

VICTORIA UNIVERSITY OF WELLINGTON  
*Te Whare Wananga o te Upoko o te Ika a Maui*



**Impact of Formal Educational Qualifications on the  
Assessment by IS Managers of their own  
Effectiveness**

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MMIM592

By

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## **Preface**

This Report is not confidential.

This paper presents the impact of formal educational qualifications on the self perception of managerial effectiveness by IS managers. It shows that there is a strong positive relationship between educational qualifications and perception of self performance and effectiveness.

This paper is addressed to IS managers, employers, and educators who seek to improve the IS managers' skills and performance.

Grateful acknowledgement is here made to the participants who provided valuable data for this paper. Also thank you to fellow MIM students who helped identify additional potential participants, and my friend Jenny Gini for reviewing the paper.

For all advice and insightful comments and for never allowing me to lose focus or give up on the research, many thank to Dr Brian Harmer.

Lastly, I would like to thank my family, especially my partner and my two children for their support throughout my study.

This work would not have reached its completion without their invaluable help and support.

I certify that the report is my own work and all references are accurately reported.

A STUDENT PRATOOMTHIP TUNGNGERN

## **A synopsis/abstract**

This study seeks to contribute to a better understanding of what role, if any, tertiary formal education contributes to the effectiveness of IS managers. The research question guiding this study is *'How does the possession or otherwise of formal educational qualifications impact on the assessment by IS managers of their own effectiveness?'* This is a qualitative research using an interview method that allows participants to provide contextual information to describe specific outcomes. A non-probability sampling technique is used with a quota sampling size of 12. The inclusion characteristics were to be an IS manager, employed in IS/IT/ICT department and to work in the Wellington region of New Zealand. The significant findings in this study is that all participating IS managers perceived that formal education positively contributed to their managerial effectiveness. They perceived that formal education helped them to improve or gain new skill and provided them with formal tools and frameworks that they utilised in their jobs. Sampling within other industries and larger random samples could be undertaken to see if this research has given results that are representative of the IS industry and its recognition of formal education.

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# 1. Introduction

Information Technology (IT) plays a significant role influencing the evolution of social economics in modern societies leading to a demand for knowledge workers (Green, 1999a; Jarvis, 2000; Mok & Lee, 2003). Organisations' Information Systems (IS) have become vital making business and IS inseparable. IS must be effectively managed to ensure it supports organisational needs. As business environments grow more complex and challenging, organisations have also realised that appropriate management of their employees' skills and competence is a key to survival in the knowledge economy (Barney, 1991; Grant, 1991). A certain level of relevant formal qualification is expected from an IS professional (Grollmann, Tutschner, & Wittig, 2007). Beside the importance of formal education mentioned in the literature (Johnnie, 1993; Smith & Ridoutt, 2007; Wooden & Harding, 1997), it appears that IS managers' formal education has gained little attention in relation to the IS field.

This study seeks to contribute to a better understanding of what role, if any, tertiary formal education contributes to the effectiveness of IS managers. The research question guiding this study is *'How does the possession or otherwise of formal educational qualifications impact on the assessment by IS managers of their own effectiveness?'*

The study aims to investigate: (1) IS managerial roles and activities associated with IS managers' specific function, (2) tertiary qualification possessed by IS managers, (3) additional training gained after completed formal education at certificate level: a one-trimester programme or more, (4) impact of formal education on IS managers' activities perceived by the IS managers themselves and (5) impact of formal education on IS managers' managerial effectiveness perceived by the IS managers themselves.

## **2. Literature Review**

As the IS profession continues to mature, more IS professionals are given the opportunity to step into management roles based on their previous successes and perhaps formal qualifications. The successes and formal qualifications that gained them the promotion may not equip these IS professionals with the skills required to become effective IS managers.

Previous research has focused on the areas of management education (Barry, 1996; Erwin, 2005; Gosling & Mintzberg, 2004; Spender, 2005) and IS professional skills and training (Downey, McMurtrey, & Zeltmann, 2008; Jovanovic, Bentley, Stein, & Nikakis, 2006; McMurtrey, Downey, Zeltmann, & Friedman, 2008; Tesch, Braun, & Crable, 2008). I found minimal specific research in the area of IS manager's education and the role of formal education on IS managers' self perceived effectiveness. The following three areas; (1) the importance of formal education, (2) formal education and managers' effectiveness, and (3) formal education and IS managers' effectiveness; have been explored to provide clarification, identify the importance and the relationships and issues that may have occurred in previous studies. The connection of these three areas is a key contribution to the goal of this study. As a result, exploring the following three areas is very important to ensure that the study will be worthwhile.

### **2.1 The importance of formal education**

Education allows us to acquire abilities and skills (Johnnie, 1993) and to improve performance and to master the environment (Katona, 1940). "When we are educated, we go through a learning process which enables us to create our environments" (Johnnie, 1993, p. 5). Reality is constructed, new skills or abilities added each time we acquire a new concept or structure (Piaget, 1968).

Education can be split into many categories including formal and informal education. Formal education is simply a process by which knowledge is acquired through a certain institution of society such as school or university (Johnnie, 1993). Conversely, "informal education is the process of acquiring

knowledge by learning the norms, sagas and values of society by means of trial and error” (Johnnie, 1993, p. 4). The relevance and importance placed on education differs from one segment of society to the next (Johnnie, 1993).

Rapid changes in technology have impacted the way organisations operate and consequently increased the demand for IS professional to have a certain level of formal qualification (Grollmann, et al., 2007). Khurshid (2003) examined 151 position advertisements in U.S. to identify the impact of the use of IT in libraries on job requirements and qualifications for catalogers. The result showed that employees require a Master of Library Science (MLS) degree, American Library Association (ALA) accredited MLS or an equivalent graduate degree such as a Master’s degree in computer science, and a Baccalaureate degree in a relevant field. The demand for certain formal education qualifications for the catalogers is due to an increased requirement of IS skills required to conduct the job (Khurshid, 2003).

In New Zealand, there has been a consistent evidence of a demand for graduate employees within three broad industries; civil engineering and across industrial, manufacturing and mechanical engineering and technology. The demand has been driven by strong economic activity, increased use of new technologies and a retiring workforce. There has also a demand for employees with baccalaureate qualifications and above in accountancy and post-graduate qualifications in information technology (Earle, 2009).

Brooke and Freeman (2009) believe that being educated at Masters level is considered to be an important stage in professional development. This entails that an individual selects the degree based on personal interests, and that supports their professional aspirations or current employment.

Formal education qualifications may also benefit organisations in the control of their business risks by focusing on critical jobs (Cutler, 1992), and within jobs by focusing on competencies considered critical to productivity (Payne, 2000). Formal education is believed to positively impact both the organisation and the individual and appear to play an integral part in career development (Harper, Brown, & Wilson, 2005). They facilitate career moves between companies and



allow prospective managers to fast track their career and are considered particularly beneficial in developing functional managerial skills (Harper, et al., 2005) and helping career prospects (Gamble & Messenger, 1990; Guerrier, 1987). Management could potentially benefit from formal education by becoming more knowledgeable in the art of motivating, achieving better results from employees and developing more appropriate leadership skills (Johnnie, 1993).

Formal education qualifications are often used as a screening tool that assists employers in making human resource decisions (Wooden & Harding, 1997). In Thailand, the Master of Business Administration (MBA) has been the stamp of approval for managers (Islam & Liangrokapart, 2006).

## **2.2 Formal education and managers' effectiveness**

With the trend of globalism and the continuously changing technologies, people find that learning is not an isolated event (Ligon, Abdullah, & Talukder, 2007) but must continue throughout their working lives (Mittelstadt, 1996). Managers are playing more important roles in modern economies. The roles they play are dependent on what their organisations require them to achieve to deliver organisational goals effectively and efficiently through available resources. In order to do this, a manager needs a set of skills which they can obtain through education (Robbins, 2001). Some organisations provide education and training to managers in order to further develop the skills needed to succeed in their jobs. The education or training is a mixture of organisation-specific and technology-related knowledge and skills. One advantage is that the organisations control the skills development of their managers (Sleezer & Denny, 2004).

An investigation by Smith and Ridoutt (2007), of organisations from six industry sectors in Australia shows a significant majority (89%) of organisations classified formal education qualifications as important or essential for technical, professional and managerial staff. Smith and Ridoutt's (2007) study shows nearly 90 percent of organisations recognise formal education qualification as very important or important to plan for future skills and training needs. Their

study also shows approximately 80 percent of organisations use formal education to ensure their employees stay competent. Overall, formal education qualifications were rated as an important or very important consideration to most employers in relation to human resource management (Smith & Ridoutt, 2007).

Rakhmayil and Yuce (2009) examined the relationship between qualifications of top management and capital structure, using data from 490 companies between 1985 and 2005. The result revealed that managers with higher qualifications will better utilise organisational resources to increase the value of their firms. The study suggests that the superior qualifications and experience improve managerial productivity. This could possibly be the reason why almost 70 percent of the directors of Germany's top 100 companies have doctorates (Merrette, 2005) and over 60 percent of the board members of Germany's largest 100 companies have doctorates (Graetz, 1997 as cited in Merrette, 2005). However, the New Zealand 2006 Census data shows there were 340,530 (8.45%) managers in the entire usual resident population aged 15 years and over (4,027,947), including ICT managers. 50,400 (14.80%) managers have no qualification, 160,968 (47.27%) managers have level 1-4 certificate as highest qualification, 37,737 (11.08%) managers have level 5-6 diploma as highest qualification, 46,437 (13.64%) managers have a baccalaureate degree and level 7 as highest qualification and 20,448 (6%) managers have post-graduate, honours, masters and doctorate degrees, and 24,546 (7.21%) for other qualifications (Statistics New Zealand, 2010). This shows a discrepancy between New Zealand and Australia in the recognition of formal education (Smith & Ridoutt, 2007).

O'Driscoll, Humpries and Henrik (1993) explored 96 New Zealand managers' learning experiences and managerial role performance from 11 private and public organisations. Despite the age, the study is still useful as it investigated the perceptions of the managers in New Zealand. It provides valuable insight into how the managers acquired the skills required to complete their jobs. The mean age of managers was 42 years and at the time of the interview their time in the organisations ranged from 2 months to 41 years with the mean 15.1 years. O'Driscoll et al, (1993) discovered 95 percent of 97 managers in the

sample perceived an average of 65 percent of their learning occurring through job-related experiences or informal education, such as trial and error and observation of role models. The managers spent a large amount of their time performing some of traditional management tasks (controlling, planning and decision-making), but less on human resource management and networking (socialising and politicking). Unsurprisingly, only 25 percent of respondents recognised the benefits gained from formal education. Managers are more likely to have gained managerial roles through internal promotion over 15 years (O'Driscoll et al, 1993). The opportunity to learn by trial and error on the job could be one reason for New Zealand managers not being interested in obtaining formal education, and hence the low number of managers who have gained tertiary qualifications.

Nevertheless, there has been an increase number of people with formal qualification across all age groups in New Zealand; 62 percent in 1996, 72 percent in 2001 and 75 percent in 2006 (Statistics New Zealand, 2010). It is more than five years since the Census 2006 was conducted and the number of managers with formal qualification may have increased. This can only be confirmed when Census 2013 data is available. The managers' perception towards the benefits gained from formal education may also have changed since O'Driscoll et al, (1993) conducted their study.

There is little evidence that managerial qualifications contribute to the effectiveness of managers in the real estate mutual fund performance area (Philpot & Peterson, 2006). This contradiction raises three questions; (1) Were organisations in this study providing additional training to their managers who have had formal education qualifications?, (2) Do organisations and/or individual managers have the perception that formal education will provide specific skills needed without additional training?, or (3) Did individuals manager have opportunities to learn through trial and error in the same way as New Zealand's managers? The answers for the three questions would provide significant value to the areas of the study. In light of the finding in this literature review, the additional training and perception of skills gained from formal education will be investigated in the research.

### **2.3 Formal education and IS Managers' effectiveness**

The current business climate has forced organisations around the world to proactively seek new opportunities to gain a competitive advantage. A competitive advantage can be described as organisational practices, assets and resources that can be created, utilised and/or sustained to advance an organisation's competitive position (Pfeffer & Vega, 1991). Empirical studies suggest that organisational resources can enable organisations to achieve a competitive advantage and can lead to long-term business performance (Wade & Hulland, 2004). Organisations can obtain assets and resources through acquisitions, mergers, strategic partnerships, and supply chain improvements (Hamel & Prahalad, 1994).

The connection between IS resources and organisational performance has been investigated by a number of researchers (Wad & Hulland, 2004; Mata, Fuerst, & Barney, 1995; Powell & Dent-Micallef, 1997). Some argue that technical IT skills, managerial IT skills, propriety technology can lead to sustained competitive advantage (Mata, et al, 1995) and organisations need human resources and technology resources to improve performance (Powell & Dent-Micallef, 1997). In this regard, IS resources can be seen as crucially important to organisations' survival (Kayworth, Chatterjee, & Sambamurthy, 2001).

With the competitive economic climate and tight fiscal business environment, organisations are expecting more for less from IS departments. As a result, IS managers must be able to effectively manage IS resources, improve IS performance and master the environment. He or she must learn to deal with situations, be constantly responsive, and look out for new ideas and opportunities to meet the organisation's objectives (Booth & Philip, 2005). They cannot afford to make a mistake thus learning on the job through the observation of role models, or trial and error may not be suitable. Formal education teaches modern IS management principles that IS managers can apply. As a result, organisations seeking to create or sustain a competitive advantage must provide formal education and additional training to their IS

managers (Bullington, Easley, & Greenwood, 2002; Wu, Chen, & Lin, 2004) or must select educated managers.

The literature review suggests there is a connection between formal education and IS managers' managerial effectiveness. In light of this, the study will explore the perception of IS managers on the impact of their formal education on their own managerial effectiveness. Since IS environment has constantly changed and IS managers' roles and activities are expected to change. In this study, the activities identified by Wu, et al (2004) will be used as a framework. New Zealand Qualifications Framework (NZQF) will also be used to categorise the IS managers formal qualification (New Zealand Qualifications Authority, 2011).

### **3 Methodology**

This is a qualitative research that aimed to explore IS managers' perception in detail and in depth. Qualitative research allows participants to provide contextual information to describe specific outcomes (Camfield, Crivello, & Woodhead, 2008). It also allows researchers to collect, analyse and interpret data that is not easily expressed as numbers. This data usually relates to concepts and human behaviours in the social context (Anderson, 2010). Within organisation and management research, qualitative research has a long history and tradition (Cassell & Symon, 2006).

Interview method is considered to be most suitable for collecting information such as facts, beliefs about the facts, feelings and motives, standards of action, present or past behaviour, and conscious reasons (Campbell, 1999). The interview method has been used in the pharmaceutical industry researching educational issues to gain a better understanding of educational problems and/or to determine pharmacists' perceptions of continuing professional development in a number of contexts (Anderson, 2010). The interview method allows the interviewer to dynamically control the flow of the conversation (Campbell, 1999). With a semi-structured interview, questions can be developed or expanded to define the areas to be explored in more detail, and to validate information (Hitchcock & Hughes, 1989). This study has also focused

on the individuals' perception on education making a face-to-face semi-structured interview method more suitable.

### **3.1 Sampling**

Non-probability sampling technique was used to simplify the selection process because of the limitation of time available to complete the study. The non-probability sampling technique used for the study was a quota sampling with the size of 12. The inclusion characteristics were to be an IS manager, employed in IS/IT/ICT department and to work in the Wellington region of New Zealand. Using these characteristics people were selected until the quota was met.

After the Human Ethics Committee (HEC) approval was granted, emails were sent to Human Resource departments of six public and six private organisations seeking access to an IS manager within IS, IT or ICT department who was willing to participate in the study from each organisation. An email template was prepared in advance under supervision of the research supervisor. There were two responses from public organisations; one approved and another was unable to participate. There was no response from another ten organisations. As a result, the professional network; LinkedIn, was used to search for IS managers. Five email invitations were sent to IS managers within the LinkedIn's private network connections. All of them responded to the invitations and were willing to participate in the study. With the limitation of a free service provided by the LinkedIn, an email invitation can only be sent to an IS manager within the private network connections. In order to send email invitation to IS managers outside the private network connections the LinkedIn account need to be upgraded for an additional fee. Therefore, six IS managers were identified with the assistance of the researcher's friends and colleagues through verbal conversations. The professional network; LinkedIn and the assistance from friends and colleagues allowed IS managers to be identified within a week period, which was faster than through HR and obtained better results.

Informed consent was an ethical requirement in this research. After the IS managers were identified, the information sheets and consent forms were

emailed to them. They had opportunity to ask questions and had them answered to their satisfaction before the interview was conducted.

### **3.2 Interview Method**

Data collection was done via a face-to-face semi-structured interview. The interview date, time and location were arranged with the IS managers via emails and phone calls. The interview took place either in the IS managers' office, the researcher's office or the IS managers' home. Most of the interviews took place in a meeting room at the IS managers' office. A signed consent form was obtained prior to the interview taking place either on the interview day or returned via email. With the permission of each interviewee, the interviews were recorded on a digital voice recorder with an average 60 minutes in length. The IS managers were encouraged to treat the interview as a conversation rather than an interview. The interview questions were open-ended questions that focused on exploring answers of the study's questions and objectives, see [Appendix A](#). The qualification framework in [Appendix C](#), and twenty one IS managers' activities identified by Wu, et al (2004) in [Appendix D](#), were used as frameworks.

The interview questions in [Appendix B](#), and frameworks were also provided to IS managers to use as guidelines during the interview. The IS managers were asked to write details of their qualifications, mark or add activities that were not covered within the framework, and rate the perception of the impact of formal education on their activities and their own effectiveness on the papers provided.

Data was transcribed from the digital voice recorder and emailed to the IS managers to review their own transcripts. An email follow up was also made to elucidate answers with some IS managers. All IS managers had the opportunity to delete, modify, or elaborate on any of their responses as well as checking for accuracy.

Concepts like validity and reliability were a little more difficult to grasp and apply when using individuals' judgement as measurement instruments (Campbell, 1999). This study placed emphasis on data collection and analysis to ensure research quality.

### **3.3 Content Analysis Method**

Content analysis (CA) methodology was used to identify certain words or concepts within the twelve interview transcripts, and information written on the papers during the interviews. CA allowed data to be analysed and quantified by broken down the text into manageable categories based on pre-defined themes or coding schemes (Inductive) and themes derived or open coding (Deductive) from the collected data (Busch, De Maret, Flynn, Kellum, Le, Meyers, Saunders, White, & Palmquist, 2005).

Coding schemes were used with IS managers' activities, formal education qualification and additional training. Formal education is tertiary qualifications at level 5-6 diploma, level 7 qualifications and baccalaureate degrees, post-graduate, honours, Masters and doctorate degrees. Additional training is formal education at certificate level: a one-trimester programme or more. Open coding was used to derive the themes from the collected data to identify the impact of formal education. Coding data was examined and categorised manually utilising Microsoft Excel spreadsheet and Visio. It was time consuming and inefficient but it allows errors to be easily recognised. Information in the text that was not coded was reserved for reassessment.

The CA basic methods: conceptual analysis and relational analysis were used to examine the themes. Conceptual analysis was used to identify research questions. Investigative Objectives and texts were coded into manageable categories focused on specific words that were related to the research question and objectives. Conceptual analysis allowed the themes to be explored, identified and quantified. Conceptual analysis has been recognised as a useful and effective tool for CA when correctly utilised (Busch,et al, 2005). However, the conceptual analysis method is only dealing with quantitative data, therefore the levels of interpretation and generalisation are limited (Busch et al., 2005). In order to create a better result the relational analysis methodology was used as a supplement in data analysis. The relational analysis methodology allows the relationships between concepts to be explored and determined (Busch et al., 2005).



Likert scale (1 = no impact, 2 = neutral, 3 = moderate impact, 4= impact, 5 = great impact) was used to categorise or rate the IS managers' perception of the impact formal education has on their effectiveness.

After the conclusion of the research, all interview transcripts, questions and electronic information were put in a locked file at Victoria University of Wellington and access will be restricted to the investigator for 2 years. The audio recording was deleted from the digital voice recorder. The final report was sent to those participants as requested.

## 4 Results

### 4.1 Sample characteristics

Twelve IS managers from six government organisations and six private organisations agreed to participate in this study. There were eight males and four females. Six of the twelve IS managers are immigrants. Each IS manager works in different organisation within the Wellington region of New Zealand. Eight IS managers have subordinates directly reporting to them. The organisational industries included Education Management (2), Banking (1), Military (1), Information Services (1), Accounting (1), Information Technology and Services (2), Financial Services (1), Government Administration (2), and Wholesale (1). The roles of IS managers are shown in Table 1.

**Table 1: IS Managers' Role**

Role	Number of IS manager
CIO	4
Head of IT	1
ICT Manager	1
IT Manager	1
Development Manager	1
Business Engagement Manager	1
Project Manager	1
Service Improvement Manager	1
Webmaster/Community Manager	1

## **4.2 Tertiary qualification possessed by IS managers**

All of the interviewed IS managers have gained tertiary formal education either from overseas or New Zealand university. The IS managers have Masters (7), Honors (2), Baccalaureate (2), or diploma (1) as their highest tertiary formal education. Three of the twelve IS managers are in progress of gaining their Masters degree; all of them have already gained Honors, Baccalaureate or diploma qualifications. The qualifications possessed and being possessed by IS managers based on New Zealand Qualification Framework are show in Table 2.

Ten of the twelve IS managers hold tertiary formal education in New Zealand, including four of the six immigrants. Two of these four IS managers gained their first formal education in New Zealand and other two already have a Baccalaureate (1) and Masters degree (1) from overseas university before obtained additional formal education in New Zealand.

There are two IS managers who have not gained formal education in New Zealand. They are immigrants and both of them hold a Masters degree as a highest formal as well as a Baccalaureate degree or diploma qualification from an overseas university.

In term of possessing additional training, five of the twelve IS managers would like to gain a PhD, Masters degree, business orientated degree with a financial focus, or industry specific certifications. Three of the twelve IS managers would like to complete their Masters degree, and three of the twelve IS managers are not interested to gain any additional training at this period due to the recent completion of their Masters degree and /or specific industry training. They believe that it comes to a point where experience is much more important.

Four of the twelve IS managers have gained professional development training that spanned one or more trimester. The training includes Information Technology Infrastructure Library (ITIL), PRINCE2, COBIT IT Governance and Control, Public Sector Senior Managers' Leadership, and General Management.

**Table 2: IS Managers' Qualification**

<b>Qualification</b>	<b>Subject Area</b>	<b>Qualification Title (Number of IS Manager)</b>	<b>Provider Location</b>
Masters	Information Technology	Computer Science (1)	Overseas
		Advance Software Engineering (1)	Overseas
	Management and Commerce	Public Management (1)	New Zealand
		Business Administration (1)	Overseas
	Society and Culture,	Information Management (5)	New Zealand
		Economics (1)	Overseas
Post-graduate	Creative Arts	Post Graduate in Creative Writing (1)	New Zealand
	Education	Honours in Education (1)	New Zealand
	Society and Culture	Honours in English Philosophy (1)	New Zealand
		Post Graduate Diploma in Information Management (1)	New Zealand
Bachelors	Creative Arts	Arts and Media (1)	New Zealand
		Broadcast Communications (1)	New Zealand
		English Literature Drama (1)	New Zealand
	Engineering and Related Technologies	Electrical and Electronic Engineering (1)	New Zealand
		Mechanical Engineering (1)	Overseas
	Information Technology	Computer Science (1)	New Zealand
		Science and Computer Engineering (1)	Overseas
	Natural and Physical Sciences	Geography (1)	New Zealand
Diploma	Creative Arts	Stage Management (1)	New Zealand
	Information Technology	Computer Science (1)	Overseas
	Management and Commerce	Business Administration in Marketing and Communications, HR and Finance (1)	New Zealand
Certificate	Engineering and Related Technologies	Electrical Trade Certificate (1)	New Zealand
	Information Technology	Business Computing (1)	New Zealand
Other Professional Development Training	Management and Commerce	Public Sector Senior Managers' Leadership Certificate (1)	New Zealand
		General Management (1)	New Zealand
	Information Technology	The Information Technology Infrastructure Library (ITIL) (2)	New Zealand
		PRINCE2 (2)	New Zealand
		COBIT: IT Governance and Control (1)	New Zealand

Five of the twelve IS managers mentioned that they have gained professional development that spanned less than one trimester. The training includes coaching, negotiation, trusted advisor, and advanced management.

The study identified two key factors that impede the IS managers from gaining additional tertiary formal education or other additional training. These factors are work-life balance; it is difficult to balance work, family and study, and the current workload. Some IS managers are planning to gain or continue their additional tertiary formal education when their children have grown up, at a certain age or when their workload is reduced.

Ten of the twelve IS managers described that they have opportunities to learn through trial and error. One senior IS manager believes that experimentation is part of everybody's role at all levels within an organisation. The IS managers described that they can learn through this channel because their employers or managers encouraged and provided them with opportunities as long as they can demonstrate or achieve the benefits and learn from mistakes.

The study revealed that there is an organisation that uses a bonus scheme to reward employees who attempt to learn through trial and error even if not successful. This is to recognise those employees that are willing to try new things as long as they do not keep failing and are able to justify their failure. Three senior IS managers described that at senior management level, the consequences of failure are far more significant than at a junior one. They felt that they have used a lot of trial and error to learn before they have reached a senior level; CIO. They felt that there is less room to learn by trial and error now. Nonetheless, they believe that it is important to have opportunity to learn this way, especially in their role in managing the organisational risk around investment and technology. It is also vital in strategic information that the organisation needs to develop.

All the IS managers recognised that not all failure is acceptable or will be tolerated, therefore the experimental areas are vital. As a result, they were careful to choose areas that did not affect the organisation's finance or risk damaging reputations. The experimental areas usually generated small chance

of failure. They also evaluated the risks profile, weighting up against risk, and planned for consequences of the areas of failure of the experimentation.

The IS managers described that they used trial and error in small scale prototypes or Research and Development (R&D) at the back office under the radar, or evaluated previous projects, formulated new solutions then trialled those solutions. They felt that having a trusting environment facilitates this process as people feel comfortable pointing out what they could have done better and often help them to learn from mistakes.

Trial and error also allowed them to generate new ideas or identified new solutions to solve business problems. One IS manager described that trial and error helped him to develop soft skills such as people management, communication and negotiation skills.

On the other hand, two of the twelve IS managers felt that they do not have opportunities to learn through trial and error. One IS manager described that learning through trial and error is not possible due to the amount of work involved in the delivery of projects and that there is an absence of R&D in his department. Another IS manager described that an error is unforgiving at senior management levels, especially in government organisations and that a very bad error would result in the resignation.

The IS managers described the motivation that drove their decisions to obtain tertiary formal education and additional training include recruitment, person Interest, career direction, their employer, exploration, desire to enhance knowledge, low study fees, networking, and as an alternative option. Table 3 shows the IS managers' motivations.

The study also reviewed that some IS managers had sought advice before they made decision in the subject area, including advice from school or university advisor, direct manager, partner, or parents. One IS manager described that her study was planned by her manager, including the subject area and educational provider.

**Table 3: IS managers' motivations**

<b>Motivation</b>	<b>Description</b>
Recruitment	<ul style="list-style-type: none"> <li>• Entrance criteria to get a job</li> <li>• To improve CVs</li> <li>• Do it because everybody else is doing it, keep up with the status quo</li> </ul>
Person Interest	<ul style="list-style-type: none"> <li>• Liked the subject at school and decided to obtained tertiary formal education the same area</li> <li>• A degree or course in an area of interest</li> <li>• A degree or course relevant to employment</li> <li>• Wanted something a bit different but also of interest</li> <li>• Degree/course is valuable for work advancement</li> <li>• Fascinated by subject.</li> </ul>
Career Direction	<ul style="list-style-type: none"> <li>• Change career direction</li> <li>• Progress to more senior management role</li> <li>• Career progression towards a career aspiration</li> <li>• Most senior level role required a Master's degree</li> <li>• Relevant to the current role and career direction</li> <li>• To prove personal skills and professional experience</li> </ul>
Employer	<ul style="list-style-type: none"> <li>• Personal development.</li> </ul>
Exploration	<ul style="list-style-type: none"> <li>• Explore a new career direction.</li> </ul>
Enhance knowledge	<ul style="list-style-type: none"> <li>• Interest in the subject at school and want to learn more.</li> </ul>
Study fees	<ul style="list-style-type: none"> <li>• Cheap at that time (no student loan).</li> </ul>
Networking	<ul style="list-style-type: none"> <li>• Networking with classmates, building friendship brings contacts with other businesses.</li> </ul>
Alternative	<ul style="list-style-type: none"> <li>• Unable to get into university in the area of interest and decided to do something different.</li> </ul>

### **4.3 The important of formal education, additional training and benefits gained**

Ten of the twelve IS managers perceived that formal education is necessary, very necessary or essential. They described that formal education helped them to understand and organise their thoughts and taught them the ability to learn; both soft and hard skills. Learning through formal education allowed them to grow themselves, develop new capabilities and ultimately advance their careers. Formal education also helped them to improve their existing skills and

develop new skills. This helped them to gain more confidence, and to make better decisions. The wider knowledge, theories and exercises provided through formal education formulated experience that helped them to overcome some obstacles. One of the ten IS managers described that formal education provides a formal tool and strategy that can be utilised on the job. Three IS managers perceived that formal education provided them a big picture; an end-to-end picture, that led them to new areas that they had never thought of. Two IS managers perceived that formal education bought them a network, especially at the Masters level, and also influenced their career directions.

The IS managers also perceived that formal education provided them some advantages, especially to get a job where organisations often put a requirement of formal education, or helped them stay competitive in the current employment climate. This is also true when the organisations wanted to get top candidates. One senior IS manager believes that a degree does say a lot about the person, and he looks at degrees when he recruits.

Two senior IS managers perceived that a formal education qualification is vital in a government organisation. They argued that there is an increasing focus being put in government circles for high formal education qualification in senior IS management roles. It is incredibly hard to get across certain employment ceilings in government without definitely a Masters degree at least, if not more. They perceived that tertiary formal education such as a Masters or post graduate education provides thinking skills and the framework that is expected from senior managers. As a result, formal education is necessary for people who want to progress into a management role, especially for a senior IS management role. Four of the twelve IS managers perceived that formal education is valuable where you need a broad understanding how the business works or how the world operates. They also perceived that formal education, especially at Masters or post graduate level, enables them to clarify fuzzy or ambiguity problems.

Conversely, two of the twelve IS managers perceived that the necessity of formal education depends on the circumstances. The first IS manager perceived that formal education is necessary to get a job by matching the

entrance criteria, including Masters and PhD, but does not help to do the job. The second IS manager perceived that formal education is unnecessary for getting a job in general, or to get a highly paid job. The IS manager gave an example that the CIO role will fall to him if he stays in the same role at the same private organisation. However, to get into a senior management role at the broad level within the same organisation, formal education is a requirement and necessary.

It is important to point out that the first IS manager gained a Bachelor and Masters from overseas university, and has undertaken no formal education in New Zealand. The main motivation for getting formal education was recruitment; a Bachelor degree was chosen as an alternative for getting a first job and a Masters degree was also recruitment purpose, and perceived that the Masters would provide a foundation to perform a non- management job. The second IS manager holds a Masters degree from New Zealand university, but has no other formal education or additional training. It is evident that this IS manager has made career progression through work experience as his formal education has only been achieved recently.

The IS managers who gained formal education, additional training or personal development training perceived that continuing learning is absolutely necessary to stay on top of things. Even though they already knew some of training content, the additional training provided them with a wider perspective. Further they benefitted from the combined wisdom of the people attending the courses. They perceived this as essential if you want to keep progressing and doing a better job.

The IS managers also perceived that professional development training such as ITIL, PRINCE2 or other, provided a practical frameworks or tool kits that allowed them to solve problems. One IS manager described this as a “mythical way” to achieve outcome through the frameworks. He perceived that those frameworks allowed him to make very quick decisions by following a clear recipe to solve specific problems. The frameworks also allowed him to easily manage and terminate the problems, and quickly identify issues that need to be solved. Nonetheless, the IS managers described that this kind of training is



quite narrow in application and more business related and specific, therefore not suitable for an ambiguity problem, and this is where formal education comes to play.

#### **4.4 Skills gained from formal education or additional training**

All of the twelve IS managers described that formal education has either improved or helped them to gain new skills. Table 4 shows the skills described by the IS managers.

**Table 4: Skills gained**

<b>Skills Gained</b>	<b>IS Manager (12)</b>
Analytical skills	3
Communication skills (including writing and presentation skills)	11
Critical thinking skill	4
Listening skills	1
Networking skills	2
Persuasion skills	7
Problem solving skills	3
Research skills	7
Strategic thinking skills	4
Technical skills	3
Time management	2

The majority of IS managers perceived that they gained or improved their communication, persuasion and research skills. Several IS managers perceived that they gained or improved their analytical, critical thinking, listening, networking, problem solving, strategic thinking, technical and time management skills.

The IS managers described that formal education helped them to clearly articulate and develop better expression that in turn develop persuasion skills, and writing skills. Four IS managers described that formal education helped them to better engage in senior management dialogue.

The IS managers who gained or improved their research skills described that formal education, especially at Masters level, taught them to effectively conduct

technological or other IT related research which benefits both individuals and organisations.

Four IS managers described that the strategic thinking skills helped them to understand the organisation's strategy and vision and be able to align themselves to their jobs. The skills lifted their thinking from operational level to a strategic level; one of the three IS managers believed that strategic thinking is vital for a general manager level and above.

One IS manager described that formal education helped her to be a better listener. She also believed that listening skills are important for business success.

The IS managers who gained professional development training perceived that the training helped them to develop specific skills such as coaching, negotiating, influencing and persuading skills. These skills helped them to perform on a specific activity or tasks.

#### **4.5 Impact of formal education on IS managers' managerial effectiveness**

This study reviewed that the IS managers are involved in different managerial activities regardless of roles, organisational type and whether the IS manager has a subordinate or not. The impacts of formal education on their activities are also different. Table 5 shows the impact of formal education on the IS managerial activity and overall managerial effectiveness perceived by the IS managers on their own effectiveness. All of the IS Managers indicated that formal education had some impact on their overall managerial effectiveness to different degrees. The level of impact varied from great impact, considerable impact to moderate impact.

*Great impact:* Six of the twelve IS managers who perceived and rated the impact of formal education on their overall managerial effectiveness as of great impact. Five of the six IS managers gained (4), and will gain (1) their Masters in New Zealand. Their Masters subject areas are in management and commerce (1), and society and culture (4). One of the five IS managers in this group gained a Masters degree from an overseas university in the society and culture

subject area. This IS manager also gained a post-graduate diploma in the society and culture subject area in a New Zealand university.

Three of the six IS managers chose their study subject based on advice or a plan from their managers, school or university advisors. Another half of the six IS managers chose the subject based on their interest and relevant to their jobs. Five of the six IS managers had the opportunity to learn through trial and error. One of IS managers of this group is the second IS manager who perceived that formal education is unnecessary for getting a job in general, but to get a job as a senior manager formal education is a requirement.

*Considerable Impact:* Five of the twelve IS managers perceived and rated formal education as having a considerable impact on their overall managerial effectiveness. The IS managers in this group also described the impact of formal education on their activities and overall managerial effectiveness in different ways.

Three of the five IS managers hold technical formal education in Information Technology (2) and Engineering and related technologies (1) at Masters, Baccalaureate, diploma and certificate level as their highest formal education. One of these three IS managers holds a Masters and diploma in Computer Science from an overseas university. He perceived that he utilised about 99% of computer learning from formal education in his role. He described that formal education helped him to proceed through challenges, and achieve his goals. Formal education made a difference in terms of gaining new skills, and helped him to get a CIO job. He also perceived that formal education had a positive impact on his managerial activities but only to some extent, not 100%. He described that his formal education is not suitable for planning and provided less benefit in the area of people management and social aspect. He learnt this on the job, and got very little through formal education.

An IS manager from the group above perceived that the technical perspective from his formal education helped him in his role; the CIO, but more in research than technical areas. Formal education helped to identify the source of information, and helped him to perform in his role. Formal education gave him

confidence, credibility, and respect upon successfully delivery. He described that staff management, and managerial work was learnt incrementally through the job after gaining formal education. The final IS manager in this group said formal education enabled him to perform at a higher level at a much earlier stage in his career. He perceived that he did not have to learn everything through trial and error. This IS manager only holds a Baccalaureate degree in computer science from a New Zealand university and holds a position equivalent to the CIO.

Two of the five IS managers hold a post graduate degree and diploma as their highest formal education. They are studying towards a Masters degree. One of the two IS managers holds formal education in Creative Arts and Society and Culture and several professional development training certificates in the IT subject area. The other has a diploma and a professional training certificate in Management and Commerce with both IS managers receiving their formal education from a New Zealand university. Both described that the research skills gained from formal education and frameworks provided in their Masters degree helps in their managerial activities.

All IS managers above with formal education who rated it as having considerable impact on their over managerial effectiveness had the opportunity to learn through trial and error. The entire group also chose the subject base on their personal interest, career direction and to enhance knowledge.

*Moderate impact:* There is only one IS manager who perceived that formal education only moderately impacts on his overall managerial effectiveness. This IS manager is the same as the first IS manager who perceived that formal education is unnecessary to perform on jobs but it is necessary for recruitment. The IS manager described that the benefits were gained from the Masters degree rather than the Bachelor degree, and were shown by increased research skills. This IS manager does not have the opportunity to learn through trial and error in his current role. He is the first IS manager who perceives that formal education is necessary to get a job by matching the entrance criteria but does not help to do the job.

**Table 5: Impact of formal education on IS activity and overall managerial effectiveness**

Activity \ Rating	A	B	C	D	E	F
Strategy setting	4	5	1	1	-	11
Seeking and assessing new market opportunities skills	1	2	3	-	3	9
Long-term planning	4	5	1	-	1	11
Leveraging internal and external resources	-	4	5	3	-	12
Design of standard operation procedure	1	3	2	3	-	9
Setting organizational resource standard	1	4	4	-	1	10
Aligning the MIS organization	1	5	2	1	1	10
Organization design	2	2	3	1	2	10
Human resource allocation	1	2	5	-	1	9
Conflict resolution and motivation of employees	-	2	2	5	2	11
Recruiting	-	1	4	2	2	9
Planning for training	1	4	3	2	-	10
Implementing and assessing training programs	-	4	-	2	1	7
Personnel performance evaluation	1	3	3	2	2	11
Cost-benefit analysis	2	4	2	-	2	10
Monitoring work schedule	1	2	4	3	1	11
Analysis and review of work status	1	3	5	2	1	12
Attending social activities on behalf of the company	-	2	1	3	3	9
Crisis management	1	3	3	1	1	9
Negotiation on behalf of the company	1	4	4	-	2	11
Spokesman on behalf of the company	1	3	1	2	1	8
<b>Impact of formal education on overall managerial effectiveness</b>	<b>6</b>	<b>5</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>12</b>

**A = Great impact, B = Considerable Impact, C = Moderate impact, D = Neutral, E = No impact, and F = Total number of IS managers involved in an activity**

The IS managers perceived that formal education provided them a basic background that gave them a good understanding of how things are done, and the whole thinking, just knowing what is out there, knows where to look for answers. This basic understanding helps them to adopt, and adapt to a new situation, whatever scenario they encountered and expand their knowledge to new environment. Formal education also gave them formal tools and frameworks that they can utilise on their jobs in real life situation, and helped

them to perform on their activities more effectively. This framework is very useful with how to deal with ambiguity at workplace.

One IS manager described that the advantage the Masters degree gave was the understanding of how organisation positions itself in its external environment. It gives tools and a framework that allow IS managers to understand how the organisations are operated, and the environment organisations operates in. Frameworks help to navigate through factors which influence and help achieve business objectives in strategic context and to understand the organisational direction.

Four of the six IS managers described that formal education provided them with a big picture; the end-to-end picture, that helped them to succeed in their career by making better decisions. All of the six IS managers agreed that formal education made them to communicate more effectively at all levels. Four of the six IS managers described that the activities within the formal education, especially in the Masters degree, allowed them to think more strategically, and prepare and provide a foundation for the senior management role that required more strategic thinking. Two of the six IS managers described that formal education helped their progress in their career path and contributed to promotions and pay increases. Three of the six IS managers described that formal education gave them more confidence and made them realise that they are great assets for the organisation. All of the IS managers also feel that they are continuing to improve.

One IS manager described that formal education helped him to understand people better. This allowed him to drive and motivate people.

The study reviewed additional IS Managers' activities that are not covered in the IS managers' activities identified by Wu, et al (2004), see Appendix C. Table 4 shows the activities described by the IS managers.

**Table 6: Addition IS Managers' activity**

Activity	Description
Short -term planning	<ul style="list-style-type: none"> <li>• Alignment with the long term goals.</li> </ul>
Project management	<ul style="list-style-type: none"> <li>• Project Management and related tasks; i.e. producing a project report, project plan, settings targets and milestones, meeting people regularly to update on progress.</li> </ul>
Change management	<ul style="list-style-type: none"> <li>• Managing and implementing technological change</li> </ul>
Sales and marketing	<ul style="list-style-type: none"> <li>• Relationship Building, including with executive level</li> <li>• Negotiating within the company at all levels</li> <li>• Building trust</li> <li>• Being able to sell your idea to get excited , motivate sponsors</li> <li>• Establish expectations with businesses and senior management to deliver organisational value and make good use of IS resources</li> </ul>
Research	<ul style="list-style-type: none"> <li>• Adapting previous research to suit your current needs and goals</li> <li>• Having research as an ongoing part of the routine</li> <li>• Using research to keep up to date, to see what is happening in the market place in terms of e.g. IT, governance, and methodology to bench mark and track, and adopt some practices which will increase efficiency.</li> </ul>

## 5 Discussion

The results show that formal education has various impacts on IS managers' managerial activities and it contributes to the effectiveness of IS managers as perceived by themselves. It is most effective in activities that involve strategy setting, long-term planning, negotiation on behalf of the company, leveraging internal and external resources, design of standard operation procedure, setting organizational resource standard, aligning the MIS organization, organization design, human resource allocation, planning for training, personnel performance evaluation, cost–benefit analysis, monitoring work schedule, analysis and review of work status, crisis management. Nonetheless the IS managers perceived that formal education has less impact on activities that involved social activities or human behaviours.

The majority of IS managers in this study made progress in their careers through formal education and working experiences. They perceived that formal education allowed them to acquire abilities and skills this supports Johnnie's

(1993) theory. Formal education is also described by them as helping them to adapt to a new situation whatever scenario they encountered, to expand their knowledge to new environment and allowed to improve performance and to master the environment. This finding supports Katona's (1940) theory.

It is interesting to find out that there is an increasing demand for the senior IS management with high qualifications in the public sector in Wellington with a focus on formal education at Masters Level. This supports Earle's (2009) finding that there is a demand for employee with post-graduate qualifications in IT.

This study shows that the impact of formal education on IS managers' managerial effectiveness is influenced by the selection criteria of the formal education subject area. The IS managers that selected a subject area based on personal interests, and that supported their professional aspirations or current employment perceived formal education as having a great impact or considerable impact on their managerial effectiveness. This supports Brooke and Freeman's (2009) statement that a high level of formal education is an important stage in professional development.

The majority of IS managers perceived that formal education played an integral part in their career development and at least three indicated that fast tracked their career, supporting Harper, et al (2005). All of the IS managers who progressed their career though formal education perceived that formal education helped their career prospects supporting Gamble and Messenger's (1990) and Guerrier's (1987) findings. Three of the IS managers indicated that they used formal education qualifications as a screening tool when hiring new employees supporting Wooden and Harding's (1997) study.

The fact that all of the IS managers in the study have a post-graduate, Honours or Masters degree seemed very high when compared to the Census 2006 data. The researcher believes this is due to the selection process not being completely random as she utilized her social connections to invite people to participate in the study. The researcher's social network included people from tertiary university that were and still are studying the same Masters degree as her. Another factor that could have influenced this was that prior to accepting to



participate, IS managers were provided with information on areas of the research study. This may have caused IS managers that did not have a tertiary formal education to decline to participate as they may have felt that they would not be able to contribute. A possible future area for study would be to focus on IS managers without tertiary formal education or a larger unbiased sample to see if this is truly representative of the It industry

This study also supports O'Driscoll, et al (1993) that IS managers learn through trial and error to supplement their formal education. Several IS managers indicated however that as they have progressed into more senior roles, the opportunity to learn through trial and error diminishes due to the fact that mistakes could have a significant impact on the organization. This study also reviewed that learning on the job through trial and error can be suitable for certain aspects of the jobs as perceived by the IS managers. However, the overwhelming perception is that formal education is vital for the IS managers' managerial effectiveness and career progression. As a result, the assumption that NZ managers are not interested in obtaining formal education because they have an opportunity to learn through trial and error does not apply to the group of IS managers in this study. Nonetheless future study needs to be done to other field of employment to see if this is a common perception.

All bar two of the IS managers gained additional training since completing their initial tertiary formal education. They used the additional training to change career direction and or expand their knowledge to assist in career progression. The three main subject areas that IS managers study in are IT, Social and Culture and Management and Commerce.

However this study contradicts O'Driscoll et al' (1993) study's in that only 25 percent of managers recognised the benefits gained from formal education compared to this study which found 100% recognition. This would seem to indicate that the IS managers perceived that their effectiveness is increased by formal education to a greater extent than managers in other industries.

For future study the area of motivation and source of qualifications could be looked at to investigate the impact of formal education on IS managers'

managerial effectiveness in more depth. This could identify if there is a strong correlation between a desire to progress in career, and the recognition of the importance of formal education with its perceived impact on managerial effectiveness.

## **6 Conclusion**

The significance of formal education in employment has long been recognised especially overseas. This study aimed at looking at the level of formal education as linked to self perceived effectiveness of IS managers for which little research is available. The significant findings in this study is that all participating IS managers perceived that formal education positively contributed to their managerial effectiveness, in contrast to other NZ industries where studies have shown it to be less recognised. The perceived contribution and skills increased vary regardless of roles, type of organisation, and whether the IS manager has a subordinate or not. IS managers perceived that they gained or improved skills through formal education, and those skills helped them to perform on their job more effectively. Nonetheless, IS managers perceived that formal education has various impacts on their managers' managerial activities especially in the areas of research, analysis and organisational planning though less in areas dealing with social activities or human behaviours.

Sampling within other industries and larger random samples could be undertaken to see if this research has given results that are representative of the IS industry and its recognition of formal education.

Future study could explore the areas of motivation and source of qualifications that could impact upon formal education and its links to IS managers' perceived/actual managerial effectiveness in more depth.

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## Appendix A: Interview Guide Questions for the Interviewer

Research question	Investigative Objectives	Guide Questions
How does the possession or otherwise of formal educational qualifications impact on the assessment by IS managers of their own effectiveness?	1. IS managerial roles and activities associated with IS managers' specific function.	<p>1) Can you please describe your role, function and activities associated with your current role?</p> <p><i>Using the IS managers' roles and activities identified by Wu, Chen and Lin (2004) as a frame work to probe the interview.</i></p>
	2. Tertiary qualification possessed by IS managers.	<p>2) Can you please describe tertiary qualification you possess or would like to possess, and explain why you have chosen it or would like to gain it?</p> <p><i>Using NZQA national qualifications framework as a frame work to probe the interview, if needed</i></p> <p>3) What is your perception of the benefits gained from formal education? Do you think it is necessary to obtain formal education, why?</p> <p><i>Ask the following question if an interviewee does not mention;</i></p> <p>4) Can you please describe whether you have gain new skills through formal education and what are</p>

		<p>those skills and how have you utilised those skills in your job?</p> <p>5) Do you have an opportunity to learn through trial and error? If yes, please describe?</p>
	<p>3. Additional training gained after completed formal education at certificate level: a one-trimester programme or more.</p>	<p>6) Can you please describe additional training you have gained after completing formal education at certificate level: a one-trimester programme or more you have possessed or would like to possess, and explained why you have chosen it? And when did you obtain your additional training or would like to obtain?</p> <p><i>Using NZQA national qualifications framework as a frame work to probe the interview, if needed</i></p> <p>7) What is your perception of the benefits gain from additional training? Do you think it is necessary to obtain additional training after you have completed your formal education, why?</p> <p><i>Ask the following question if an interviewee does not mention;</i></p> <p>8) Can you please describe whether you have gained</p>

		new skills through additional training and what are those skills and how you have utilised those skills in your job?
	4. Impact of formal education on IS managers' managerial effectiveness perceived by the IS managers themselves.	<p>9) Can you please describe the impact of formal education on your managerial activities you have described and rate the impact? <i>*Prompt Likert scale</i></p> <p>10) Can you please describe the impact of additionally training on your managerial activities you have described and rate the impact? <i>*Prompt Likert scale</i></p> <p>11) Can you please describe the impact of formal education on your overall managerial effectiveness and rate the impact? <i>*Prompt Likert scale</i></p>
<p><i>* Likert scale</i></p> <p><i>1 = no impact, 2 = neutral, 3 = moderately, 4 = impact, and 5 = great impact</i></p>		

## Appendix B: Interview Question for the Interviewee

Questions
1) Can you please describe your role, function and activities associated with your current role?
2) Can you please describe tertiary qualification you possess or would like to possess, and explain why you have chosen it or would like to gain it?
3) What is your perception of the benefits gained from formal education? Do you think it is necessary to obtain formal education, why?
4) Can you please describe whether you have gained new skills through formal education and what are those skills and how have you utilised those skills in your job?
5) Do you have an opportunity to learn through trial and error? If yes, please describe?
6) Can you please describe additional training you have gained after completing formal education at certificate level: a one-trimester programme or more you have possessed or would like to possess, and explained why you have chosen it? And when did you obtain your additional training or would like to obtain?
7) What is your perception of the benefits gained from additional training? Do you think it is necessary to obtain additional training after you have completed your formal education, why?
8) Can you please describe whether you have gained new skills through additional training and what are those skills and how you have utilised those skills in your job?
9) Can you please describe the impact of formal education on your managerial activities you have described and rate the impact? <i>*Use Likert scale</i>
10) Can you please describe the impact of additional training on your managerial activities you have described and rate the impact? <i>*Use Likert scale</i>
11) Can you please describe the impact of formal education on your overall managerial effectiveness and rate the impact? <i>*Use Likert scale</i>
<i>* Likert scale</i> <i>1 = no impact, 2 = neutral, 3 = moderately, 4 = impact, and 5 = great impact</i>

## Appendix C: New Zealand Qualification Framework (NZQA, 2011)

Qualification	Qualification Title	Subject Area (Use table below)
PhD		
Masters Degree		
Bachelor Degree		
Diploma		
Certificate		
Other		

(NZQA, 2011)

	Subject Area
1	Agriculture, environmental and Related Studies
2	Architecture and Building
3	Creative Arts
4	Education
5	Engineering and related technologies
6	Food, hospitality and personal services
7	Health
8	Information Technology
9	Management and Commerce
10	Mixed field programmes
11	Natural and physical sciences
12	Society and culture

(NZQA, 2011)

## Appendix D: IS Manager Activities Framework

No.	Activity	Description
1	Strategy setting	<ul style="list-style-type: none"> <li>Formulating IS objectives, defining strategies and policies to achieve them, and developing detailed plans to achieve the objective</li> </ul>
2	Seeking and assessing new market opportunities	<ul style="list-style-type: none"> <li>To pursue an aggressive competitive strategy pioneering products and markets, to understand the changes and innovations in the industry and uncertainty of actions of competitors and customers</li> <li>Scanning the activities and opportunities for differentiation of products, markets, and services</li> </ul>
3	Long-term planning	<ul style="list-style-type: none"> <li>To align the organization's long-range plan with its strategic business plan</li> <li>Rapidly changing business environments, increased involvement by end users, and accelerated technological changes underscore the need to continue improving strategic planning skills</li> </ul>
4	Leveraging internal and external resources	<ul style="list-style-type: none"> <li>Seeking and accessing proposals from external technology, consultation and/or other service/product sources needed to accomplish the IS objective</li> <li>Selecting, accepting and/or negotiating with internal and external resources to satisfy project needs and constraints in a timely manner</li> <li>Serving as a liaison between the company and the external resource monitoring, evaluation and/or influencing the performance of the provider</li> </ul>
5	Design of standard operation procedure	<ul style="list-style-type: none"> <li>Setting standards for elementary operations (times, procedure, etc.), attracting personnel with new skills and planning for shifts in skill requirements</li> </ul>
6	Setting organizational resource standard	<ul style="list-style-type: none"> <li>Requiring new skill mixes, new organizational structures, new job design concepts, massive retraining, and more movement between IS and customer organization</li> </ul>
7	Aligning the MIS organization	<ul style="list-style-type: none"> <li>Developing a rationale that justifies the proposed managerial activities in terms of business criteria that important or the company (strategic or tactically) and that appeal to the interests, concerns, etc. of key decision makers</li> </ul>
8	Organization design	<ul style="list-style-type: none"> <li>To identify the major information categories used within an</li> </ul>

		enterprise and their relationships to business processes to guide applications development and facilitate the sharing of data
9	Human resource allocation	<ul style="list-style-type: none"> <li>To assign interesting tasks, make sure that IS employees' work with competent colleagues and work on professionally important projects, and to provide jobs for IS employees, which permit freedom and autonomy to be creative and pursue their own ideas</li> </ul>
10	Conflict resolution and motivation of employees	<ul style="list-style-type: none"> <li>To resolve the conflicts between subordinates and peers; to motivate not only the top performers but all employees, particularly in an environment of stabilizing growth, slower promotion and increased levels of maintenance for older systems</li> </ul>
11	Recruiting	<ul style="list-style-type: none"> <li>To make up for the current and future shortages of qualified information systems personnel that threatens the IS department's ability to keep up with the information needs of its parent organization</li> </ul>
12	Planning for training	<ul style="list-style-type: none"> <li>Conducting knowledge/skills needs assessments, determining requisite areas of significant deficiencies and appropriate education/training programs</li> </ul>
13	Implementing and assessing training programs	<ul style="list-style-type: none"> <li>Implementing education/training programs and conducting post-education/training assessments</li> <li>Keeping track of subordinate training and special skills as they relate to job assignments to facilitate their personal growth and development</li> </ul>
14	Personnel performance evaluation	<ul style="list-style-type: none"> <li>Evaluating the quality of subordinate job performance</li> </ul>
15	Cost-benefit analysis	<ul style="list-style-type: none"> <li>Installing new cost metrics to promote IT cost-consciousness, such as IT cost per unit of product or service, activity-based costing of IT services, and distribution cost analysis of IT-intensive operations</li> </ul>
16	Monitoring work schedule	<ul style="list-style-type: none"> <li>Keeping up with information on the progress of operations in the company</li> </ul>
17	Analysis and review of work status	<ul style="list-style-type: none"> <li>Gathering the pertinent information needed to evaluate proposed and/or current project work in terms of business, technology and company political criteria that one has committed to or is planning on accomplishing over a specified time period</li> </ul>
18	Attending social	<ul style="list-style-type: none"> <li>To carry out a number of social, inspirational, legal, and</li> </ul>

	activities on behalf of the company	ceremonial duties and be available to certain parties requesting his input because of his status or authority
19	Crisis management	<ul style="list-style-type: none"> <li>To be responsible for corrective action when the organization faces unexpected crises</li> </ul>
20	Negotiation on behalf of the company	<ul style="list-style-type: none"> <li>To take charge when his organization must engage in important negotiation activity with other organizations</li> </ul>
21	Spokesman on behalf of the company	<ul style="list-style-type: none"> <li>To transmit information such as the organization's performance, plans, and policy to external groups in a public relations capacity for his organization</li> </ul>

(Wu, Chen, and Lin, 2004)