporting the development of IT people.

- Promote the benefits outlined in the research project to the case study organisation’s IT staff and have the case study organisation develop an undergraduate, intern and graduate framework that identifies roles, responsibilities and processes to support it. Have the framework promoted to internal and external stakeholders.
- Have the case study organisation build relationships with one or more academic institutes, leveraging existing relationships, to foster the interaction between academia and industry.
- Review the constraints found in this research project and investigate strategies to mitigate their effect.
- Develop a set of assessment criteria and mechanism for measuring the success of an undergraduate, intern or graduate programme.
- Extend the company’s mentoring programme to include the IT managers or delegated representatives.
- Develop and better align the conceptual framework used in this research project to the P-CMM with a view to extending it to make it specific for supporting undergraduate, intern and graduate programmes in business.

7.4 Further research

This research project investigated people’s perceptions in regards to IT interns and graduates. The findings describe the start of a journey for the case study organisation. The topic of attracting, developing, and retaining talented individuals lends itself to action-based research. Elements of this study could be used to review the progress the case study organisation has made with employing an IT intern or IT graduate; to measure
if perceptions have changed; and to capture the experience of an IT graduate. There are also further areas to explore in understanding how to attract, develop and retain talented people.

Further research is required to understand an organisation’s maturity from the perspective of the Human Resource department. The use of the P-CMM could be explored to determine the organisation’s workforce strategies employed at a holistic level, the influences on the IT department and the development of IT people.

Conducting a study of New Zealand companies that already have established IT graduate and internship programmes could help to determine whether organisations are doing enough to attract people into the IT industry. Academic institutes have recognised that more needs to be done in attracting students at a secondary school level. In support of this, does a New Zealand organisation have a role to play in attracting students through work experience?
8 Reflection

8.1 About the topic

I have believed for a number of years that the success of IT practices and outcomes has been “about the people” and that the best results are achieved through inspiring, motivating, mentoring, empowering and teaching people. It had been my fortunate experience to learn, gain knowledge and mature through multiple job role opportunities and exposure to exciting IT projects and tasks but more importantly, working with talented and inspiring people, both young and old. Despite a continuously changing IT environment and countless organisational restructures, my belief has been reaffirmed through this research project. Attracting, developing and retaining talented people not only make an IT department successful, but ultimately sustainable. It has been my perception that this is not an easy thing to achieve as ultimately, people are in business to make money and often the perception of employee development is that it comes at a cost. By adopting an intern or a graduate, the cost can be balanced against new competencies and capabilities that can be used to assist in work efforts at the same time as providing an opportunity for continued learning. The development opportunity is two-fold. Not only is a graduate or intern given the opportunity to learn but also existing employees have the opportunity to grow their experience through supervising, mentoring or managing these talented individuals. I now believe a key objective is to have a framework underpinning the programme so that individuals are supported and that the experiences are not as an “unconscious” experience as mine had been over the years. To me, this all culminates in the creation of improved and sustainable working culture.

I had also been impressed and even enlightened by the maturity and quality of the engineering graduates that I interviewed. I reflected on what I was like when I was their age and I was encouraged by how astute they were about life in the workforce and the research topic. Whilst they all had a thirst for knowledge, they had a great sense of belonging and contribution as well as appreciation for those that were teaching them.
During the journey one of the greatest provoked thoughts I have had is that it is not about having a programme or about the components or processes. It is about the relationships. This is not necessarily about people but the relationships between entities and that influencing the relationships can improve a situation, instead of invariably making changes to a component only to find later that this still does not achieve the desired outcome. As found during this research process, one of the key inputs to improvement is feedback.

8.2 About the research process

The experience of conducting and writing a research project has developed an appreciation of the effort required to achieve the end goal. I underestimated the effort when I first began the journey. As an adult student with over ten years of experience in the IT industry, I thought that it was merely a case of spending the time and executing a process designed to suit the type of research. This was not to be the case.

The literature review was one of the more time consuming efforts due to the volume of papers and the amount of reading and comprehension required to create an appropriate and informed view of the topic. The reality was that this research project did not follow a traditional waterfall approach and that there were periods when parts of the literature had not been fully disseminated. This caused periods of nervousness, as it was thought that literature not yet reviewed and digested would reveal aspects contradictory to my research theme and render some of the findings irrelevant. There were periods in which I wondered whether I had asked the right questions or whether some questions were relevant. As the write-up of this research progressed and as other elements of the research process were experienced I was put at ease as the pieces of the puzzle fell into place. A secondary benefit of performing the literature review was learning the meaning of words seemingly used more commonly in research papers. Finding the definitions for words like “empirical”, “ecotone”, “emancipatory”, “nexus” and “ontology”, created additional learning for me.
Upon commencing the research project, I had expectations that there would be a greater level of guidance, linked to outcomes of academic research process. Although frustrating at times, supervisor meetings often resulted in having to repeat processes during the analysis phase, which entailed reviewing all eleven interview data sets multiple times. It is now evident to me that this is all part of the learning and research process of finding the meaning in the data and being able to bring a consistent and coherent view to research findings and discussion. The frustration was partially due to not being able to allocate larger periods to the research project, causing longer gaps between supervisor feedback sessions.

One of the more rewarding experiences of the research process was arriving at the defined conceptual model. The process of modelling was also demanding, as there were many iterations and failed attempts. However, the experience showed that each model or attempt was built on understanding formed from the previous one(s) coupled with a new piece of information or concept to explore. A number of techniques were employed during the analysis and modelling process. Supporting tools were used at different stages through the journey.

- FreeMind mind mapping software was used to categorise, arrange and link information abstracted from the interview data
- Microsoft PowerPoint was used to create rich pictures based on Checkland’s theory, which helped to reveal and visualise the relationships between entities
- Microsoft Excel was used to record, reduce and code interview and survey data as well as trying out initial maturity model overlays
- Microsoft Visio was used for early conceptualisation and was used to create the final conceptual framework models and assessments.

A reasonable amount of understanding has been gained by spending time learning about the components and processes of the People Capability Maturity Model (P-CMM). I hope to learn more through the promotion, implementation and practices of P-CMM. One of the appreciations I now have is taking the time to question and reflect about what people have said in order to gain understanding and to learn.
9 References


Zealand Association for Cooperative Education Annual Conference, Rotorua, New Zealand.


## Appendix A: Survey Questions

### DEMOGRAPHIC QUESTIONS

**Q1. What is your current role in IT?**

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<tr>
<td>Desktop Support</td>
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<tr>
<td>Desktop Support Team Leader</td>
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<td>Group Manager</td>
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<tr>
<td>Information Specialist</td>
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<td>Information Specialist Team Leader</td>
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<td>Infrastructure Specialist</td>
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<td>Infrastructure Specialist Team Leader</td>
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<tr>
<td>Network and Security Specialist</td>
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<tr>
<td>Network and Security Specialist Team Leader</td>
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<tr>
<td>Project Manager</td>
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</table>
Q2. **What is your current band?**

| Team Manager |  
| Testing Specialist |  
| Other (Please specify) | [ ]  

| VE2 | [ ]  
| VL1 | [ ]  
| VL2 | [ ]  
| VP1 | [ ]  
| VP2 | [ ]  
| VS1 | [ ]  
| VS2 | [ ]  
| Not sure | [ ]  

Q3. **Did you start your professional career in IT?**

| Yes | [ ]  
| No | [ ]  
| Not sure | [ ]  

Q4. **If No, What was your career profession prior to entering IT?**

*Verbatim*

[ ]
Q5. If Yes, were you an IT graduate?

Yes ☐
No ☐

Q6. If Yes, did you participate in a IT graduate or internship programme?

Yes ☐
No ☐

Q7. If Yes, please describe your experience with the programme

Verbatim

Q8. How many years have you been in IT?

Less than 2 years ☐
2-5 years ☐
6-10 years ☐
More than 10 years ☐

Q9. How many different roles have you held in IT?

1 ☐
2 ☐
3 ☐
Q10. If more than 1, what is the average time in a role before a change occurred?

- <1 year
- 1 year
- 2 years
- 3 years
- 4 years
- 5 years
- More than 5 years

Q11. Do you have a career development plan?

- Yes
- No
- Not sure

Q12. Have you received externally provided training, paid for by the company within the last 12 months?

- Yes
- No
- Not sure
<table>
<thead>
<tr>
<th>Q13.</th>
<th>The organisation supports my career development.</th>
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</thead>
<tbody>
<tr>
<td>Q14.</td>
<td>My manager supports my career development.</td>
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<tr>
<td>Q15.</td>
<td>I drive my own career - I make sure plans are approved and actioned.</td>
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<tr>
<td>Q16.</td>
<td>An organisation or department restructure has a positive effect on my career.</td>
</tr>
<tr>
<td>Q17.</td>
<td>My job is challenging, stimulating and rewarding.</td>
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<tr>
<td>Q18.</td>
<td>I actively assist others in achieving goals.</td>
</tr>
<tr>
<td>Q19.</td>
<td>When I ask, I receive help and coaching.</td>
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<tr>
<td>Q20.</td>
<td>I regularly participate on stimulating projects or problems.</td>
</tr>
<tr>
<td>Q21.</td>
<td>My ideas a respectfully listened to and implemented where appropriate.</td>
</tr>
<tr>
<td>Q22.</td>
<td>Employing an IT graduate is a good idea.</td>
</tr>
<tr>
<td>Q23.</td>
<td>Providing an under graduate (degree student) with an IT project is a good idea.</td>
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</tbody>
</table>
Q24. In your opinion, what barriers do you perceive exist to implementing a IT graduate programme.

Q25. I feel I would make a good support person or mentor to an IT under graduate (degree student), graduate or intern.

Q26. If I was nominated AND I was supported, I would be prepared to manage or mentor an IT graduate as part of a structured programme.

Q27 What challenges do you perceive in mentoring or managing others? *Verbatim*

Team Perceptions

Q28. My team has clearly defined goals and objectives.

Q29. My Team is suited to having an IT graduate in it.

Q30. Having an IT graduate would add value to my team.

Q31. My team sets challenging goals and works towards them with energy, enthusiasm and commitment.

Management and Leadership Perceptions
| Q35. | My manager is approachable, positive and genuinely listens to what others have to say. | 1. Strongly Disagree | 2. Disagree | 3. Neutral | 4. Agree | 5. Strongly Agree |
| Q38. | My manager shares information knowledge and ideas that may help others to succeed. | 1. Strongly Disagree | 2. Disagree | 3. Neutral | 4. Agree | 5. Strongly Agree |
| Q40. | IT management are ready to support an IT graduate or internship initiative. | 1. Strongly Disagree | 2. Disagree | 3. Neutral | 4. Agree | 5. Strongly Agree |
| Q41. | What factors do you think management need to consider in supporting an IT graduate or internship programme? *Verbatim* |
### Organisation Perceptions

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<tr>
<td>Q42. An IT graduate or internship programme would be beneficial to the IT department or the organisation.</td>
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<td>Q43. Please give reasons as why the IT department would or would not benefit from an IT graduate programme.</td>
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<td>Q44. HR is required to help support an IT graduate or internship programme.</td>
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<td>Q55. Any other comments or remarks? <em>Verbatim</em></td>
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10.2 Appendix B: IT Management Interview Questions

1. What is your current role?
2. How long have you held your current role?
3. How long have you been in IT management?
4. How many staff / direct reports do you currently manage?
5. Do you actively manage your staff’s career plans?
6. If yes, does the company provide support to you in doing so?
7. If no, what are the perceived barriers?
8. Could the organisation or IT department support an undergraduate individual or group project?
9. If no, what constraints do you perceive there to be? (e.g. supporting resources, time, cost, lack of projects / initiative)
10. Would you lead / support / mentor a graduate or IT intern?
11. Would you lead / support / mentor an undergraduate project?
12. Are you an influencer of staffing and resourcing?
13. If yes, what attributes or accountabilities enable you to be that?
14. What qualities or benefits do think an IT graduate would bring to the IT team?
15. How long do you think a graduate programme should be?
16. What type of attributes would you look for in an IT graduate? (e.g. technical ability, SDLC knowledge, communication skills)
17. Are there and cultural consideration to be made for the either the team of the graduate student?
18. Are there any personality types that you would avoid?
19. What minimum level of course would be required to start as an IT graduate or intern? E.g. certificate, diploma, degree, masters?
20. Would you insist on a minimum level of grade from an IT academic degree course? What would that be?
21. Would you insist on a pre-requisite qualification from a well known academic institution or would you give even choice to qualifications from relatively lesser prestigious institutions?
22. Please feel free to elaborate
23. How many different areas do you think an IT graduate should experience to qualify for a career choice?
24. What factors do you consider important for an IT graduate to experience as part of his or hers training?
25. Do you think a support programme needs to accompany a graduate programme? i.e. do you think there should be development of the support people or mentors?
26. If an undergraduate project was on offer, would you prefer a single / sole person that would most likely perform most if not all of the SDLC steps, or a group of 2-4 people that has shared responsibilities across the SDLC?
27. Please elaborate on your preference in regards to pros and cons
28 What benefits or barriers could there be to adopting and running a summer IT internship programme? (e.g. backfill, staff holidays, system freezes, project deadlines)

29 Would you delegate the role of graduate mentor or leader to one of your team members?

30 What would put you off an IT graduate? - what would be some negative attributes?

NEW What impact or opportunity does the economic recession pose?
10.3 Appendix C: Engineering Graduate Interview Questions

1. How long have you worked for the organisation since you graduated?
2. Did you participate in or work for the organisation before you graduated?
3. If so, please explain how you were engaged?
4. Please describe your experience from the classroom to employment
5. Has or did your graduate programme involve you working outside of the organisation?
6. If yes, please explain / describe
7. How long is / was your graduate programme?
8. Are you satisfied with your career progression?
9. How frequently did you change role during your graduate programme?
10. Was this too short, too long or just right?
11. Please elaborate on this experience (pros and cons)
   - Was every manager you reported to, supportive and engaging with your graduate programme?
12. Did you have separate mentor or graduate support person outside of your immediate reporting manager?
13. How often did you meet with a graduate mentor / manager / director?
14. Did you do an under graduate project?
15. If yes, was it a self or group project?
16. What was your experience?
17. Did you have any misconceptions prior to graduating and enter a graduate programme?
18. Please explain what factors were better or worse than you thought
   - Whilst engaged on the graduate programme, did you receive additional training provided by the organisation?
19. Were there any perceived benefits for entering a graduate programme with the company and if so, did they live up to expectation?
20. Please elaborate on this experience (pros and cons)
21. What benefits or factors would be useful or paralleled for an IT graduate programme?
22. Have you experienced and cultural issues with moving into employment?
   - Were there any instances when you felt you were not treated as equally as an employee?
23. If yes, please describe the instance / experience.
Towards a valued ICT Department by inducting, developing and retaining talented employees

Hello!

As you maybe aware, I am a Masters of Computing student at Unitec. Part of the programme involves a research paper on a subject of my choice. My research topic looks at the factors involved in developing an IT graduate or internship programme within an organisation. I am doing the research at (your) company and have the approval of the company to carry out the research.

What am I doing?

I want to identify the factors required and assess the maturity that would contribute to successfully implementing an IT graduate or internship programme.

What it will mean for you?

I want to interview you and talk about:

- your experience, perception or attitude towards adopting a graduate programme
- the benefits you think a graduate programme could bring to the organisation
- the type of leadership, mentorship and support structures that may or may not exist in the organisation that would contribute to a programme
- what your / the organisations requirements are from a programme and what you think the graduate’s requirements might be from a programme

I would appreciate it if you could meet with me for about 45 minutes to talk about these kinds of things. I plan to tape the interviews and will be transcribing it later. All features that could identify you will be removed and the information on the tapes used will be erased, once the transcription is done.

You are free to withdraw from this project for whatever reason within two weeks of the interview.

What will I do with this?
By taking part in this you will be helping me to understand what elements are required in implementing an IT graduate or internship programme as well the maturity levels required to support it.

Consent

If you agree to participate, you and your parent/guardian will be asked to sign a consent form. This does not stop you from changing your mind if you wish to withdraw from the project. Your employer can also ask for you to be withdrawn. However, because of the schedule, any withdrawals must be done within 2 weeks after we have interviewed you.

Please contact me if you need more information about the project: []

At any time if you have any concerns about the research project you can contact our supervisor: []

Confidentiality

Your name and information that may identify you will be kept completely confidential. All information collected from you will be stored on a password protected file and the only access to your information is yourself, I and my research supervisors.

Thank you!

This study has been approved by the Unitec Research Ethics Committee from ( ) to ( ). If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretariat (Ph: 09 815 4321 ext.7254). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.