**THEORY OF CONSTRAINTS (TOC)
AND APPRECIATIVE INQUIRY (AI):**

**A COMPARATIVE STUDY OF
THEIR EFFECTIVENESS IN IMPROVING
MASTER'S THESIS STUDENTS' PERFORMANCE**

By

Garoon Pongsart

A thesis
submitted to Victoria University of Wellington
in fulfilment of the requirements for the degree of
Doctor of Philosophy

Victoria University of Wellington

2015

Abstract

The foundations of this research derived from two separate directions: firstly methodological, and secondly, a problematic situation. Both were strongly driven by the “highs” and “lows” of the researcher’s experiences over several years working in the business sector in Thailand and overseas, combined with his passion for being part of education reform in Thailand.

Many students fail to complete their studies. Of domestic students starting an Honours/Master’s qualification at public providers in 1998, by the end of 2002 (5 years later), only 59% had completed their degrees successfully, 2% were still studying towards completion, while 39% had left without completing (Scott, 2004). Why was the completion rate so low? What were the problems that postgraduate students encountered while doing their theses? And how could we help improve the students’ performance?

This research compared and contrasted the two approaches, Theory of Constraints (TOC) and Appreciative Inquiry (AI), by applying them to improve this problematic situation area: Master’s thesis students’ issues. A Hybrid model, combining aspects of the two methods, was also developed and tested. A web-based survey was used to recruit 12 Victoria University of Wellington Master’s thesis students for individual interviews, allocating them into three similar groups of four: TOC, AI, and Hybrid. One interviewee from each group also took part in two coaching sessions (action research).

The outcomes yielded from the three methods revealed both the root causes of the students’ problems (TOC) and the root causes of their success (AI). Based on the two opposite approaches, and the hybrid model, the researcher developed and proposed guidelines for future postgraduate research students, their supervisors, and graduate school committees.

However, some limitations for TOC and AI were revealed: the time-consuming processes for full TOC analysis, and the fact that some tools were not user-friendly. To enhance AI’s performance, stress-free environments may be required. More research on applying TOC, AI, and the Hybrid model to individuals is therefore required in the future.

Acknowledgements

I would like to convey my sincere thanks and gratitude to the Victoria Management School (now School of Management), VUW professors and staff members, VUW PGSA, VUW SLSS, all my research participants, Theory of Constraints (TOC) and Appreciative Inquiry (AI) founders, developers, and academics, my VMS and VUW PhD colleagues and friends, my research webmaster, and my family members who supported me and helped enhance the success of my PhD thesis.

I also owe a lot to Professor Rowena Cullen, Professor John Davies, Associate Professor Deborah Jones, Professor Sally Davenport, Tracey Wharakura, Trinh & Bruce Middleton, Metha Pongsart, Chatchai Thanasumrith, RERU board members and management, and Assistant Professor Chaloeey Pumipuntu (RERU President).

A million thanks to Robyn Moore, my NZ sister, who devoted her time to help make my voice clearer throughout the entire thesis.

My thesis would not have been completed without the guidance, kind support, and understanding from my two PhD thesis supervisors: Professor Victoria J. Mabin (my major supervisor – “I am here to help”), and Dr. Deborah Laurs (my co-supervisor – “You are my first priority”). You helped make my dreams of completing the PhD come true. Please accept my appreciation from the bottom of my heart..... *What I owe you all is immeasurable!!!*

Table of Contents

ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
TABLE OF FIGURES.....	x
TABLE OF TABLES.....	xiii
CHAPTER ONE: INTRODUCTION	1
1.1 Background to this study.....	1
1.2 Research questions.....	5
1.3 Research aims.....	6
1.4 Thesis outline	6
CHAPTER TWO: THE TWO FOUNDATIONS: A PROBLEMATIC SITUATION AND METHODOLOGICAL APPROACHES.....	9
Part I: The Problematic Situation	9
2.1 What is a Master’s thesis?.....	9
2.2 Why focus on Master’s?	11
2.3 Master’s thesis students’ constraints.....	14
2.4 Part I Summary.....	16
Part II: Methodological Approaches.....	16
2.5 Brief history	16
2.5.1 A brief history of Theory of Constraints (TOC).....	16
2.5.2 Brief history of Appreciative Inquiry (AI)	17
2.6 Principles:	18

2.7 The evolution of TOC Thinking Process (TP) and Tools versus AI 4-D Cycle.....	21
2.7.1 The TOC Thinking Process (TP).....	21
2.7.2 AI 4-D Cycle	26
2.8 Comparing similar processes of TOC TPs and AI 4-D Cycle.....	29
2.8.1 A system’s goal/objective.....	29
2.8.2 A system’s current situation analysis	30
2.8.3 A system’s forecasted future reality	30
2.8.4 A system’s implementation plan	31
2.9 Part II Summary	31
2.10 Chapter Summary	32
CHAPTER THREE: METHODOLOGY.....	33
3.1 Research Philosophy	33
3.2 Research Approach.....	34
3.3 Methodological Choices.....	35
3.4 Research Strategies.....	35
3.4.1 Web-based Survey:.....	35
3.4.2 Semi-structured Interviews.....	37
3.4.3 Action Research.....	37
3.5 Time Horizon.....	38
3.6 Techniques and procedures.....	38
3.6.1 Quantitative (Web-based Survey).....	39
3.6.2 Qualitative (Individual interview)	39
3.6.3 Hybrid Approach:	42
3.6.4 Qualitative (Action research).....	44
3.7 Chapter Summary	46
CHAPTER FOUR: “MANAGING THE LOWS”: APPLYING THEORY OF CONSTRAINTS (TOC) TO MASTER’S THESIS STUDENTS’ PERFORMANCE ISSUES (RESEARCH FINDINGS, AND ANALYSIS).....	47
4.1 TOC interviewees:	47

4.2 Applying TOC Thinking Processes (TPs) and tools to the four TOC interviewees	49
4.2.1 What is your goal?	50
4.2.2 What to change?	54
4.2.3 What to change to?	66
4.2.3.1 Tarn's Evaporating Cloud/EC:	67
4.2.3.2 Tammy's Evaporating Cloud/EC:	69
4.2.3.3 Ton's Evaporating Cloud/EC	71
4.2.3.4 Tim's Evaporating Cloud/EC	73
4.2.3.5 Testing the solutions by Negative Branch Reservation (NBR) method	75
4.2.4 How to cause the change	79
4.2.4.1 The Prerequisite tree (PRT)'s Objective	80
4.2.4.2 The Prerequisite Tree (PRT)'s Obstacles (Obs)	81
4.2.4.3 The Prerequisite Tree (PRT)'s Intermediate Objective (IO)	83
4.3 Coaching session (Action Research)	93
4.3.1 TOC coaching session with Tarn	94
4.3.1.1: Coaching I (November 2009)	94
4.3.1.2 Coaching I Summary	101
4.3.1.3: Coaching II (December 2009)	102
4.3.2: Coaching summary	110
4.4 Chapter Summary	113
 CHAPTER FIVE: "MAXIMISING THE HIGHS": APPLYING APPRECIATIVE INQUIRY (AI) TO MASTER'S THESIS STUDENTS' PERFORMANCE ISSUES (RESEARCH FINDINGS, AND ANALYSIS)	 115
5.1 Appreciative Inquiry interviewees:	115
5.2 Applying Appreciative Inquiry (AI) to the four AI interviewees	117
5.2.1 Affirmative Topic:	117
5.2.2 Discovery: identify what gives life, and appreciate the best of what is	121
5.2.3 Dream: identify what might be, and envision the results the world is calling for	127
5.2.4 Design: what should be the ideal/co-construct the future design	131
5.2.5 Destiny: What will be?	134
5.3 Conclusion	139
5.4 AI coaching session (Action research)	140
5.4.1 AI coaching sessions with Apinya	141

5.4.1.1: Coaching I (November 2009).....	141
5.4.1.2: Coaching II: December 2009	147
5.5 Chapter summary	157
 CHAPTER SIX: ADDRESSING THE HIGHS AND THE LOWS: APPLYING A HYBRID MODEL (TOC+AI) TO MASTER’S THESIS STUDENTS’ PERFORMANCE ISSUES (RESEARCH FINDINGS, AND ANALYSIS)	 159
6.1 Hybrid individual interviewees.....	159
6.2 Applying the Hybrid model to the four interviewees (Hybrid analysis)	161
6.2.1 Hybrid Step I: What is your goal?	162
6.2.2 Hybrid Step II: What is your current reality?	165
6.2.2.1 Current Reality Tree (CRT)	165
6.2.2.2 The critical root cause analysis	170
6.2.2.3 Using the TOC Evaporating Cloud (EC) to evaporate the conflicts.	176
6.2.3 Hybrid Step III: What is your affirmative topic?.....	191
6.2.4 Hybrid Step IV: Discovery: Appreciating what is.....	192
6.2.5 Hybrid Step V: Dream: What might be?	197
6.2.6 Hybrid Step VI: Design:	201
6.2.7 Hybrid Step VII: What will be your prerequisite tree and implementation plan?	205
6.4 Conclusion	212
6.5 Coaching session (Action research).....	212
6.5.1 Coaching session I with Hong (November 2009).....	213
6.5.2 Coaching session II with Hong (December 2009).....	217
6.7 Chapter summary	225
 CHAPTER SEVEN:	 227
 COMPARING THE THEORY OF CONSTRAINTS (TOC), APPRECIATIVE INQUIRY (AI), AND HYBRID MODEL, ON THEIR EFFECTIVENESS FOR UNDERSTANDING AND IMPROVING MASTER’S THESIS STUDENTS’ PERFORMANCE	 227
7.1 Comparing the effectiveness of TOC, AI, and Hybrid model in the individual interviews .	227
7.1.1 Research interview questions	227
7.1.2 IO Map versus AI affirmative topic and provocative proposition.....	230
7.1.3 Current reality versus past achievements.....	231

7.1.4 EC and FRT versus Dream and Design	232
7.1.5 Prerequisite Tree (PRT) and Destiny.....	232
7.1.6 Summary.....	233
7.2 Comparing the effectiveness of TOC, AI, and Hybrid model in coaching sessions	234
7.2.1 TOC coaching sessions' effectiveness.....	234
7.2.2 AI coaching sessions' effectiveness	235
7.2.3 Hybrid model coaching sessions' effectiveness	237
7.2.4 Summary.....	238
7.3 Chapter summary	239
 CHAPTER EIGHT: RESEARCH DISCUSSION AND CONCLUSION	 241
Part I: Discussion	241
8.1 The Approaches: Theory of Constraints (TOC) and Appreciative Inquiry (AI).....	241
8.1.1 Theory of Constraints (TOC) and Appreciative Inquiry (AI) at macro and micro levels	241
8.1.2 Theory of Constraints (TOC) and Appreciative Inquiry (AI) in this research versus their other versions.....	244
8.1.2.1 Theory of Constraints (TOC) and its other versions	244
8.1.2.2 Appreciative Inquiry and its other versions.....	246
8.2 The individual context: Master's thesis students and their performance issues	248
8.2.1 Root causes of problems.....	249
8.2.2 Root causes of success.....	252
8.3 Matching the lows, the highs, and the methods.....	254
8.4 The proposed guidelines to improve Master's thesis students' performance.....	255
8.4.1 Supporting activities for starting:	259
8.4.2 Supporting activities in data collection stage:	261
8.4.3 Supporting activities in data analysis stage:	262
8.4.4 Supporting activities in writing-up stage:.....	264
8.4.5 The generic Intermediate Objective (IO) Map	265
Part II: Conclusion	266
8.5 Conclusion	266
8.5.1 Research achievements.....	266

8.5.1.1 Comparing and contrasting the usefulness (performance) of TOC and AI in improving Master's thesis students' performance	267
8.5.1.1.1 TOC Performance in an individual context: Master's thesis students	267
8.5.1.1.2 AI Performance on an individual context: Master's thesis students	268
8.5.1.1.3 Hybrid model performance in an individual context: Master's thesis students	269
8.5.1.2 Developing guidelines to help enhance Master's thesis students' success from TOC, AI, and Hybrid model	270
8.5.2 Research contribution	270
8.5.3 Further applications	271
8.6 Revisiting the research:	272
8.7 Limitations of this study	274
8.8 Future research	275
8.9 Reflections.....	275
8.10 Chapter Summary:	279
REFERENCES.....	281
APPENDIX A: QUESTIONNAIRE SURVEY	293

Table of Figures

Figure 2.1 Mark's story from Kearns et al. (2006, p.5) reformatted by the researcher	10
Figure 2.2: Timescale for a Master's thesis from Hart (2006, p.21) reformatted by the researcher	13
Figure 2.3 Interrelated issues (Pongsart, 2005).....	16
Figure 2.4 The TOC principles (Dettmer, 2007, p.13).....	19
Figure 2.5: Summary of the Theory of Constraints (TOC) Thinking Process (TP) and its tools' evolution.....	23
Figure 2.6 TOC Thinking Process Full Analysis (TPFA), Cox et al. (2003) and Dettmer (2007), reformatted by the researcher	25
Figure 2.7 AI 4-D Cycle (Cooperrider & Whitney, 2005, p.16).....	29
Figure 3.1 Theory of constraints (TOC) individual interview questions	41
Adapted to Master's thesis context from Dettmer, 2007 (first three questions) and Cox et al, 2003 (last eight questions)	41
Figure 3.2 Appreciative Inquiry individual interview questions.....	41
(Adapted from Orem et al, 2007 and Cooperrider et al, 2008)	41
Figure 3.3: The Proposed Hybrid Approach.....	42
Figure 4.1: Tarn's IO Map	51
Figure 4.2: Tammy's IO Map	51
Figure 4.3: Ton's IO Map	52
Figure 4.4: Tim's IO Map	52
Figure 4.5: Tarn's Current Reality Tree (CRT) constructed from three performance issues	57
(I: Knowing how to get started, II: Keeping the deadlines/timeline, and III: Feeling study valuable/worthwhile).....	57
Figure 4.6: Tammy's Current Reality Tree (CRT) constructed from three performance issues.....	58
(I: Knowing how to get started, II: Designing my study, and III: Not knowing when to stop reading the literature)	58
Figure 4.7: Ton's Current reality Tree (CRT) constructed from three performance issues	59
Figure 4.9: Tarn's Evaporating Cloud (EC).....	68
Figure 4.10: Tammy's Evaporating Cloud (EC).....	71
Figure 4.11: Ton's Evaporating Cloud (EC).....	72
Figure 4.12: Tim's Evaporating Cloud (EC)	75
Figure 4.13: Tarn's Negative Branch Reservation (NBR), and Future Reality Branch (FRB)	78
Figure 4.14: Tarn's Prerequisite Tree (PRT)	85
Figure 4.15: Tammy's Prerequisite Tree (PRT)	90
Figure 4.17: Tim's Prerequisite Tree (PRT)	92
Figure 4.18: Tarn's Highs and Lows (Feelings about her Master's thesis) as of 03/11/2009.....	96

Figure 4.19: Tarn's Highs and Lows (Feelings about her Master's thesis) as of 17/12/2009.....	104
Figure 4.20: Tarn's revised IO Map for Coaching II (pink entities were added to the IO Map of Coaching I).....	109
Figure 5.1: Coaching I agenda with Apinya (November 2009).....	141
Figure 5.2: Apinya's Highs and Lows as of 1 st Coaching, November 2009.....	143
Figure 5.3: Coaching II agenda with Apinya (December 2009).....	148
Figure 5.4: Apinya's Highs and Lows as of 2 nd Coaching, December 2009	149
Figure 6.1: Seven steps of the Hybrid model (combining TOC and AI)	161
Figure 6.2: Hong's IO Map.....	163
Figure 6.3: Helen's IO Map	163
Figure 6.4: Harn's IO Map.....	164
Figure 6.5: Henry's IO Map.....	164
Figure 6.6: Hong's Current Reality Tree (CRT).....	167
Figure 6.7: Helen's Current Reality Tree (CRT)	168
Figure 6.8: Harn's Combined Current Reality Tree (CRT)	169
Figure 6.9: Henry's Current Reality Tree (CRT).....	170
Figure 6.10 Root causes of Hong's problem vs her IO Map	171
Figure 6.12 Root causes of Harn's problem vs his IO Map.....	172
Figure 6.14: Hong's Evaporating Cloud (EC)	180
Figure 6.15: Helen's Evaporating Cloud (EC).....	181
Figure 6.16: Harn's Evaporating Cloud (EC)	182
Figure 6.17: Henry's Evaporating Cloud (EC).....	183
Figure 6.18: Negative Branch Reservation (NBR) and Future Reality Branch (FRB) for Hong	184
Figure 6.20: Negative Branch Reservation (NBR) and Future Reality Branch (FRB) for Harn	185
Figure 6.21: Negative Branch Reservation (NBR) and Future Reality Branch (FRB) for Henry	186
Figure 6.22: Hong's Future Reality Tree (FRT)	187
Figure 6.23: Helen's Future Reality Tree (FRT)	188
Figure 6.24: Harn's Future Reality Tree (FRT).....	189
Figure 6.25: Henry's Future Reality Tree (FRT).....	190
Figure 6.26: Coaching I agenda with Hong (November 2009).....	213
Figure 6.27 Hong's feelings about her Master's thesis: Highs and Lows.....	214
Figure 6.28: Coaching II agenda with Hong (December 2009).....	218
Figure 6.29 Hong's feelings about her Master's (Highs and Lows) as of December 2009	219
Figure 6.30: Hong's IO Map.....	223
Figure 8.1: AI Managing Change, the three generative factors: Continuity, Novelty, and Transition (Adapted from Cooperrider et al. 2008, p.26).....	247
Figure 8.2: Proposed Guidelines to improve Master's thesis students' performance	256

Figure 8.3: Generic IO Map for research students' quality and on-time completion.....	265
Figure 8.4: Original three phase research design	272

Table of Tables

Table 1.1 Retention, Completion and Progress in Tertiary Education 2003 (NZ).....	4
Table 2.1: Standard expectations of the Master’s degree	14
Table 2.2: Top ten problems encountered by VUW Master’s thesis students	15
Table 2.3 Appreciative Inquiry’s Principles	20
Table 2.4: Mohr and Jacobsgaard 4-I model.....	28
Table 4.1: Characteristics of the 4 TOC interviewees	48
Table 4.2: TOC interviewees’ root causes of their performance issues versus span of control.....	63
and sphere of influence	63
Table 4.3: TOC interviewees’ critical root causes of their performance issues versus	63
span of control and sphere of influence	63
Table 4.4: Tarn’s Prerequisite Tree (PRT).....	89
Table 4.5: Summary of key entities of each TOC interviewee after applying TOC.....	93
Table 4.6: Tarn’s questionnaire: degrees of difficulty June 2009 and November 2009	97
Table 4.7: Proposed PRT for Tarn to eliminate distractions during “Coaching I”	101
Table 4.8:Tarn’s questionnaire: degrees of difficulty June 2009, November 2009, December 2009.	106
Table 4.9: Tarn’s PRT for Coaching II	110
Table 4.10: Summary of the coaching sessions with Tarn.....	112
Table 5.1: Characteristics and other important information of the 4 AI interviewees.....	116
Table 5.2 Affirmative topic and other important information of each AI interviewee	120
Table 5.3: AI interviewees’ Discovery with related information and data	127
Table 5.4: AI interviewees’ Dream with the previous AI phases and related information.....	131
Table 5.5: Apinya’s questionnaire: degrees of difficulty June 2009 and November 2009	144
Table 5.6: Apinya’s questionnaire, degrees of difficulty June 2009, November 2009, December 2009	150
Table 5.7: Summary of coaching sessions with Apinya	157
Table 6.1: Characteristics of 4 Hybrid interviewees.....	160
Table 6.2: Hybrid interviewees’ root causes analysis by TOC span of control & sphere of influence	175
Table 6.3 Summary of results of TOC analysis of each Hybrid model interviewee.....	179
Table 6.4 Each interviewee’s affirmative topic and the sources of affirmative topic’s components..	191
Table 6.5 Summary of the results yielded from TOC and AI analysis of each Hybrid model interviewee	201
Table 7.1 TOC and AI interview questions	227
Table 7.2 AI reframing Apinya’s non-positive issues	236
Table 8.1 The relation of Lows, Highs, and Methods.....	254

Chapter One: Introduction

This study compares and contrasts the usefulness of Theory of Constraints (TOC), Appreciative Inquiry (AI), and a Hybrid model (a combination of TOC and AI) in an individual context, as applied to problems faced by Master's thesis students. Research questions, the research aims, and a summary of the contents of the remaining thesis chapters are outlined in this chapter.

1.1 Background to this study

The foundations of this research emerged from two separate directions: firstly, methodological and secondly, a problematic situation. The research was motivated by the researcher's twenty years observing the "highs" and "lows" of working in the business sector in Thailand and overseas, combined with his passion for facilitating education reform in Thailand.

Firstly, the research aimed to answer questions of a methodological nature. The Theory of Constraints (TOC) provides Thinking Processes (TP) and tools to identify, analyse, and manage the root cause of a problem, while Appreciative Inquiry (AI) offers positive questions, together with its AI 4-D Cycle, to seek and exploit the root cause of success. Despite approaching an issue from different angles, the two methods, TOC and AI, appear to have a common goal: striving for the best improvements. So, there are also similarities within the two diametrically-opposed approaches. Could we utilise those similarities and differences? Could a hybrid approach be used as an alternative? And how useful are these approaches in dealing with a similar issue and context?

This methodological debate was tested using application to a real issue that concerns the tertiary education sector worldwide. The high drop-out rate of Master's thesis students is a problematic issue in need of addressing (Scott, 2004). The Master's level of education provides quality candidates for workplaces and societies worldwide. Many developing countries demand higher-educated staff who can contribute to developing their societies. Developed countries enjoy having postgraduates on their staff and may often require existing staff members to upgrade to a minimum of postgraduate level before promotion. In addition, a Master's thesis is an ideal preparation for pursuing a higher degree: the PhD. Research on improving Master's Degree thesis students' performance may make a significant contribution to academic systems and societies as a whole. Moreover, the Master's thesis was part of the

researcher's own tertiary experience. Fortunately, it would also be part of his future career, as a lecturer and supervisor to Master's thesis students.

This section presents the researcher's background related to his PhD research topic in terms of the theoretical frameworks and problematic issues. The researcher had been working with four companies in his home country, Thailand, and overseas. "Highs" and "Lows" formed critical points in his life experiences. These past experiences were powerful motives for him to conduct research in relation to "Success" and "Failure" factors in order to improve and enhance a situation. He applied the two diametrically opposed approaches, Theory of Constraints (TOC) and Appreciative Inquiry (AI) to Master's thesis students' issues, and to his future supervisory role.

"Achievements" and "Constraints" are what I experience in my day-to-day life and activities. I am happy and motivated when anticipating success, but I feel depressed and unhappy when facing troubles. To live our lives happily in a sophisticated society and a complex world, we must think of how past "success" and "failure" lessons can help us. Can we strengthen our future based on past success? Or can we build up our success from what we have learned from failure?

Before doing a Master's Degree at Victoria Management School (VMS), Victoria University of Wellington, I worked with four companies, Nissan Motors (Thailand), SAS Service Partners (Saudi Arabia), Sara Lee Trading (Thailand), and the Bangkok Post (a leading English newspaper in Thailand). Working in the business sector, I had to make decisions and solve problems every single minute. Conflicts occurred from time to time, and as a manager of an organisation with many different departments, I had to administer not only external problem-solving with customers, but also to solve internal conflicts, between departments and personnel within the company. Often, compromise, not win-win, was the "solution" chosen. While the results were deemed to be successful, as evidenced by various awards (Employee of the year at Nissan Motors and two consecutive years "Best Performance" awards from SAS Service Partners), such "solutions" did not last very long. We might have solved the symptoms, but the core conflicts (or the root cause of the problems) remained.

Although working in the business sector in Thailand offered me a high salary and an opportunity to have a business of my own, my passion does not lie there. It is educational

reform that inspires me. Specifically, educational reform in my hometown, Roi Et, Thailand. I believe in education and look forward to a positive change in my home country driven by the educational reform. I resigned from the Bangkok Post and decided to join Roi Et Rajabhat University (RERU), a new University in my hometown, operating since 2002. With good experience from my work with the 4 respected businesses, a Master's in Business (non-thesis), and my strong passion for education, my new role as a RERU lecturer had been guaranteed since 2002. Before joining RERU, I came to New Zealand to pursue a (thesis-based) Master's Degree in Management Studies (MMS) at Victoria Management School (VMS), Victoria University of Wellington (VUW), NZ in 2003. My Master's was awarded in March 2005.

During my MMS coursework at VMS, I learned to address the root cause of a problem using Goldratt's Theory of Constraints (TOC) Thinking Processes (TPs) and tools. In my MMS thesis (Pongsart, 2005), I applied the TOC TPs and tools to the problematic issues encountered by Master's Degree thesis students at VUW. The top 10 major problems encountered by those students were: keeping deadlines/timelines, keeping healthy/fit, finding time for a thesis, designing a study, knowing how to get started, knowing how to stop reading literature, feeling supported, staying motivated, meeting social demands, and organising the literature. Master's Degree thesis students' problems are complex. They are interrelated. Keeping deadlines/timelines may cause health problems. Keeping healthy/fit may be related to feeling supported or staying motivated. Staying motivated may lead to problems in keeping deadlines/timelines. The TOC TPs and tools helped me discover the interrelationships and policy constraints underlying those complex problems. My research participants had to eliminate the policy constraints of those problems, in order to achieve quality and on- time thesis completion.

Many students fail to complete their theses on time. Of all New Zealand domestic students starting an Honour's/Master's qualification at public providers in 1998, by the end of 2002 (5 years later), only 59% had completed their degrees successfully, 2% were still studying towards completion and 39% had left without completing (Scott, 2004):

Domestic Student Starting a Qualification at Public Providers in 1998 by qualification level	By end of 2002 (5 years later) percentage that		
	Successfully Complete	Still be studying Towards completion	Leave without Completing
Honour's/Master's	59%	2%	39%
Doctorates (5 year-1998 students)	26%	23%	51%
Doctorates (estimated long-term)	54% - 57%	0%	43% - 46%

*Table 1.1 Retention, Completion and Progress in Tertiary Education 2003 (NZ)
(Source: Scott, 2004, p.9)*

To fail in thesis completion is a waste of time and resources on both the part of the university, and the student. The low completion rate impacts on the university's ranking and earnings. Low ranking universities may not attract future students' registration and enrolment. In addition, the low ranking and low numbers of student enrolments will certainly jeopardise funding subsidised by the government. For students who have not had a job and/or live on a student loan, their level of debt will increase, as they are required to pay for extension fees and their living expenses. Furthermore, students who fail to complete their theses may face greater competition in gaining the job they desire, and may not achieve the income that accompanies a Master's Degree. In addition, thesis students may lose confidence in attaining their goals in life.

An unfulfilled dream or life goal can also be obtained by focusing on strengths or positive cores according to Appreciative Inquiry (AI). I first read a few pages on Appreciative Inquiry (AI) at the VUW library, during a short visit to NZ for my May 2006 graduation. I was amazed by what I read. I learned that to achieve a goal we can build on our strengths from a root cause of success (Cooperrider & Whitney, 2005, p. 12), instead of from the root cause of a problem. I learned that we can approach a problem from the other end. I was curious to find out more about AI and its applications. By applying AI to find out the positive core (Cooperrider, Whitney, & Stavros, 2008, p. 4), could related problematic issues be eliminated? Could AI be applied to Master's Degree thesis students' problems to make a difference?

This then, provided a direction for my PhD research. In addition, I was mindful of my new role as lecturer at Roi Et Rajabhat University (RERU), Thailand, and the planned introduction

there of a Master's by thesis. Further research on Master's thesis issues could be used to make a difference for Master's Degree thesis students generally, and especially through my future role as a supervisor at Roi Et.

To continue on from what I had earlier researched, applying my learning to students' problems, I envisaged contributing to improved research effectiveness. Master's thesis students will learn from other students' successes and failures. My research findings may provide a general guide to students' choices. It may provide an essential guideline or a proposed model for students to choose from, according to their needs.

The TOC TPs offer practical thinking steps to apply to any problematic issues, while the positive inquiry of AI and its 4-D Cycle should help Master's Degree thesis students enjoy a thesis journey based on their own strengths. Furthermore, the latest version of TOC TPs and tools has extended its scope to offer more choices to decision makers.

1.2 Research questions

The two methods, TOC and AI, have been known for helping improve the performance of organisations in their disciplines. However, in respect to an application to individuals (as opposed to organisations), few published works are to be found. In addition, the author found no evidence of research where the two different methods were integrated or combined.

Therefore, the Main Research Question of this study is, **“how useful are TOC and AI, when applied separately or together, as a means of improving performance in an individual context: that of the Master's thesis student?”**

Further to this, there are two sub-questions:

- (i) **“What are the similarities and differences of the outcomes yielded from addressing the root cause of a problem and/or the root cause of success?”**
- (ii) **“Could these findings provide essential guidelines to enhance research students' success?”**

1.3 Research aims

The research aimed to explore and investigate the commonalities and differences between the two methods, the Theory of Constraints (TOC) and an Appreciative Inquiry (AI). In order to enhance continuous improvement, TOC provides the thinking process tools for breakthrough change, while AI offers a 4-D Cycle as a positive approach to change.

On the surface, the two approaches are diametrically opposed. The TOC way is to find a root cause of problem, while AI looks for a root cause of success. Each approach advocates its best solution. The researcher also intended to study how the two approaches can be coordinated or partially merged and simplified, in order to strengthen the solution of change. The power of Two (TOC and AI), if valid, would be applied to enhance a quality and on-time Master's thesis.

The aims of this research were:

- (1) To compare and contrast the usefulness of the two methods, Theory of Constraints (TOC) and Appreciative Inquiry (AI) in improving Master's thesis students' performance issues at VUW.
- (2) To develop guidelines to help enhance Master's thesis students' success, using results from TOC, AI, and the Hybrid model (a combination of TOC and AI).

1.4 Thesis outline

This thesis comprises eight chapters:

- Chapter One: Introduction
The introduction provides the background to this research. It states the research questions, research aims, and the outline of the thesis chapters.
- Chapter Two: Literature review – Problematic situation and Methodological aspects
This chapter comprises the review of problematic situation, and the two methodological aspects: TOC, and AI. This reviews the literature on Master's thesis students' performance, the critical statistics in respect of postgraduate students' completion rates, and related performance issues. The methodological aspect provides a brief history of TOC and AI, their principles, TOC Thinking Processes (TPs), and AI 4-D Cycle, and the commonalities and differences of the two.
- Chapter Three: Research Methodology

The methodology chapter covers research paradigms, research methods employed in this study, research participants recruiting processes, interview questions, mixed methods, web-based survey, individual interviews, and action research.

- Chapter Four (TOC research findings and analysis), Chapter Five (AI research findings and analysis), Chapter Six (Hybrid model research findings and analysis)

Chapters Four, Five, and Six have the same pattern of contents: Characteristics of research participants, Applying TOC/AI/Hybrid to the individual interview results step-by-step, according to each method's processes, the action research findings, and the analysis of one participant from each approach.

- Chapter Seven: TOC, AI, and Hybrid model comparison

This chapter outlines an assessment of the three approaches, TOC, AI, and the Hybrid model, based on three processes: an individual interview, action research (coaching sessions), and overall.

- Chapter Eight: Discussions and Conclusions

The last chapter of this thesis is divided into two main parts:

1. Discussions (Part I) and
2. Conclusions (Part II).

Part I presents the final evaluation of the two methods, TOC and AI, both separately and in concert (Hybrid), the Master's thesis students' context, and the proposed essential guidelines to help improve research students' performance and their supervision.

Part II concludes with research achievements and contribution, revisiting the research, research limitations, future research, researcher's reflections, and the conclusion.

Chapter Two: The Two Foundations: A Problematic Situation and Methodological Approaches

Chapter Two is divided into two main parts: Part I (a problematic situation) and Part II (a methodology).

Part I: The Problematic Situation

This chapter's Part I reviews the literature on the focused area of this research: Master's thesis context. The review includes the definitions, contents, the literature gap, and problematic issues encountered by Master's thesis students at Victoria University of Wellington (VUW). Part I is divided into four main categories: (1) What is a Master's thesis? (2) Why focus on Master's? (3) Master's thesis students' constraints and (4) Chapter summary.

2.1 What is a Master's thesis?

A Master's thesis is a piece of written research at a higher education level than Bachelor and Honours, but lower than a PhD. Bui (2009, p.6) defines the Master's thesis as an empirically based research study that is an original piece of work by the graduate student. She explains that an empirically based research study is based on data that are produced by experiment or observation and the thesis must be an original piece of work, because it represents the student's culminating research and writing abilities. Hart (2006, pp.5-6) argues that the purposes of Master's thesis is to demonstrate the students' mastery of the skills of analysis, synthesis, evaluation, argumentation, and data collection and handling, by applying them to a specific topic.

The definition of a thesis or research may include various key terms. In the opinion of Gilling (2000, p.22), *Research can mean excitement, celebration, frustration, wonder, loneliness, despair, paralysis, inferiority, joy, connection, fun, humanity, great highs and lows, being grumped up, being thrilled, busy, challenged, getting to be more alive*. Gilling's definition includes positive, negative, and uncertain situations. Research students may feel excited and want to celebrate when they achieve each stage, or complete their work on time or on schedule. In contrast, they may be disappointed and sad when things turned out differently, in other words, when they encounter a constraint.

In accordance with the “great highs and lows” of research degrees, Kearns, Gardiner, Marshall, and Banytis (2006) conducted interviews with 10 PhD research students at Flinders University in Australia. “PhD: the emotional rollercoaster” is one of the major common themes found from these students. The authors categorise three types of emotion experienced on the students’ journey: up and down (like a rollercoaster): confidence, motivation and pressure (2006, 43). Figure 2.1 below demonstrates one of these student’s journeys: Mark’s story.

Figure 2.1 Mark’s story from Kearns et al. (2006, p.5) reformatted by the researcher

Mark studies part-time and has currently completed one and a half full-time equivalent years of his candidature. In addition to studying, Mark works part-time within the University. Mark’s diagram shows that he started off feeling positive about his PhD, then hit a slump at about the two-year point. He is now feeling more positive, but expects to experience another slump before he finishes (Kearns et al., 2006, p.5).

According to Figure 2.1, the positive feeling represents times when the students have high confidence in what they are doing, are motivated, and experience less pressure. In contrast, the graph line goes down when the students anticipate difficulties, low confidence, or are not motivated well enough. Kearns et al. (2006, p.43) found that the emotions and attitudes towards candidature not only differ between students but also can change on a daily basis. The

fluctuation causes uncertainty and makes situations unpredictable, which is critical for those students who experience the emotional rollercoaster.

Most importantly, “great highs and lows”, according to the definition given by Gilling (2000, p.22) and the research by Kearns et al. (2006), are crucial turning points because postgraduate research students have to spend a minimum of 1-3 years working on their own project. There seems to be a strong role played by “emotional and psychological” factors in the candidature journey (Kearns et al., 2006, p.3). Students who cope well with the lows may be able to make a U-turn as soon as possible. But those who seem to struggle with the lows and cannot find their way out, will be in a critical state. Some of them may withdraw or drop out from the university after experiencing the lows. The high dropout rate of postgraduate students in New Zealand reported in Scott’s (2004) survey, 43-51% of doctorates and 39% of honours and Master’s (see Chapter One, Table 1.1) is a cause of concern that deserves to be investigated and improved.

Although pursuing a Master’s usually takes a shorter period of time to complete than a PhD, the time length may not protect research students from the fluctuation of highs and lows. Based on the study of Demb and Funk (1999, p.21) on Master’s thesis experience, the interview results from 24 Master’s Degree graduates from Ohio State University confirms that their journey “is not one smoothly continuous experience”. This issue is discussed in the next section.

2.2 Why focus on Master’s?

Most of the academic researchers’ surveys and literature focus on doctoral students, including Styles and Radloff (2000), Rugg and Petre (2004), Phillips and Pugh (2005), and Kearns et al.’s (2006) research. According to Demb and Funk (1999, p.20), “little research on Master’s thesis experience is available”. Samraj (2008, p.55) agrees that the Master’s thesis has not received as much attention as PhD’s. The main reason that most research and literature focuses on PhD studies rather than Master’s may be due to the contribution of the doctoral degree. In terms of the knowledge contribution, a PhD thesis contributes much more value, compared to a Master’s (Manalo & Trafford, 2004, p.68). As Oliver (2004, pp.7-9), the author of *Writing your thesis*, points out, its literature review is treated much more comprehensively, and there is a much wider use of contemporary research from academic journals in order to contextualise the subject matter of the thesis in a PhD thesis, rather than a Master’s. In addition, the treatment of

methodological issues and the scope of data collected are much greater and more detailed in a PhD thesis. Master's thesis research is conducted within a particular approach and data collection is completed in a matter of months, which limits a longitudinal study.

Nevertheless, there are similarities, mainly in terms of overall structure between a Master's and a PhD thesis. As Oliver (2004, p.7) concludes, they will typically have the same overall content, consisting of a review of literature, a discussion of methodology, an analysis of data, a conclusion, and a list of reference materials. Additionally, the two theses are written in the same formal academic style, divided into appropriate chapters, and use an accepted form of academic referencing. In my opinion, presenting similar content as the PhD thesis, but within a shorter timeframe, may create just as much pressure on Master's students, if they are to complete a quality thesis on time.

Furthermore, the Master's Degree is a pathway for PhD studies. Glazer (1986, p.1) cited by Madsen (1992, p.3) characterises the Master's thesis: "The Master's Degree is the mainspring of graduate education, the first post baccalaureate degree, the midpoint to the doctorate and the terminal degree for most professions". Increasing the number of successful Master's thesis students may impact higher quality productive outputs from tertiary education, which could lead to an increase in the number and quality of students continuing on to PhD study. If the number of successful Master's thesis students declines, it will affect the number of future PhD students. This is another reason, besides personal interests, as to why the researcher chose to focus on the midpoint of the higher research degree process that Glazer defined.

The midpoint of the higher research degree, Master's, has similar thesis stages to a PhD: starting, literature review, research design, research proposal, data collection, data analysis, writing, and finishing. Within each stage, there are a number of tasks to be performed including the on-going activities (reading and writing), i.e., for the starting stage, each student has to select a supervisor and a research topic, and at the beginning of the collecting data stage, some research students must get approval from organisations or publicise their research projects in order to recruit the research participants (Hart, 2006, pp.21-22). Figure 2.2 demonstrates an example of timescale and research tasks for Master's students. Hart (2006, p.21) classifies the Master's thesis tasks into three main categories: (1) deciding on what to research and then how to research it; (2) doing the research, collecting the data, and (3) writing about what you found and what it means.

Figure 2.2: Timescale for a Master's thesis from Hart (2006, p.21) reformatted by the researcher

Hart (2006, p.20) sets a nine month timeframe, or 600 hours, for a Master's thesis of 15,000 words (i.e. every 1,000 words needs 25 working hours). From the definition, its purposes, thesis processes and stages, Master's thesis students are required to have various types of skills and capabilities to pursue the degree. Hart (2006, p.446) presents the standard expectations (skills, capabilities, attitudes and qualities) of the Master's (Table 2.1). According to the standard expectation, not only academic or technical skills and capabilities related to research and thesis writing are required, but also the attitudes and qualities. The numerous required skills may increase the level of difficulty for postgraduate research students, according to the research conducted by Kearns et al. (2006).

Standard expectations of the Master's degree			
Skills	Capabilities	Attitudes	Qualities
Brevity and succinctness	Synthetic thinking	Proactive	Integrity Objectivity Honesty Self-confidence Adaptability Determination Finisher
Citation and attribution	Analytical thinking	Ethical	
Copy - editing		Trustworthiness	
Decision-making		Responsible	
Defining and classifying	Argument analysis	Persuasive	
Document design	Effective thinking	Self-awareness	
Drafting and editing	Problem definition	Cultural awareness	
Information finding	Managing projects	Reflective	
	Self-management	practitioner	
	Graphical presentation		
Meeting deadlines			Self-discipline
Numeracy and Statistics	Giving and receiving feedback	Anthropological Research orientation	Experimentation Self-evaluative
Record keeping	Concept application	Self-development	Sense of humour
Target setting	Theory application	Self-control	Storytelling
Time management	Data management	Inter-disciplinary	Consistency

Table 2.1: Standard expectations of the Master's degree (Hart, 2006, p.7)

The standard expectation of the Master's (Table 2.1) shows the crucial requirements for Master's thesis students to develop and improve. New researchers, especially, are expected to develop these. In New Zealand universities, many Master's thesis students have just completed Honours. In 2009, more than half of students between 15-29 years old held a tertiary qualification (Statistics New Zealand). According to the researcher's own Master's thesis research (Pongsart, 2005) conducted with VUW Master's thesis students in 2004, 56% of participants were aged 30 and below (Pongsart, 2005, p.99). It indicates that there are a number of young researchers pursuing a Master's Degree. To produce a quality thesis within a short period of time: nine months (Figure 2.2), there may be various constraints that block the Master's researchers from achieving their goals.

2.3 Master's thesis students' constraints

Pongsart (2005) focused on postgraduate students' constraints in doing a Master's Degree thesis at Victoria University of Wellington (VUW). The questionnaire survey revealed the top major performance issues encountered by 62 students, as demonstrated in Table 2.2.

Ranking	<i>Problems encountered in completing Master's theses</i>
1	<i>Keeping deadlines/timelines</i>
2	<i>Keeping healthy/fit</i>
3	<i>Finding time for thesis</i>
4	<i>Designing my study</i>
5	<i>Not knowing how to get started</i>
6	<i>Not knowing when to stop reading literature</i>
7	<i>Feeling supported/motivated</i>
8	<i>Staying motivated</i>
9	<i>Meeting social demands</i>
10	<i>Organising literature found</i>

Table 2.2: Top ten problems encountered by VUW Master's thesis students (Pongsart, 2005)

Some of the problems demonstrated in Table 2.2 are related to the qualifications, skills, capabilities, attitudes, and qualities that Hart (2005) says are required for Master's thesis students to succeed. Even with all these qualifications, there is no guarantee that students will succeed. Each of Pongsart's (2005) research participants encountered more than three issues and the major issues were interrelated. The interrelationship created complexities within these problems, which were more difficult to tackle. An example of interrelated issues for each student is demonstrated in Figure 2.3.

Figure 2.3 Interrelated issues (from Pongsart, 2005)

The interrelated issues demonstrated in Figure 2.3 may cause the students to get trapped in a vicious cycle. An issue of *Staying motivated* (student “A”) can threaten mental sickness that may worsen a *Keeping healthy/fit* issue. Unfortunately, an issue with *Keeping healthy/fit* can jeopardise students’ thesis deadlines if there is no suitable action taken on time to improve the situation. So the interrelated issues plus the emotional rollercoaster experienced by thesis students require appropriate skills and methods to enhance students’ success and avoid failures, in order to achieve quality on-time thesis completion.

2.4 Part I Summary

Despite having a short period of one year full time research, Master’s students do experience “Highs and Lows”. The standard expectations (Hart, 2006, p.7) with the various skills required for higher educational research are one factor that makes a “tough journey” for new researchers. The high dropout rate in universities in New Zealand as elsewhere reflects the need to improve Master’s thesis students’ performance and research economy: the problematic system. To improve the system’s performance, Part II of this chapter introduces the two diametrically opposed methods, next.

Part II: Methodological Approaches

To help find possible solutions for the problematic situation in Part I of this chapter, Part II presents this research’s two methodological approaches: Theory of Constraints (TOC), and Appreciative Inquiry (AI). Despite addressing a critical issue of the system differently, the two approaches, TOC and AI, have a common main aim: improving a system’s performance. The main essences of the two methods are compared and contrasted under the following topics: a brief history, the principles, TOC Thinking Processes versus AI 4-D Cycle, and research and critiques related to each.

2.5 Brief history

2.5.1 A brief history of Theory of Constraints (TOC)

The Theory of Constraints (TOC) was founded by Dr. Eliyahu M. Goldratt in the 1970s. After obtaining a PhD degree in Physics, he developed a new production scheduling method and software which proved to be very successful at first but then ran into difficulties. From his own experience in business, he became interested in what caused sales to decline, and realised the

importance of addressing problems at the source. He started working on conveying his ideas to his target groups, plant managers, by writing *The Goal* (Goldratt & Cox (1984), which eventually became very successful, with more than 3 million copies sold (2004). Goldratt encountered a new issue that his clients in manufacturing sectors found difficulties in implementing what they had learned from *The Goal* (1992, p.343). The TOC developer advocated his ongoing improvement process with the Five Focusing Steps (Identify the system's constraint, Decide how to exploit the system's constraint, Subordinate everything else to those decisions, Elevate the constraint, and Go back to Step 1) in his second revision of *The Goal* (1992, p.345). After that he faced another constraint. The Five Focusing Steps worked well at identifying and managing physical constraints, but not policies (Cox, Blackstone & Schleier, 2003, p.114). According to Scheinkopf (1999), Goldratt and his team of scholars then developed the TOC Thinking Process and tools to manage complex problematic issues that included policy constraints (Figure 2.4). Goldratt (1992, p.346) said that he needed to develop the generic thinking processes that would: (1) Enable people to rapidly identify the core erroneous policy (the constraint); (2) Enable construction of new policies that will not bring with them new devastating problems; and (3) Enable construction of a feasible implementation plan that would not be hampered by resistance to change. This thesis, aimed at finding solutions to help improve Master's thesis students' performance, focuses on the Thinking Processes which are discussed in section 2.6.

2.5.2 Brief history of Appreciative Inquiry (AI)

Born a short decade after TOC, Appreciative Inquiry (AI) is a positive methodology that focuses on strengths and past success. According to two AI scholars, Watkins and Mohr (2001, 15), David L. Cooperrider and Suresh Srivastva of Case Western Reserve University are the two most central "parents" of AI. Cooperrider found out that the positive questions he used during the interviews with doctors and staff members on his Cleveland Clinic Project yielded valuable outcomes while he was doing his PhD research in 1980. "Cooperrider [was] amazed by the level of positive cooperative, innovation, and egalitarian governance in the organization" (Watkins & Mohr, 2001, p.15). Srivastva, Cooperrider's PhD supervisor, then advised Cooperrider to include the positive inquiries in the studies. In 1986, "Appreciative Inquiry: Toward a Methodology for Understanding and Enhancing Organization Innovation" was published as Cooperrider's doctoral dissertation (Cooperrider, 1986).

Since then, some scholars have followed Cooperrider's research and advocated the powerful and positive impacts of AI on personal and organisational development. As with TOC, many leading firms and organisations from various industries had appreciated the contribution of AI including Hunter Douglas, McDonald's, NASA, British Airways, and Avon Mexico.

Both TOC and AI aim to achieve positive change and great improvements on systems, especially at organisational, or macro, levels. The main difference is that each method addresses similar issues from a different perspective. TOC addresses a system's core problem with an aim to find the root cause(s) of a problem, while AI focuses on a system's strengths, with an aim to utilise the root cause(s) of success. To understand the philosophy behind these practices, the two approaches' principles are outlined, next.

2.6 Principles

Theory of Constraints (TOC) principles have been summarized by Dettmer (one of the TOC developers) as presented in Figure 2.4. As a simple analogy, TOC compares systems to chains. To improve the performance of the whole chain, the weakest link has to be identified and addressed. TOC offers Thinking Processes (TPs) and tools to help address a system's weakest links. The TOC TPs provide steps to manage the weakest links, starting from identifying a system's goal, analysing the system's current reality to find the weakest links (effect-cause-effect relationships) that lead to the root cause(s) of a problem, managing conflicts (TOC frames a problem as a conflict), providing solutions, forecasting the future, and providing an implementation plan. According to Dettmer (2007), inertia can easily take place. Therefore a process of ongoing improvement requires updating the solution so that it remains effective.

Similar to TOC, in terms of continuous improvement processes, Appreciative Inquiry (AI) compares organisations as open books, with endless sources of studying and learning (Cooperrider & Whitney, 2005, p.51). The five principles of AI are: Constructionist; Simultaneity; Poetic; Anticipatory, and Positive (Cooperrider et al, 2008). AI's five principles are demonstrated in Table 2.3. The main principles of AI are rooted in positive inquiry and inspiring conversation, based on the premise that positive inquiry causes positive changes. AI also focuses on a macro level, by addressing a system's strengths and past achievements.

- System thinking is preferable to analytical thinking in managing change and solving problems.
- An optimal system solution deteriorates over time as the system environment changes. A process of ongoing improvement is required to update and maintain the effectiveness of a solution – or replace it if it becomes irrelevant.
- If a system is performing as well as it can, not more than one of its component parts will be performing as well as they can. If all the parts are performing as well as they can, the system as a whole will not be. The system optimum is not the sum of the local optima.
- Systems are analogous to chains. Each system has a “weakest link” (constraint) that ultimately limits the success of the entire system.
- Strengthening any link in a chain other than the weakest one does nothing to improve the performance of the whole chain.
- Knowing what to change requires a thorough understanding of the system’s current reality, its goal, and the magnitude and direction of the difference between the two.
- Most of the undesirable effects within a system are caused by a few critical root causes.
- Root causes are almost never superficially apparent. They manifest themselves through a number of undesirable effects (UDEs) linked by a network of cause and effect.
- Elimination of individual UDEs gives a false sense of security while ignoring the underlying critical root cause. Solutions that do this are likely to be short-lived. Eliminating a critical root cause simultaneously eliminates all resulting UDEs.
- Root causes are usually perpetuated by a hidden or underlying conflict. Eliminating root causes requires challenging the assumptions underlying the conflict and invalidating at least one.
- System constraints can either be physical or policy. Physical constraints are relatively easy to identify and simple to eliminate. Policy constraints are usually more difficult to identify and eliminate, but removing them normally results in a larger degree of system improvement than the elimination of a physical constraint.
- Inertia is the worst enemy of a process of ongoing improvement. Solutions tend to assume a mass of their own that resists further change.
- Ideas are NOT solutions.

Figure 2.4 The TOC principles (Dettmer, 2007, p.13)

Principle	Definition
1. Constructionist	<p><i>Words Create Worlds</i></p> <ul style="list-style-type: none"> • Reality, as we know it, is a subjective not objective state. • It is socially created, through language and conversations.
2. Simultaneity	<p><i>Inquiry Creates Change</i></p> <ul style="list-style-type: none"> • Inquiry is intervention. • The moment we ask a question, we begin to create a change.
3. Poetic	<p><i>We can choose what we study</i></p> <ul style="list-style-type: none"> • Organisations, like open books, are endless sources of study and learning. • What we choose to study makes a difference. It describes – even creates – the world as we know it.
4. Anticipatory	<p><i>Image Inspires Action</i></p> <ul style="list-style-type: none"> • Human systems move in the direction of their images of the future. • The more positive and hopeful the image of the future, the more positive the present-day action.
5. The Positive	<p><i>Positive Questions Lead to Positive Change</i></p> <ul style="list-style-type: none"> • Momentum for large-scale change requires large amounts of positive affect and social bonding. • This momentum is best generated through positive questions that amplify the positive core.

*Table 2.3 Appreciative Inquiry's Principles
(Cooperrider et al., 2008, and Whitney & Trosten-Bloom, 2003)*

Based on each method's main principle, TOC addresses a system's constraint, while AI focuses on a system's success. TOC provides Thinking Processes (TPs) to help strengthen the weakest link. Together with AI positive questions, AI employs 4-D Cycle to cause a system's improvements. The AI 4-D Cycle and TOC TPs are reviewed next.

2.7 The evolution of TOC Thinking Process (TP) and Tools versus AI 4-D Cycle.

2.7.1 The TOC Thinking Process (TP)

The TOC Thinking Processes (TPs) have been developed by Goldratt, and TOC scholars since the 1990s. With regards to the TOC TP tools, Goldratt introduced the Evaporating Cloud (EC) and Current Reality Tree (CRT) in his books *The Theory of Constraints* (1990) and *It's Not Luck* (1994) respectively. The TOC scholars who published books that included TOC TPs are: Noreen, Smith, and Mackey (1995); Scheinkopf (1999); Schragenheim (1999); Smith (2000); Cox et al. (2003), and Dettmer (1997, 2003, 2007). Some of the works of these scholars that involved the development of TOC TP and tools are demonstrated in Figure 2.5. In addition, Dettmer's 2007 version of the TOC Logical Thinking Process Full Analysis (TPFA), shown in Figure 2.6, aims to answer 4 TOC critical questions: (1) what is the goal?; (2) what to change?; (3) what to change to?, and (4) how to cause change?

From the works of TOC scholars during 1995 – 2010 (Figure 2.5) and details of Dettmer's 2007 version (Figure 2.6), the main TOC TP steps remain the same. The major change in the main theme of answering TOC critical questions, took place in 2007, with the work of Dettmer. He adds Goldratt's original question, What is the goal?; to the other three *critical questions*: What to change?; What to change to?; and How to cause change?

In 2010, a handbook of TOC was launched by TOC scholars, edited by Cox and Schleier. The *Theory of Constraints Handbook* (Cox and Schleier, 2010) included the work on Thinking Processes of Barnard and Scheinkopf. Barnard (2010) adds two questions to Goldratt's 3 *critical questions*: Why change?; and How to create the Process of Ongoing Improvement? Meanwhile, Scheinkopf (2010) provides a Strategy and Tactic Tree, as the communication and synchronisation to Goldratt's three *critical questions*. The definition of each TOC TP tool is provided in Chapter Four: TOC analysis.

Part I:

Goldratt's works and philosophy (From 1979 – 2011)

*Every system was built for a purpose.... We must first define the system's goal; and the measurements that will enable us to judge the impact of any subsystem and any local decision, on the **global goal** (1)*

The Five Focusing Steps (1)

Step 1. Identify the system's constraints.

Step 2. Decide how to exploit the system's constraints.

Step 3. Subordinate everything else to the above decision.

Step 4. Elevate the system's constraints.

Step 5. If in the previous steps a constraint has been broken, go back to step one, but do not allow inertia to cause a system constraint.

*If **a process of ongoing improvement** is to be effective, we must first of all find – **What to change?** (Pinpoint the core problems!), **To what to change to?** (Construct simple, practical solutions!), and **How to cause change?** (Induce the appropriate people to invent such solutions!) (1)*

*The **Effect-Cause-Effect** method is a very powerful technique when used to determine core problems (1)*

Goldratt's books (and some books with co-authors) (2)

The Goal (with Jeff Cox) (1984), The Race (with Bob Fox) (1986), What is the thing called Theory of Constraints and how should it be implemented? (1990), The Haystack Syndrome: Sifting Information out of the Data Ocean (1990), The Goal, 2nd rev.ed.(with Jeff Cox) (1992), It's not luck (1994), Critical Chain (1997), Late night discussion on TOC (1998), Necessary, but not sufficient (2000), Production: The TOC Way (2003), The Choice (2008), Isn't it obvious (with Eshkoli & Brownleer) (2009)

*The TOC TP tools to answer Goldratt's change questions provided at [AGI Goldratt Institute](https://www.agi-goldratt.com/) are: the Core Conflict Cloud (Three-clouds) and CRT (identified policies, measurements and procedures are included) to answer **What to change?**, the Core Conflict Cloud and FRT (new policies, measurements and procedures are identified) to answer **To what to change?**, PRT and TT (with proposed TOC's Critical Chain project management) to answer **How to cause change?** (3)*

Sources: (1) Goldratt (1990) , (2) Mabin & Balderstone (2000) , (3) AGI Goldratt Institute (2013)

<p style="text-align: center;">Part II:</p> <p style="text-align: center;"><u>TOC Scholars and their TOC TPs and tools developments</u></p>				
Noreen 1995	Scheinkopf 1999	Cox et al. 2003	Dettmer 2007	Cox & Schleier 2010 (10)
Traditional TOC TPs and tools The role of Thinking Process tools (4) ↓ What to change? (CRT) What to change to? (EC,FRT) How to cause change? (PRT, TT)	TOC TPs tools with Communication CRT The Full Analysis (6) ↓ What to change? (CRT, EC) To what to change? (EC,FRT,PRT) How to cause change? (PRT, TT)	TOC TPs tools with the Three UDE Cloud (Generic Evaporating Cloud) approach and Policies & procedures, Measures, and Behaviour patterns	Traditional modified TOC TPs tools called “The Logical Thinking Process” with Intermediate Objective (IO) Map The Logical Thinking Process – Intermediate Objectives (IO) Map (9) ↓ What is the Goal and what are the steps to reach it? (IO map) What to change? (CRT) What to change to? (EC, FRT) How to cause the change? [PRT, Critical Chain (to retire TT)] (Traditional single Evaporating Cloud and building an upwards single CRT are preferable)	Barnard 2010 5 Questions 1. Why Change 2. What to change 3. What to change to 4. How to cause the change 5. How to create POOGI (Process of Ongoing Improvement)
Dettmer 1997	Dettmer 2003 (7)	TOC road map to ongoing improvement (8) (Use the Business Model to describe the business and its environment) ↓ What to change? 1. Identify the core problem (GEC) 2. Identify linkages to UDEs (CRT) To what to change? 3. Frame the core problem (GEC with assumptions) 4. Construct and test the solution (Injections to GEC and FRT) How to cause change? 5. Identify the obstacles and intermediate objectives (PRT) 6. Prepare buy-in (Layers of Resistance)		
Traditional TOC TPs and tools called the “Logical tools” The logical tools as a complete “Thinking Process” (5) ↓ What to change? (CRT) What to change to? [CRD (EC),FRT] How to cause change? (PRT, TT)	Traditional TOC TPs and tools called the “Logical tools” with Intermediate Objective (IO) Map The Logical Tools of the Constraint Management Model ↓ Step 1: Define the system (Strategic Intermediate Objective Map) Step 2: spiral the mismatches (Strategic CRT) Step 3: Create a transformation (Strategic EC) Step 4: Design the future (Strategic FRT) Step 5: Plan the execution (PRT)			Scheinkopf 2010 The integrated TOC TPs 3 Questions with Strategy and Tactic Tree

Sources: (4) Noreen et al. (1995), (5) Dettmer (1997), (6) Scheinkopf (1999), (7) Dettmer (2003), (8) Cox et al. (2003), (9) Dettmer (2007), and (10) The TOC Handbook, edited by Cox & Schleier (2010)

Figure 2.5: Summary of the Theory of Constraints (TOC) Thinking Process (TP)
and its tools' evolution

In over 15 years from *The Goal* to 1999, the Evaporating Cloud (EC) had not been changed much, in terms of its format and how to construct the cloud. Dettmer (1997) contributed more detail, with definitions, assumptions, and the essence of the cloud: a Conflict Resolution Diagram. Since 1999, the EC has been developed from a single cloud method to a Three UDE Cloud method, and in particular, the Core Conflict Cloud, or a Generic Evaporating Cloud (GEC), to cope with a bigger context environment, as seen in Cox et al. (2003). The GEC has gained widespread usage (Kim, Mabin & Davies, 2008), though Dettmer (2003, 2007), one of the TOC experts, still prefers to use the IO map followed by the old fashioned CRT, not the GEC/CRT combination, arguing that the GEC logic is less rigorous and can lead to false identification of the core problem.

Another related invention among TOC TP tools before 2000 was the Communication Current Reality Tree (CCRT) that connects the Evaporating Cloud (EC) to the base of the Current Reality Tree (CRT) (Button, 1999, Houle & Burton-Houle, 1998). The main advantage of the CCRT is that it provides a simpler depiction of the overall objective and the current undesirable situation. This makes it easier to communicate with and gain buy-in from all concerned, as stated by Scheinkopf (1999), Lepore and Cohen (1999), and Cox et al. (2003). Cox et al (2003) and Cox, Mabin and Davies (2005) also introduce the Current Reality Branch. These and other variants are discussed in Kim et al. (2008). Underpinning all these trees are the Categories of Legitimate Reservation (CLR), a set of protocols for constructing logic diagrams (Cox et al, 2003, p.83).

Figure 2.6 TOC Thinking Process Full Analysis (TPFA), Cox et al. (2003) and Dettmer (2007), reformatted by the researcher

The TOC Thinking Process Full Analysis (TPFA) (See Figure 2.6) remained unchanged until 1999. Scheinkopf has made a link between each three critical questions: what to change?; to what to change?; and how to cause change?; by placing the EC and PRT to each link respectively. Dettmer (2003) has applied the TOC TP tools to strategic management, calling it “The Logical Tools of the Constraint Management Model”. He introduces an Intermediate Objective (IO) Map to the top of the other tools. Interestingly, within the same year of Dettmer’s book in 2003, Cox et al. issued a roadmap of ongoing improvement. In their roadmap, the authors provided the Business System Model, on top of the *three critical questions*. The structure of TOC TP tools positioned within the roadmap is similar to Scheinkopf’s. However, Cox et al. begin the analysis to answer the first critical question, by employing the GEC to identify the core problem, followed by using the CRT to identify the linkages to UDEs. Dettmer continues the development of Intermediate Objectives (IO) Map to answer the Goldratt’s original question: What is the Goal and what are the steps to reach it? Dettmer maintains the three critical questions after an IO map. However, he advocates the traditional tools, and does not support combining the Cloud and CRT, as in the 3 cloud method, as already mentioned. He also recommends Critical Chain (Dettmer, 2007; Goldratt, 1997; Walker, 2010) as the final stage of implementing the activity plan, replacing the Transition Tree (TT). The Critical Chain offers its users a means to prioritise activities, in order to enhance the success of their implementation.

2.7.2 AI 4-D Cycle

Developed in the same decades as the TOC TPs, and with the same aim of improving a system’s performance, Cooperrider’s Appreciative Inquiry (AI) provides a 4-D Cycle to address the root cause of success (Cooperrider & Whitney, 2005, p.12), but avoids “problem solving”, in contrast to TOC. The AI 4-D Cycle comprises Discovery, Dream, Design, and Destiny (see Figure 2.7). Before employing the AI 4-D Cycle, an *affirmative topic* choice or the focus of the intervention (Cooperrider et al, 2008, 35) based on past and/or current success of a system, needs to be constructed. In the “Discovery” phase (Appreciating what gives life), the system’s members are invited/challenged/required to discover and value positive exceptions, successes, and more vital or alive moments (Cooperrider et al., 2008, p.6). By doing this, the members are collectively appreciating their system’s achievements before embarking on the next step. Faure (2006) agrees that starting from past achievements anchors the emerging common vision of the company’s future in known territory.

The second step of AI 4-D Cycle is a Dream (Envisioning what might be), where system's members and stakeholders collectively explore their hopes and dreams, in order to envision possibilities that are big, bold, and beyond the boundaries of what has been in the past (Whitney & Trosten-Bloom, 2003, p.8). This second phase seems naïve and too abstract to many audiences. According to AI scholars, Watkins and Mohr (2001, p.16), Cooperrider's ideas were met with scepticism and even laughter, when Cooperrider first presented AI to the Academy of Management in 1984. Coincidentally, Goldratt (TOC founder) published his first book, *The Goal* (1984) in the same year. Prior to this, Goldratt's *The Goal* had been rejected by McGraw-Hill. According to Goldratt (1992, p.340), McGraw-Hill never thought that his "love story about manufacturing" would be popular around the world, with more than 3 million copies sold. Similarly, the academics who laughed at Cooperrider's presentation might be surprised at how AI has gained worldwide attention, after a decade. In practice, the AI 4-D Cycle, especially Dream phase, is an enjoyable experience (Grant, 2007). According to Green (2008), a New Zealand AI practitioner, enjoyment and excitement encourage people to participate and take positive actions.

The last two phases of AI are Design and Destiny. The Design phase (third phase) is determining what will be. System members and stakeholders are encouraged to combine what they have appreciated in the first phase and envisioned in the second phase, to construct a *provocative proposition*: a statement about what the organisation wants to achieve (Reed, 2008, 33). Then, the last phase of AI 4-D Cycle is Destiny (Planning what will be). The activity plan to achieve the provocative proposition is introduced and implemented by system members and owners.

During the development of the *AI 4-D cycle*, Bernard Mohr and Mette Jacobsgaard developed and introduced a *4-I* model (*Initiate, Inquire, Imagine, and Innovate*) to help enhance the application of AI (cited in Watkins & Mohr, 2001, pp. 45-46). The *4-I* model provides instructions/guidelines while applying AI to create positive changes (see Table 2.4). However, the majority of AI articles mainly applied the *AI 4-D cycle* model solely.

<i>4-I Model</i>	Explanation
<i>Initiate</i>	<ul style="list-style-type: none"> • Introduce key stakeholders to AI theory and practice • Create temporary project structures (sponsor team and core group) and educate sponsor team and core group in AI theory and practice • Determine overall project focus/topic • Develop preliminary project strategy (timing, participation, resources, etc.)
<i>Inquire</i>	<ul style="list-style-type: none"> • Conduct generic interviews (this may also be done in the “intimate” phase as part of core group and sponsor team education) • Develop customized interview protocol; pilot and revise protocol (often this is the core group with as much involvement by steering committee as possible) • Maximum possible number of client system members are interviewed
<i>Imagine</i>	<ul style="list-style-type: none"> • Collate and share interview data and pull out themes (life-giving forces) • Develop provocative propositions (a grounded vision of the desired future) • Consensually validate provocative propositions with as many members of the system as possible
<i>Innovate</i>	<ul style="list-style-type: none"> • Engage maximum possible number of organization members in conversations that enable exploration of and commitment to whatever actions, new roles, relationships, or “design” modifications (i.e., the social architecture of the organization) are seen as being important to support implementation of the provocative propositions • Implement the design changes using an AI-based progress review process

Table 2.4: Mohr and Jacobsgaard 4-I model (cited in Watkins & Mohr, 2001, p. 46)

In much research, AI has been developed as a method or approach to deal with a macro context, i.e. organisations or macro system levels (Cooperrider et al, 2008). The AI 4-D Cycle requires full participation from all system members and stakeholders. More recently, AI has been extended to include team-building, leadership, customer service, conflict management, cross-gender relationships and culture change, which still involves mass change, rather than applying it to an individual (Cooperrider et al., 2008). Some management consultants have employed AI with individuals, i.e. interviews with their clients in order to help recognise the customer’s strengths (Orem, Binkert & Clancy, 2007), but this has not been not commonly reported in the literature. This raises a question: why not apply AI to an individual? Is this a limitation of applying AI? The researcher intends to explore how AI can be applied to individuals or smaller contexts.

Figure 2.7 AI 4-D Cycle (Cooperrider & Whitney, 2005, p.16)

2.8 Comparing similar processes of TOC TPs and AI 4-D Cycle

Despite having contrasting principles and opposing methods to cause positive changes in a system, there are some commonalities in the TOC TPs and AI's 4-D Cycle processes. The comparison between TOC TPs and AI 4-D Cycle is outlined in this section under the following themes:

2.8.1 A system's goal/objective

TOC is known as a goal-oriented method. The TOC *Intermediate Objective (IO) Map*, subsequently renamed the *Goal Tree* (Dettmer, 2011), was designed to help a system's owner identify the system goal, and/or to use the goal as a main criterion for an analysis to measure against any critical constraints. According to Goldratt (1990, see Figure 2.5), defining the system's goal is a priority in any system. In addition, having a clear goal helps the system's owner(s) stay focused. Goldratt (2010, p.3) defines TOC as "Focus: doing what should be done". TOC focuses on what will have a high impact on a system's improvements. The IO Map enhances staying focused. The IO Map comprises three main components: *Goal*, *Critical*

Success Factors (CSFs/Milestones), and *Necessary Conditions* (important activities to be performed in order to achieve each CSF).

Similarly, AI introduces an *affirmative topic* to a system's owner as the focused area that the system's owner wishes to address. Compared with TOC's IO Map, AI affirmative topic does not explicitly function as a system's goal, but in AI strength based approach, it is the topic that the system aims to make the most out of. According to Cooperrider et al. (2008, p.41), one of the criteria determining the affirmative topics' selection is that the topics move in the direction the group wants to go. This guidance also suggests that AI affirmative topic has a similar meaning to goal or objective setting (of the TOC IO Map), though there is not the same emphasis on explicitly stating and pursuing the ultimate goal, as there is with the TOC IO map.

2.8.2 A system's current situation analysis

After employing the IO Map, the next step of the TOC TPs is to analyse the system's current reality by using the Current Reality Tree/CRT (Figure 2.6). The aim is to find critical root cause(s) that has/have negative impacts on the system's goal, and find a solution using the EC to manage these and strengthen the system's performance. This TOC process is one of the main parts of addressing the root cause of a problem.

Instead of managing the system's constraints, AI seeks to utilise the system's strengths and past success. The current analysis of AI is *Discovery*. AI Discovery is to employ positive questions to allow the system's owner appreciate the current and past achievements, as well as the system's strengths in relation to its affirmative topics. The current situation analyses of TOC and AI, approach and improve the system from different angles: the constraints and the strengths. TOC seeks to eliminate the negatives, and accentuate the positives (Cox, Mabin & Davies, 2005; Mabin, Davies & Cox, 2006) whereas AI concentrates on the positives (Hayes, 2007; Cooperrider et.al, 2008).

2.8.3 A system's forecasted future reality

To forecast a system's future is another common procedure between TOC TPs and AI 4-D Cycle. TOC offers the *Future Reality Tree (FRT)* to a system's owner to view what will be the system's future once the solution from the CRT/EC process has been identified. This provides a way of testing the solution before developing the implementation plan. On the other hand, AI's forecasted future is *Dream*. AI offers a wide perspective for system's owners to look

beyond boundaries, and identify their common dreams after appreciating the system's best. What is yielded from Discovery and Dream will be merged and utilised in the next step, *Design*. TOC's future reality and AI's Dream are similar in terms of utilising the solution from the previous step. However, TOC maps the system's future reality from the solution that has been tested, while AI uses the solution, past positive/successful stories, to enhance the system's future realisation.

2.8.4 A system's implementation plan

The common final stage of TOC and AI is to provide their users an implementation plan, in order to improve the system performance. The implementation plans of TOC and AI are different. A TOC action plan is based on the tested solution yielded from addressing the root cause of the system's problem, while AI's is based on the system's root cause(s) of success. TOC TPs offer the Prerequisite Tree (PRT), Transition Tree (TRT), and Critical Chain (CCPM) as tools to help a system's owner implement the solution yielded from the previous TPs. The PRT comprises an objective, obstacles (that might block TOC users from achieving the set objective), and intermediate objectives (activities to be performed in order to overcome the obstacles, and to achieve the objective). The Transition Tree and Critical Chain provide more detailed planning if the system owner requires further elaboration before implementing. On the other hand, the AI implementation plan in Destiny phase requires a system's owner to articulate and amplify the provocative proposition composed in Design phase, into an action plan.

The PRT offers the system's owner a sequence of actions to take to overcome obstacles that are preventing implementation of the solution, while AI Destiny's plan requires AI users to take actions based on the users' system or best practices' success factors. The similarities and differences between TOC TPs and AI 4-D Cycle are influenced by their own principles: TOC's goal oriented constraints based (addresses weaknesses), and AI's positive and strengths based, respectively. Both TOC and AI use strengths to improve a system's performance.

2.9 Part II Summary

The two opposing methodologies, TOC goal oriented, and AI strengths based, have their own tools and procedures to help improve systems. TOC deals with system's constraints, but AI urges that system's members/owners utilise their strengths and past success, for improving the system's performance. Both approaches, TOC and AI, have been introduced and applied in

macro levels for more than two decades. In this research, the researcher was interested to apply the two to an individual context, Master's thesis students, as reviewed in Part I of this chapter.

2.10 Chapter Summary

Part I introduces the problematic area, Master's thesis students. The review includes what is the Master's thesis, why it should be the focus, and what are research students' constraints? What students are encountering, not only has a negative impact on their completion rates, but also on the higher research economy. To cause a positive impact in this regard, Part II of this chapter offers the two methodologies: TOC and AI, both of which have been successfully applied to organisations or macro level worldwide. To address the constraints, in order to help improve a system's performance, Theory of Constraints (TOC) offers the system's owner Thinking Processes and tools. In contrast, Appreciative Inquiry (AI) provides AI 4-D Cycle to make the most out of the root cause of success, but avoids approaching problems. The researcher was interested to employ TOC and AI to a micro problematic context, Master's thesis students, and help improve the students' performance in doing their thesis.

Further commentary on the literature, in light of the research findings, is provided in Chapter Eight. Next, Chapter Three emphasises an appropriate research method to study how to improve Master's thesis students' performance by applying TOC or AI or both, to address the students' issues.

Chapter Three: Methodology

This research aimed to compare the effectiveness of TOC, AI, and the Hybrid (TOC+AI), by applying the three approaches reviewed in Chapter Two, to improve Master's thesis students' performance. Thus, in this chapter (Methodology), the researcher discusses the research philosophy and paradigms, and the research strategy employed. In keeping with the research aims and objectives, three different methods were designed and employed: a web-based survey; semi-structured individual interviews, and action research. The justification for each method is discussed. This chapter also includes the interview questions, as provided by TOC and AI.

The elements of the research process

Saunders, Lewis and Thornhill (2011, p.128) summarise the research process as six “onion layers”: research philosophy, research approaches, methodology choices, research strategies, time horizons, and data collection methods. Each layer comprises two or more sub-elements. Each element in relation to this research design is discussed in sections 3.1 to 3.6, next.

3.1 Research Philosophy

The two main research philosophies governing the methods employed in this research are positivism and phenomenology. Positivism is based on the approach used in the natural sciences, such as biology, botany and physics (Collis & Hussey, 2003, p.52). According to Bryman and Bell (2007, p.16), the purpose of positivism is to generate hypotheses that can be tested and that will thereby allow explanations of laws to be assessed. That is, the research findings can be generalised, known as scientific laws (Gray, 2009, p.19) or law-like generalisations (Saunders et al., 2011, p.129), which is different from phenomenology. Phenomenology deals with the ways people interpret events, literally, and make sense of their personal experiences (Denscombe, 2007, p.79). According to Collis and Hussey (2003, pp.50-51), if you are a phenomenologist you will be examining small samples, possibly over a period of time. You will use various research methods to obtain different perceptions of phenomena, and in your analysis you will seek to understand what is happening in a situation, and look for patterns which may be repeated in other, similar, situations.

This research can be considered a combination of both positivism and phenomenology, especially TOC. To find a root cause of each problem, Cox et al (2003) and Dettmer (2007) provide a set of questions (Figure 3.1) to ask the system's owner and interpret his/her answers. This is phenomenology. On the other hand, TOC, described by Dettmer (2007, p.12) as a prescriptive approach, can be classified in terms of positivist philosophy because of its verifiable principles, and use of cause and effect logic. The main TOC principles (Figure 2.4, Chapter Two) (Dettmer, 2007, p.13) are: (1) Systems are analogous to chains. Each system has a "weakest link" (or a constraint) that ultimately limits the success of the entire system. (2) Strengthening any link in a chain, other than the weakest one, does nothing to improve the performance of the whole chain. (3) Most of the undesirable effects within a system are caused by a few critical root causes. The three examples of TOC principles can be tested and generalised according to positivist philosophy. In addition, the network of cause and effect can also be examined by using TOC TP steps and tools.

In contrast, AI, as a phenomenological approach, is interpretive. AI uses re-framing to build on the positive core of personal experiences, acknowledging that the interpretation of experiences varies from one person to another.

This research compared the effectiveness of TOC, AI, and the Hybrid model, and as a result, sought to develop essential guidelines for research students and other concerned parties. The phenomenological paradigm offers qualitative research methods (Gray, 2009, pp.22-23). For example, individual interviews and action research, in small samples, researched in depth or over time. Prior to employing qualitative methods, a quantitative, web-based survey was used to recruit and compare interviewees. More detail is provided in sections 3.2 – 3.6.

3.2 Research Approach

According to Gray (2009, pp.28, 577), phenomenology emphasises inductive logic: the development of fact on which theories or concepts are later built, moving from specifics to generalisations. Induction logic rests on comparatively free-ranging direct observation of the empirical world, and on the conclusions inferred from these observations. Gray also explains that a deductive approach, the experimental approach, uses a priori questions, or a hypothesis, that the research will test (2009, p.576). In accordance with the outcome-based aims of each of these methods (TOC, AI and the Hybrid model) to improve performance, the researcher employed an experimental approach, using the same one-hour long format for all participant interviews.

3.3 Methodological Choices

The methodological choices offer quantitative, qualitative, and mixed methods, in accordance with each phase of the research design. Saunders et al. (2011, p.161) make a distinction between research design and its tactics. They claim that design is concerned with the overall plan of your research; tactics are about the finer details of data collection and analysis or what they call “techniques and procedures” (section 3.6). This research employed mixed methods, both quantitative and qualitative, to answer the research questions (section 1.2, Chapter One). More details are discussed in Section 3.6: techniques and procedures.

3.4 Research Strategies

The research strategy is a general plan of how the researcher intends to go about answering the research question(s) (Saunders, Lewis & Thornhill, 2000, p.92). In addition, research strategies provide a starting point and a set of steps, by means of which “what” and “why” questions can be answered (Blaikie, 2007, p.8). The questions of this research were: to discover and compare the effectiveness of the three approaches (TOC, AI, and Hybrid), as well as the similarities and differences of the research outcomes after applying each approach separately to the similar issues of Master’s thesis students (section 1.2). The research strategies employed to help answer the research questions were: a web-based survey, interviews and action research. The next sections, 3.4.1 – 3.4.3, provide the justification for using each strategy.

3.4.1 Web-based Survey

The main objectives of designing a web-based questionnaire in the first phase were to survey the major performance issues experienced by Master’s thesis students, and to recruit interviewees with similar issues, through the survey website. The major issues identified by the students were considered to be the symptoms (for TOC) that needed a deeper analysis to find the root cause. In addition, success factors and past achievements (for AI) were identified by research participants, along with the core strengths to improve the situation.

The internet plays an important role in today’s world, with its speed and efficiency. Online surveys have become popular among academic and business researchers. According to Sue and Ritter (2007, p.7) the advantages of online surveys are: low cost, speed, efficiency, contingency questions effectiveness, direct data entry, and wide geographic reach. Furthermore, the authors suggest various criteria for online surveys, including knowing your target audience and the

ability to create an online survey. A web-based survey was conducted in this research due to the following reasons: Accessibility to the internet of the research participants, Ability to create an online survey, Ability of direct data entry and automatic data processing, Real time feedback, and Paperless survey method.

The ability to create an online survey:

As a lecturer at the Business School of RERU, Roi Et, Thailand, the researcher was appointed to one of the committees to implement the School's webpage before coming to NZ to pursue PhD study. The researcher was introduced to a computer science student, whom the committee had selected as the RERU Business School's webmaster. That student volunteered to be the webmaster for this study. Although the webmaster was based in Thailand and the researcher in New Zealand, with modern technology, the two communicated regularly online, with the researcher sending his requirements from New Zealand to Thailand by e-mail.

Ability of direct data entry and automatic data processing:

The major advantages of web-based surveys are their capacity for direct data entry and automatic data processing (Roberts, 2007, p.21). Research participants input their own data into the website created for the study. Besides this, the researcher had asked his webmaster to write a program to formulate each question into a graphical format for further analysis. These benefits saved the researcher time, in terms of data processing for further analysis.

Real time feedback:

One of the advantages offered by a web-based survey is real time feedback. The results of a web-based survey can be programmed for people to view online. Once research participants submit their answers, the results can be viewed on the website immediately. This benefit can be a motivation for the target group to take part in a web-based survey.

Paperless survey:

Today, many countries are having campaigns to protect natural resources and environment. A paperless survey is one way that academic research can be part of those campaigns. A web-based survey offers an environmentally friendly method of research. The research activities are processed online: research participants input their answers into the webpage, and the results can be viewed online. The paper saved by a web-based survey includes questionnaires, envelopes, postage stamps, and all the reminder materials (Roberts, 2007, p.20). In addition,

web-based researchers can save time and paper through providing real-time, on-demand feedback to their research participants, as previously mentioned.

The support available for developing a web-based survey combined with the accumulated benefits, convinced the researcher to select this channel as the first strategy to answer the research questions, prior to semi-structured interviews, discussed next.

3.4.2 Semi-structured Interviews

Conducting a series of semi-structured (individual) interviews with a sample of web-site respondents enhanced the researcher's understanding of Master's thesis students' performance issues, especially problematic issues that may be personal and sensitive. Easterby-Smith, Thorpe and Jackson (2008, p.145) state that both semi-structured and unstructured interviews are appropriate methods when:

1. It is necessary to understand the constructs that the respondent uses as a basis for his or her opinions and beliefs about a particular matter or situation;
2. The aim of the interview is to develop an understanding of the respondent's 'world' so that the researcher might influence it, either independently, or collaboratively as in the case with action research; and
3. The step-by-step logic of a situation is not clear; the subject matter is highly confidential or commercially sensitive; and there are issues about which the interviewee may be reluctant to be truthful other than confidentiality in a one-to-one situation.

The one-on-one interview with each student was employed to generate rich data for the researcher's further analysis, using a set of either TOC or AI questions (Figures 3.1 and 3.2) or the TOC+AI Hybrid approach, including follow up questions. The semi-structured interview was also employed as part of the action research.

3.4.3 Action Research

Action research was the third strategy employed in this research after conducting the web-based survey and semi-structured individual interviews. According to Cardno (2005, p.1) the term "action research" creates the expectation that those involved will be researching a particular situation with the intention of taking action that will make a difference – that is, bring change or improvement. The aim of this research was not simply to understand but also to improve Master's thesis students' performance. Action research was therefore employed as the

final stage of this research, in order to enhance understanding and aid improvement of the students' performance, after receiving and analysing preliminary data obtained using the semi-structured interviews and the relevant TOC or AI or Hybrid set of questions.

Action research involves change and the researcher is part of the change process (Cardno, 2005. Easterby-Smith et al. (2008, p.93) identify the two beliefs associated with action research designs: (1) the best way of learning about an organisation or social system is through attempting to change it, and this, therefore, should be an objective of the action researcher, (2) the people most likely to be affected by, or involved in implementing, these changes should be as far as possible involved in the research process itself. The researcher took part in the change by learning and understanding the Master's thesis students' performance issues and applied the three approaches (TOC, AI and Hybrid) to attempt to provide guidance to change and improve the students' performance. The outcomes of these changes through conducting action research, answered the researcher's research questions identified in section 1.2.

3.5 Time Horizon

Subsequent to the development of research strategies, the next layer that researchers have to consider, in designing research, is choosing a time horizon. With reference to the "research onion" of Saunders et al. (2011, pp.190-191), the two time horizons are (1) cross-sectional studies or "snapshot" of the study of phenomenon/phenomena at a particular time, and (2) longitudinal studies or a diary/a series of snapshots.

The main strength of the longitudinal study is its capacity to study change and development, as discussed in Saunders et al. (2011, pp.190-191). The web-based survey was introduced in order to find out the major and/or common problems/success among VUW Master's thesis students at a certain period of time (cross-sectional studies). The study was conducted over a period of time (Figure 3.4) in order to best answer all the research questions and develop some essential guidelines for Master's students.

3.6 Techniques and procedures

The discussion in this section is related to section 3.3: Methodological choices. Research techniques and procedures (data collection and analysis), according to Saunders et al. (2011, p.161), are the centre of the "research onion" (inside the five outer layers). The researcher

collected data and analysed it, using mixed methodologies: a web-based survey, individual interviews, and action research. In addition, the hybrid approach (TOC+AI) was designed and employed, with an aim to formulate essential guidelines for Master's thesis students, and others involved.

3.6.1 Quantitative (Web-based Survey)

The researcher publicised this research project via the newsletter of the VUW Postgraduate Students' Association (PGSA). The researcher decided to use the PGSA newsletter as a channel of communication to the research participants, because the PGSA has access to VUW postgraduate students' contact addresses (e-mail). The PGSA introduced this research project via its website (www.garoonpongsart.com), inviting 2008 Master's thesis students to take part by filling in the questionnaire provided there.

The website included a welcome screen, providing brief information about the research project and inviting the 2008 VUW Master's thesis students to take part by completing the questionnaire (survey). Details provided also included the research objectives, the researcher's and supervisors' contact addresses, and the online questionnaire's results (viewed by using a given password). Participants could enter from the welcome screen and then take about 10 – 15 minutes to complete the 28 questions (see Appendix A). After completion, each student received a six digit password to view his or her online results, in order to maintain confidentiality. The online results could be viewed after ten participants had taken part in the survey.

3.6.2 Qualitative (Individual interview)

From the web-based questionnaire (survey), the researcher recruited 24-30 interviewees who agreed to take part in an individual interview. Interview selection was according to certain criteria: age, gender, thesis stage, performance issues, and other characteristics of the interviewees that were based on question numbers 1-25 of the survey. These criteria were intended to help the researcher minimise the differences in interviewees' backgrounds and qualifications in order to enhance the comparison, in the light of the research questions. Interviewees who had similar qualifications and backgrounds, as well as those who had encountered the same group of performance issues, would be allocated to each of three different interview groups: TOC/AI/Hybrid (see Figure 3.4). Each group would have the same number of interviewees: 4 students.

After recruitment, the researcher conducted a series of individual interviews by employing one set of questions, TOC/AI/Hybrid, for the students in each separate group. The sets of questions for each approach are illustrated in Figures 3.1 and 3.2. The researcher used a combination of TOC and AI questions for the hybrid.

A single interview was used to enable the construction of all the TOC diagrams (prior to the action research phase). This is in contrast to the conventional approach, in which each diagram would be discussed with the owner and more questions asked before proceeding to the next.

After each 1-1.5 hour individual interview, the researcher composed a storyline for each student, applying the tool(s) provided by each approach, TOC/AI/Hybrid, step by step, in order to come up with individual activity (or implementation) plans to improve each interviewees' performance. This step was intended to answer the sub-research question regarding the relative impact of focusing on problems, success, or both, on the outcomes (activity plans).

To answer the main research question, the researcher then conducted action research with a 'matched' sample of interviewees, one from each of the three methods.

Theory of constraints (TOC) individual interview questions

1. What is your Master's thesis goal?
2. What are the critical success factors in reaching your Master's thesis goal?
3. What are the necessary conditions or major activities that are prerequisites to enhance critical success factor's achievement?
4. What is the problem or UDE (UDE = Undesirable effect) from your perspective?
5. How is the problem/UDE undesirable or bad?
6. In what way is it undesirable?
7. Why do you put up with this problem/UDE?
8. What objective is being jeopardised by the problem/UDE?
9. Is there a specific action resulting from the problem/UDE?
10. Is there a specific action causing the problem/UDE?
11. Does this problem/UDE create any conflict? What is the problem/UDE in conflict with?
Describe the conflict.

Figure 3.1 Theory of constraints (TOC) individual interview questions

Adapted to Master's thesis context from Dettmer, 2007 (first three questions) and
Cox et al, 2003 (last eight questions)

Appreciative Inquiry (AI) individual interview questions

- Without being modest, what do you value most about yourself and your study?
- What are the core factors that give life to your study?
- What would you describe as being a high-point experience in your university days when you were most alive and engaged? What happened? How was it? What are the key success factors that enabled you to obtain the achievements?
- What energises you during your Master's thesis journey?
- What are the 3-5 core strengths that can enhance your performance in doing a Master's thesis? Please describe those strengths?
- What are the three wishes to heighten vitality and health?
- What have you incorporated into your current study (doing a Master's thesis) from your past achievements?
- Imagine you have awakened from a long deep sleep. You get up to realise that everything is as you always dreamed it would be (in relation to your Master's Degree thesis). Your ideal state has become the reality. What do you see? What is going on? How have things changed? How does it feel?
- Imagine your thesis has just won an award as the outstanding thesis of the year from the World Master's thesis conference. What is said about your thesis as the award is dedicated? What are your supervisors, your school saying? What are your family members and your loved ones saying? What did it take to win the award? What are you doing that makes a difference?
- What three wishes do you have to enhance the vitality of your Master's Degree thesis?

Figure 3.2 Appreciative Inquiry (AI) individual interview questions

(Adapted from Orem et al, 2007 and Cooperrider et al, 2008)

3.6.3 Hybrid Approach:

The Hybrid Approach aims to focus on both problems and successes, by combining strengths from both TOC and AI, as a third alternative approach to improving Master's thesis students' performance, as shown in Figure 3.3.

Figure 3.3: The Proposed Hybrid Approach.

Step I: What is your goal? (Tool: IO Map - TOC)

The hybrid approach, developed from TOC and AI by the researcher, has the aim of constructing some guidelines for improving Master's thesis students' performance. The hybrid method is a combination of the two approaches: TOC (goal oriented) and AI (strength based). One of the findings of my research applying TOC to Master's Degree thesis students' problems (Pongsart 2005) is that the students must set a clear goal of what they wanted to achieve, in

order to avoid the lows. The proposed hybrid approach in this research employed the TOC IO Map as a tool to answer the first question in step I: What is your goal?

Step II: What is your current reality? (Tool: Cox et al.'s 8 questions and Current Reality Tree/CRT)

TOC provides a powerful tool to analyse the current situation: the Current Reality Tree (CRT). The CRT is one of the most popular TOC tools according to Kim et al. (2008). To solve complex issues, the CRT demonstrates its effectiveness with effect-cause-effect diagrams that seek to reveal the core problems linked to undesirable effects. To get rich data, in order to construct the CRT, Cox et al. (2003) provide a set of questions (see Figure 3.1) that ask the problem owners to tell their stories in depth. Using these questions, I hoped to gain clear access to the performance issues of my research participants, and to be able to continue the problem-solving process after the interviews.

Step III. What will be your “affirmative topic”? (Tool: Positive questions and Reframing from Appreciative Inquiry)

The Current Reality Tree (CRT) from Step II identifies what to change: the core problem(s). Step III introduces AI techniques to reframe the research participant's core problem(s) into an affirmative topic and asks him/her some positive questions, in order to construct the affirmative topic.

Steps IV and V Discovery and Dream

The researcher employed the first two Ds from the AI 4-D Cycle, Discovery and Dream. This step was to discover the high point experiences of the Master's thesis students who were recruited and allocated to the Hybrid approach. By doing this, it was an attempt to expand their hopes and dreams beyond boundaries, in order to envision the results (Cooperrider et al., 2008). The main reason for employing Discovery and Dream in this stage of a hybrid approach is to utilise strengths of the research participants, in order to enhance their success.

Step VI Design (Tool: Provocative Proposition & Future Reality Tree/FRT)

In this step, the researcher decided to follow the third D of AI, because the first three steps of AI (Discovery, Dream, and Design) require an input from one to another continuously. A provocative proposition based on the results yielded from Discovery and Dream phase was constructed, as per AI 4-D Cycle procedure and practice. However, the researcher would also

utilise the TOC Future Reality Tree (FRT) to construct and test potential solutions in this phase, before implementation.

Steps VII & VIII: What will be your prerequisite? (Tool: PRT) and create your own activity plan (Tool: Critical Chain)

For steps VII & VIII, the research employed two TOC tools, the Prerequisite Tree (PRT) and Critical Chain Project Management to create and implement an activity (action) plan, in order to improve and enhance Master's thesis students' performance.

Step IX. How to implement your plan in order to enhance your achievements?

After completing the VIII steps of the Hybrid approach, the researcher hoped to come up with win-win solutions and proposed implementation (activity) plans, for the interviewees taking part in this research. However, to successfully implement the activity plans, each student may have needed to adapt certain things to best fit their personality. According to Dettmer (2007, p.312), "an inadequate understanding of human psychology (and lack of strategy for dealing with it) is the single most frequent cause of system failure in most organisations". So the final step of this Hybrid approach was designed to provide the opportunity for the researcher and the interviewees to discuss other issues. These included "self-discipline", "procrastination", "responsibility", and other necessary conditions that would enhance the implementation plan.

3.6.4 Qualitative (Action research)

After applying each approach's tools to the information obtained from the individual interviews (step 2 of Figure 3.4), the researcher recruited three participants from each approach, TOC, AI and Hybrid, to participate in the action research, and then provided feedback to them. The main criteria for this recruitment were that all three participants should have experienced the same performance issues and have similar qualifications. The researcher met with each participant a further two times between September and December 2009, and conducted the following activities: provided feedback after the individual interviews, received comments from the research participants, followed up on the progress from the last meeting, discussed any new issues, applied the respective tools, and adjusted the new action plan in order to understand and improve each participant's performance.

Feedback was an integral part of the analysis process and its outcomes (in this case, individual action plans to enhance each interviewee's performance in doing a Master's thesis). According

to Denscombe (2007, p.126), action research insists that practitioners must be participants, not just in the sense of taking part but in the sense of also being a partner in the research. By providing feedback to the research participants and getting comments from them, the researcher and the participants played a partnership role. The researcher and the research participants also learned from each other; the researcher learned from the participants about their performance issues, while the research participants were offered specific suggestions on how to improve their performance issues, based on the techniques and tools offered by that particular approach. Both the researcher and the action research participants aimed to improve the performance issues of the participants.

In every meeting, the researcher received comments from each action research participant. These comments helped the researcher analyse the findings and see how effective the tools were from the research participants' point of view.

The first meeting (after the individual interviews):

- To follow up on progress after the activity plan was implemented by the interviewee (plan sent by e-mail after the individual interviews)
- To get comments from the participants on how effective the tools/approach are, according to the interviewees' point of view
- To discuss whether any existing/new performance issues need to be improved
- To apply the questions provided by the approach: TOC/AI/Hybrid
- To apply tools/techniques
- To create/adjust an activity plan

The second meeting (a minimum of four weeks after the first meeting)

- To follow up on progress after the activity plan has been implemented by each interviewee (plan sent by e-mail after the first meeting)
- To get comments from the participants on how effective the tools/approach are according to the interviewees' point of view
- To discuss whether any existing/new performance issues need to be improved
- To apply the questions provided by the approach: TOC/AI/Hybrid
- To apply tools/techniques
- To create/adjust an activity plan

From the two follow up meetings, the researcher analysed the effectiveness of each of the TOC/AI/Hybrid approaches, based on the feedback/comments received from the interviewees, and by comparing and contrasting the three approaches, in order to answer the main research question.

3.7 Chapter Summary

The researcher employed both quantitative and qualitative methods, including a qualitative longitudinal study (action research), in order to answer main and sub-questions of this research. The main question was to discover the utility of the methods, when applied separately or together, towards improving performance in an individual context: that of the Master's thesis students. The sub-questions considered the similarities and differences of the outcomes yielded from addressing the root cause of a problem and the root cause of success, and, whether some essential guidelines to enhance research students' success could be drawn from these findings. A depiction of the research design is in Figure 3.4. The findings from applying the TOC, AI and Hybrid methodologies are analysed in Chapters Four, Five and Six respectively, and compared in Chapter Seven.

Chapter Four: “Managing the lows”: Applying Theory of Constraints (TOC) to Master’s thesis students’ performance issues (Research findings, and Analysis)

Chapter Four presents the findings and analysis of the four selected Master’s thesis students from VUW, who took part in the Theory of Constraints (TOC) individual interviews and coaching sessions, as part of this research.

This chapter is divided into four main sections:

- (1) TOC interviewees
- (2) Applying *TOC Thinking Process and tools*, the process and tools for system improvements, to the four interviewees (TOC analysis)
- (3) Coaching sessions
- (4) Summary

4.1 TOC interviewees:

Four TOC interviewees were selected for this study and analysis (see Table 4.1). The main criteria for recruiting the interviewees were: gender, age, thesis stage, international/local student, and major performance issues encountered by the interviewees. The four TOC interviewees are referred to as Tarn, Tammy, Ton, and Tim. To aid clarity, all interviewees were assigned names starting with the appropriate letter to clearly signify the methodology used (T for TOC, A for AI, and H for Hybrid interviewees respectively).

TOC Interviewees’ name (not their real names)	Tarn	Tammy	Ton	Tim
Gender	Female	Female	Male	Male
Age	30<<30	30<<30	30<<30	30<<30
Local/International	International	Local	International	Local
Thesis stage	Data collection	Data analysis	Write-up	Finishing
Full-time/ Part-time study	Full-time	Full-time	Full-time	Part-time
Financing	Loan	Loan	Scholarship	Scholarship
Supervisor selection	By school	Only supervisor available	By school	Self
Thesis goal	Quality and on-time	Quality and on-time	Quality and on-time	Quality

TOC Interviewees' name (not their real names)	Tarn	Tammy	Ton	Tim
Three Major performance issues (Appendix A)	<i>Issue I: Knowing how to get started (A15)</i> <i>Issue II: Keeping the deadlines or timelines (A8),</i> <i>Issue III: Feeling my study valuable or worthwhile (A10)</i>	<i>Issue I: Knowing how to get started (A15)</i> <i>Issue II: Designing my study (A16)</i> <i>Issue III: Not knowing when to stop reading the literature (A19)</i>	<i>Issue I: Writing the results section (A34)</i> <i>Issue II: Reporting Data (A31)</i> <i>Issue III: Writing acceptable English (A22)</i>	<i>Issue I: Keeping the deadlines or timelines (A8)</i> <i>Issue II: Staying motivated (A1)</i> <i>Issue III: Writing a thesis (A37)</i>

Table 4.1: Characteristics of the 4 TOC interviewees

Based on the web-based questionnaire survey, there were similarities and differences among the four selected TOC interviewees in terms of characteristics. Tarn (female) and Ton (male) were international students who speak English as their second or third language. Tammy and Tim were local students, from New Zealand. All four students were 30 or below 30 years old. By the time the researcher conducted the TOC individual interviews, they were each in a different stage of their Master's thesis: data collection (Tarn), data analysis (Tammy), write-up (Ton) and Finished (Tim).

Certain factors may have had a critical impact on the students' thesis performance: whether full-time/part-time study, financing their theses, their selection of supervisors, and their individual thesis goals. Tim was the only part-time student, while the rest were full-time. The two females had student loans, while the two males were on a scholarship. In respect to the selection of supervisors, the two international students were allocated supervisors by their schools, while Tim selected his supervisor himself, and Tammy was told that her supervisor was the only person available for the role. Regarding their thesis goal, Tim was the only one who aimed at producing a quality thesis whereas the other three mentioned both quality and punctuality.

For the purpose of comparison with the Appreciative Inquiry (AI) interviewees (Chapter Five) and the Hybrid model interviewees (Chapter Six), the researcher selected the three major performance issues indicated by each TOC interviewee on their web-based survey as "high" or "very high" degree of difficulty (Refer to Table 4.1 and Appendix A) as the focused issues for the TOC individual interview. Tarn revealed that *Keeping the deadlines/timelines (A8)*, *Feeling her*

study valuable or worthwhile (A10), and *Knowing how to get started (A15)* were some of her major performance issues during the data collection stage. Tammy was also having a problem with *Knowing how to get started (A15)*, *Designing her study (A16)* and *Knowing when to stop reading the literature (A19)*. Being in the last two stages, the two males were experiencing writing issues. Ton, as an international student with English as his second language, disclosed that *Writing acceptable English (A22)*, *Writing the results section (A34)* and *Reporting data (A31)* were his major performance issues. Tim, a New Zealander, indicated *Writing a thesis (A37)* as one of his major performances issues as well as *Keeping the deadlines/timelines (A8)* and *Staying motivated (A1)*.

All the performance issues encountered by the four TOC interviewees, in the Theory of Constraints (TOC)'s context, can be considered as Undesirable Effects (UDEs) or symptoms. This terminology is used to distinguish it from the underlying problem that causes the UDE (Cox et al 2003, p.74). In addition, according to Dettmer (2007, p.13), most of the UDEs within a system are caused by a few critical root causes. He also explains that root causes are almost never superficially apparent. They manifest themselves through a number of UDEs linked by a network of cause and effect (see Current Reality Tree/CRT section 4.2.2). Thus, a system is affected by its weakest link: the critical root cause(s). One of the TOC principles stated by Dettmer (2007, p.13) regarding managing the constraints is that elimination of UDEs gives a false sense of security, while ignoring the underlying core problem. Solutions are likely to be short-lived. On the other hand, solution of a core problem simultaneously eliminates all resulting UDEs. The next step in improving Master's thesis students' performance issues is to employ the TOC Thinking Processes (TPs) and tools to address the root cause of their symptoms or UDEs.

4.2 Applying TOC Thinking Processes (TPs) and tools to the four TOC interviewees

The Theory of Constraints (TOC) is a goal-oriented methodology. Its main goal is to strengthen the weakest links to enhance ongoing improvements for a system. Goldratt (1990, p.4), the acknowledged founder of TOC, remarks that every system was built for a purpose and any action taken by any part of the system must be measured by its impact on the overall purpose. Therefore, "What is your goal?" is a critical question, one that Dettmer (2007) adds to Goldratt's version of the TOC Thinking Processes. Goldratt's original three critical questions are: "What to change?"; "What to change to?", and "How to cause change?"

In order to understand and help improve Master's thesis students' performance by applying the Theory of Constraints (TOC) Thinking Processes (TPs) and tools, the researcher followed the original method invented by Goldratt and his team members (1990s), combined with the modified version by Cox et al. (2003) and the latest version of Dettmer (2007). This is clearly outlined in the Chapter Three: Research methodology. The combined version is organised into four steps:

- (1) What is your goal?
- (2) What to change?
- (3) What to change to?
- (4) How to cause the change?

4.2.1 What is your goal?

An Intermediate Objectives (IO) Map is a graphical representation of a system's goal, critical success factors (CSFs), and the necessary conditions (NC) for achieving them. These elements are arrayed in a logically connected hierarchy, with the goal at the top, the CSFs immediately below it, and the supporting NCs below them. Each of the entities in the IO Map exists in a necessity-based relationship with the entities below it. The CSFs could be considered major milestones, or terminal outcomes, on the journey to the goal. NCs represent the conclusion of significant activities required to complete the CSFs.

(Dettmer, 2007, p.68)

During the TOC individual interviews, each interviewee was asked to fill in the Intermediate Objectives (IO) Map (see Figures 4.1-4.4) (see Dettmer, 2007) to clarify his/her goal in doing a Master's Degree thesis, including the critical success factors and necessary conditions in order to achieve that goal. Dettmer (2007, p.5) also suggests that the goal setter ought to be the system's owner(s). The main purpose is to compare how seriously problematic issues block each student from achieving his/her goal, which is discussed in the next section, what to change?

With reference to the TOC interviewees' Intermediate Objectives (IO) Maps demonstrated in Figures 4.1-4.4, each student appeared to have his/her own goal in doing a Master's Degree thesis in line with the assumption (described in Dettmer 2007, p.69) that the goal will be unique to each system. Tammy's goal was to get a qualification, but Ton focused closely on producing

a quality piece of research that would fill a research gap of the subject in his home country. However, there is a commonality in Tarn and Tim, in terms of their future and/or career orientation goals: to gain the skills and education level needed to get a job that will inspiring and worth doing (Tarn), and a quality thesis that equips me for my future (Tim).

Figure 4.3: Ton's IO Map

Despite experiencing time constraints in filling in the IO Map, all four TOC interviewees seemed to clarify their goals well, especially Tarn and Ton, who identified their Critical Success Factors (CSFs) and Necessary Conditions (NCs) in detail (Figures 4.1 and 4.3). According to Dettmer (2007, p.70), determining what needs changing requires that we first know what we are trying to achieve – *where we want to be when all is said and done*. The purpose of “change” in a TOC context means improvement. Goldratt (1990, p.10) says, “We cannot improve something unless we change.” He argues that not every change is an improvement, but certainly, every improvement is a change. Therefore, a clear goal of what they want to achieve must be one of the success factors that would help each of the students make a positive change in their thesis performance.

Figure 4.4: Tim's IO Map

Dettmer's (2007) IO Map provides the two substantial supporting layers for achieving the stated goal: Critical Success Factors (CSFs) and Necessary Conditions (NCs). According to the definition provided by Dettmer (2007), CSFs are high level requirements or terminal outcomes in attaining the goal and each CSF has some number of NCs (supporting activities to CSF), more focused and detailed efforts that are prerequisites to its achievements. Dettmer (2007) also states that normally each IO Map comprises 3-5 CSFs with a maximum of two main supporting NCs to each CSF, and some NCs can enhance more than one CSF. In their individual IO Maps, Tarn, Tim, and especially Ton, outlined more than one entity for each layer of CSFs and NCs. Tammy constructed one simple vertical IO Map with one CSF, and two layers of NCs.

Interestingly, one person's goal can be another's Critical Success Factor (CSF), and vice versa. Ton's goal was to produce a quality piece of research which could be one of the milestones or CSFs for Tim's goal: *a quality thesis that equips me for my future*. Similarly, in order to get a qualification (Tammy's goal) *one must produce a quality piece of research* (Ton's goal). Dettmer (2007, p.76) explains that there are many levels of goal setting in organisations, a *process level* and a *system level*, and within the same organisation or company a process level's goal is likely to be a necessary condition or critical success factor of that higher-level company IO Map. Although the four TOC interviewees were from different schools within Victoria University of Wellington (VUW), their common mission is pursuing a Master's Degree thesis, which may be analogous to one system. Each student's perspective in goal setting can be treated as a different part of the system. Ton's goal may represent his current ambition in conducting meaningful research, while Tammy's indicated her hope of finishing a thesis and getting a qualification: a Master's Degree. Tarn and Tim share a common and, arguably, a higher-level goal. Both students aim for a future career beyond their Master's Degree.

However, some Critical Success Factors (CSFs) or terminal/high-level outcomes defined by the interviewees needed to be refined in accordance with Dettmer (2007)'s definition. The examples of replacement/revision of CSFs are demonstrated below:

- From Figure 4.1: "CSF1: I have to manage my time" should be replaced by "CSF1: Quality time management".
- From Figure 4.2: "CSF1: doing the work" should be replaced by "CSF1: Completion of the work".

- From Figure 4.3: “CSF2: Frequent consulting with my supervisor” should be replaced by “CSF2: Quality and timely meeting with my supervisor”.
- For Figure 4.4, all 4 CSFs fit well with the goal and the definition of the CSF.

According to Tracy (2003, pp.8-9), *Clear goals enable you to step on the accelerator of your own life and race ahead rapidly toward achieving more of what you really want.* A clear goal of embarking on a higher degree of study will not only point you in the right direction, but it is one of the most important motivating factors to enhancing your success. Pursuing a higher degree is a huge investment for many parties: students, parents, scholarship donors, and all concerned. Success versus failure yields an extremely large gap. Completing the IO Map offers Master’s thesis students an opportunity to re-think the main purpose of pursuing this higher study as well as crystallising the main criteria for achieving it, including the activities required in order to meet the stated criteria and accomplish the set goal. During the thesis process, students can revisit the stated goal and construct a lower level goal for any smaller scope, short term current activity, which is in line with the main goal. For example, Tarn’s set goal was to gain the skills and education level needed to get a job that would be inspiring and worth doing. Her two revised Critical Success Factors (CSFs) are: quality time management, and supportive environments. Time management, a common imperative entity to most TOC interviewees in this research, could be one of Tarn’s continuous IO Map’s second level goals, which would enhance her quality and on-time thesis: the common goal among most of the web-based survey’s participants (78%). In addition, during each new stage, e.g. Data analysis, each student should review or revise his/her IO Map accordingly.

In the process of applying TOC Thinking Processes (TPs) and tools to the four TOC interviewees, after determining the system (each student’s) goal, the second step is to analyse the current reality of each student’s performance issues and identify what prevents the student from achieving his/her goal. This step is about answering the second TOC critical question: What to change?

4.2.2 What to change?

Knowing what to change requires a thorough understanding of the system’s current reality, its goal, and the magnitude and direction of the difference between the two (Dettmer, 2007, 13). With reference to section 4.2.1, the goal in undertaking a Master’s thesis had been defined by

each of the four TOC interviewees: Tarn, Tammy, Ton, and Tim. From the students' answers to the TOC interview questions (Chapter 3), the researcher composed a storyline. This was based on their three major performance issues, in order to apply the Current Reality Tree (CRT) to understand and analyse the current situation of each TOC interviewee. Each storyline contained the interviewee's answers to one performance issue. There were three storylines of each student. The details in each storyline are displayed and discussed in this section.

Tarn's feelings of (not) Knowing how to get started, Keeping the deadlines/timelines, and Feeling my study is valuable or worthwhile in the TOC context, were called symptoms or Undesirable Effects (UDEs) as mentioned earlier in this chapter. These UDEs were distracting and had a great impact on her thesis performance, according to Tarn's storylines:

This problem makes the thesis task less manageable, because if you do not know where to start, it's difficult to get any work done.

Problems with getting started also limits the time you have to actually work on what you're doing, jeopardising the quality of your work.

Procrastination, distraction, social life, and sometimes motivation, are resulting from this problem.

This problem [Feeling my study is valuable or worthwhile] makes you uncertain about what you are doing.

According to Tarn's stories, it was difficult to decide what the constraints were, unless critical root causes could be found. TOC avoids addressing the symptoms or UDEs. Goldratt (1990, p.32) advises that *we should strive to reveal the fundamental causes, so that a root treatment can be applied, rather than just treating the leaves – or symptoms*. TOC provides the Current Reality Tree (CRT) as a tool to analyse current situations and help find the critical root cause of a problem.

Current Reality Tree (CRT): a logic-based tool for using cause-and-effect relationships to determine root problems that cause the observed undesirable effects of the system. Dettmer (1998, p. 28) says, *The CRT tells us what to change – the one simplest change to make that will have the greatest positive effect to our system.*

(Cox et al, 2003, p.74)

To construct the Current Reality Tree (CRT) of each TOC interviewee, the researcher transferred the UDEs from each interviewee's storylines into a format called "entity" with a three digit number, i.e. 101, 201, or 301. The first digit, 1, 2, or 3, represents an entity from the performance issue 1, or 2, or 3 respectively. The last two digits were allocated by the researcher starting from the base to the top of the CRT after completing the tree. The process of organising the UDEs is called the "snow flake approach" (Cox et al., 2003, p.135). Using this approach, the researcher connected each UDE, one-by-one, to others, identifying the effect entity on top of the cause entity, till all entities (UDEs) were connected. Additional entities were added as needed to enhance validity of the connections between the two existing entities, using the TP protocols as in the Categories of Legitimate Reservation (Cox et al., 2003, p.83). The additional entities were in line with each student's storylines. Each performance issue was constructed into one CRT. Then, the combined CRT of each interviewee was constructed and demonstrated in Figures 4.5 – 4.8.

According to the four interviewees' Current Reality Trees (CRT), there were similarities and differences in terms of the effect-cause-effect linkages. Although each TOC interviewee experienced different issues (refer to Table 4.1), there were some common UDEs found in their CRTs. Tarn, Tammy, and Tim talked about their first experience in doing a Master's thesis: *I lack knowledge to do research* (Tarn's entity 301), *I am new to a Master's thesis* (Tarn's entity 302), *I find that a Master's thesis is a different experience from everything else, like undergrad studies and my first year (Honours) papers* (Tammy's entity 101), and *I have never done a thesis before* (Tim's entity 102/201/301). Coincidentally, all three interviewees, Tarn, Tammy, and Tim, identified the same UDE that they *were not told or given enough information or guidelines about doing a Master's thesis* (Tarn's entity 105, Tammy's entity 102/202, and Tim's entity 202). All the previously mentioned entities, Tarn's entity 301, 302, 105, Tammy's entity 101, 102, 202, and Tim's entity 102, 201, 301, 202, have no entity from a lower level connected to these entities; these were considered as the root causes of a problem according to TOC. Dettmer (2007, p.102) says that the root cause is the beginning of the cause-effect-cause relationship. The root cause needs to be managed in order to improve the current situation.

Figure 4.5: Tarn's Current Reality Tree (CRT) constructed from three performance issues (I: Knowing how to get started, II: Keeping the deadlines/timeline, and III: Feeling study valuable/worthwhile)

Figure 4.6: Tammy's Current Reality Tree (CRT) constructed from three performance issues (I: Knowing how to get started, II: Designing my study, and III: Not knowing when to stop reading the literature)

Figure 4.7: Ton's Current reality Tree (CRT) constructed from three performance issues (I: Writing the results section, II: Reporting Data, and III: Writing acceptable English)

Figure 4.8: Tim's Current reality Tree (CRT) constructed from three performance issues (I: Keeping the deadlines/timeline, II: Staying motivated, and III: Writing a thesis)

The root causes of each student's performance issues, yielded from the CRT analysis, had to be managed. According to Scheinkopf (1999, p.145), to manage the root causes, a system's owner needs to determine the scope's limit to improve the issue. In defining the boundaries to best address the right root causes, there are two crucial factors, *a span of control* and *a sphere of influence*, to be considered. Dettmer (2007, p.70) explains that the span of control includes all of those things in our system over which we have unilateral authority to decide to make changes. The sphere of influence obviously is substantially larger than the span of control where we can influence to some degree, even if we cannot exercise unilateral control over them. Authorities and controls are needed to cause change and enhance the success of an ongoing improvement process of any system.

Taking into consideration that the span of control and the sphere of influence of each system are crucial factors for choosing which root cause to address, the researcher identified that, among the four TOC interviewees, 30% (5 out of 17) of the TOC interviewees' root causes were within their span of control, 70% (12 out of 17) of those root causes were within their sphere of influence (see Table 4.2): a wider scope. These percentages indicate that 30% of the root causes are uncontrollable, being outside both the sphere of influence and span of control of these 4 TOC interviewees. The high percentage of uncontrollable root causes can cause a high degree of difficulty, in choosing which root causes to manage, as well as improving their thesis performance due to the level of authority and control, as previously mentioned. There are certain keywords that represent an entity beyond a span of control, for example, "*I am/was not given/told...*" (Tarn's entity 105 and Tammy's entity 102/202), "*I am new to...*" or "*I have not done it before*" (Tarn's entity 302, Tammy's entity 101, 201/301). The entities with "bold" letters are considered as each TOC interviewee's root cause (s). The common characteristic of the selected root causes was that all of them were within each student's sphere of influence. More details and explanation on the selected root causes are discussed later in this section. The list of root causes for each TOC interviewee was classified into *the span of control* and *the sphere of influence*, as shown in Table 4. 2.

Apart from the two crucial factors, a span of control and a sphere of influence, a timing issue and the student's thesis stage are also important to take into consideration before selecting which root cause to address for each TOC interviewee. According to Dettmer (2007, p.13), an optimal system solution deteriorates over time as the system environment changes, and a process of ongoing improvement is required to update and maintain the effectiveness of a

solution. Each thesis stage was a new environment for Master's thesis students. Most of them were pursuing a one year research project (as a full-time student) for the first time; *I am new to a Master's thesis* (Tarn's entity 302) or *I have not done research/a thesis before* (Tammy's entity 201/301 and Tim's entity 102/201/301). At each thesis stage, there is a certain mission that each research student needs to perform and accomplish. For example, in the data collection stage, Tarn had to plan how to conduct her survey and perform her fieldwork. Based on Tarn's CRT (Figure 4.8), as a new research student, she was not sure if she used the right method, as she could not see the research's contribution yet. Tarn said, *When I worked on the questionnaire, I had some doubts.... It can be difficult to see the contribution of your work right away... This problem makes you uncertain about what you are doing. It makes you feel less sure if this is what you should be doing.* From Tarn's negative feelings about her research at this stage, the critical root cause of her problem needs to be addressed in order to help her gain confidence and move forward to the next thesis stage.

TOC interviewee	Root cause (entity number and description)	Span of control	Sphere of influence
Tarn	Entity 101: I am very bad at making decisions.	Yes	Yes
	Entity 105: I was not given enough information about doing a Master's thesis	No	Yes
	Entity 301: I lack knowledge to do research	Yes	Yes
	Entity 302: I am new to a Master's thesis	No	No
Tammy	Entity 101: I find that Master's thesis is different from everything else, like undergrad studies and my first year (Honours) papers (I have never done it before).	No	No
	Entity 102/202: I am not told about any clear research guidelines by my supervisors and others.	No	Yes
	Entity 108: I have to change my research topic after I had already worked on my thesis for several months.	No	Yes
	Entity 201/301: I have not done research & Master's before.	No	No
	Entity 303: I am perfectionist	Yes	Yes
Ton	Entity 201: I lack of experiences/skills in reporting the qualitative data.	Yes	Yes
	Entity 301: My first language is not English.	No	No
	Entity 302: My English expression is influenced by my homeland's culture.	No	Yes

TOC interviewee	Root cause (entity number and description)	Span of control	Sphere of influence
Tim	Entity 101: I have other commitments in my life besides doing a thesis.	No	Yes
	Entity 102/201/301: I have never done a thesis before.	No	No
	Entity 103: I do not prioritise my thesis as the first priority.	Yes	Yes
	Entity 202: I was not told about how to write a thesis.	No	Yes
	Entity 302: I am not motivated for doing a thesis.	No	Yes

Table 4.2: TOC interviewees' root causes of their performance issues versus span of control and sphere of influence

Which root cause is critical for Tarn and the other three TOC interviewees: Tammy, Ton, and Tim? With reference to Table 4.2 and taking the timing issue, together with each student's thesis stage, into consideration, the researcher recommended the following critical root causes for each student to be addressed (Table 4.3):

TOC interviewee	Critical root cause (entity number and description)	Span of control	Sphere of influence
Tarn	Entity 101: I am very bad at making decisions.	Yes	Yes
Tammy	Entity 102/202: I am not told about any clear research guidelines by my supervisors and others.	No	Yes
Ton	Entity 201: I lack experience/skills in reporting qualitative data.	Yes	Yes
	Entity 302: My English expression is influenced by my homeland's culture.	No	Yes
Tim	Entity 101: I have other commitments in my life besides doing a thesis.	No	Yes
	Entity 103: I do not prioritise my thesis as the first priority.	Yes	Yes
	Entity 302: I am not motivated for doing a thesis.	No	Yes

Table 4.3: TOC interviewees' critical root causes of their performance issues versus span of control and sphere of influence

Tarn, who was collecting data, needed to improve her decision making (critical root cause/entity 101) as her first priority. Being unable to make decisions on some issues related to her research had caused her confusion and difficulties. Notably, the ability to make good

decisions with effective thinking capability is one of the required skills for Master's thesis students (Hart, 2006, p.7). With reference to Tarn's Current Reality Tree (CRT) in Figure 4.5, the critical root cause, entity 101 (I am very bad at making decisions), combined with some other root causes, i.e., entity 105 (I was not given enough information about doing a Master's thesis) when she had to choose only one research topic (entity 106) and she had a wide range area of interest (entity 104) later led to her confusion (entity 107). Her confusion under time restrictions (entity 108) caused a difficult situation in selecting a good topic (entity 109) and later affected her progress in doing research (see the upper entities with yellow highlighted in Tarn's CRT). Focusing on and managing this critical root cause (entity 101) rather than the others (entity 105 and 301) will not only eliminate the Undesirable Effects (UDEs) caused by this entity, but will improve Tarn's performance in doing her Master's thesis. The other root causes, entity 105 and 301, are not critical. Although, the entity 105 is in Tarn's sphere of influence, it is difficult to address. Because this entity (105) was not within Tarn and other Master's thesis students' control, it mainly relied on the school or faculty's policies and practices. Entity 301 (I lack knowledge to do research) must be Tarn's perception, because all research students at VUW must pass a research paper/course before pursuing a one year thesis. This is the main reason why this entity was classified into both Tarn's span of control and sphere of influence (Tables 4.3 and 4.4).

Tammy, who was analysing data, must manage the critical root cause entity 102/202 rather than the other two entities, which were also within her span of control and/or sphere of influence: entity 108 (I have to change my research topic after I had already worked on my thesis for several months) and entity 303 (I am a perfectionist). Although the critical root cause entity 102/202 is only within her sphere of influence, not span of control, at the data analysis stage which is very close to the completion, it was imperative to discuss any unclear research guidelines with her supervisors and/or her school postgraduate co-ordinator. By having clear research guidelines, Tammy could allocate her time well on the remaining tasks and stay focused on her data analysis process without the constraint of (not) Knowing how to get started. On the contrary, the unclear research guidelines could devastate all of her research objectives (entities 116, 212 and 314) by their weakest links (refer to all yellow entities 102/202, 105, 103, 104/204, 106, 107, 206, 114, 111, 115, 209). Despite being one of the branches of the weakest links, the other two root causes (entities 108 and 303) were not critical at this state: data analysis. Entity 108 (I have to change my research topic after I had already worked on my thesis for several months) was not crucial anymore, as Tammy had already chosen a

new research topic. For the root cause entity 303, being a perfectionist caused Tammy's worrying (see Tammy's CRT, Figure 4.6 with all light green entities connected from entity 303). Tammy's perfectionism (her claim) forced her to search more and reach more literature (entity 307), worrying that she might miss something important (entity 304). Finally, she ended up with too many references (entity 309), which caused difficulties in looking for specific information (entity 310). This was a time consuming task (entity 311) that finally delayed her thesis work (entity 209/312). However, being a perfectionist combined with motivation and/or good guidance may enhance Tammy and many research students' success. Thus, the perfectionist issue is the next priority to manage, after the critical root cause entity 102/202: getting clear research guidelines.

Ton was writing up his last few final thesis chapters and had only two months left before his official thesis deadline. It was recommended he tackle two critical root causes, which were within his span of control and/or sphere of influence: entity 201 (I lack experience/skills in reporting qualitative data), and entity 302 (My English expression is influenced by my homeland's cultures). At the write-up thesis stage, Ton had to report and analyse the qualitative data, but his lack of skills in reporting qualitative data, combined with his English expression, caused constraints with its links, effect-cause-effect relationships, of more than half of the existing entities in Ton's CRT (see all light yellow entities in Figure 4.7). The two critical root causes, combined with some other causes, jeopardised Ton's current thesis deadlines (entity 207/313), his desire in writing (entity 312) including his research's identity (entity 120) and aggravated his emotional state, feeling sad and angry (entities 113 and 109/310) as well as frustrated/disappointed (entity 210). These two critical root causes needed to be fixed, in order to help Ton's improve his thesis performance before at this stage.

Tim had just submitted his thesis, but his stories describing performance issues as a part-time local Master's thesis student are worth analysis. The three selected critical root causes, excluding the root cause which was not in either his span of control or sphere of influence (entity 102/201/301, refer to Table 4.3), were entity 101 (I have other commitments in my life besides doing a thesis), entity 103 (I do not prioritise my thesis as the first priority), and entity 302 (I am not motivated for doing a thesis). These three critical root causes, combined with a few other entities caused by the root cause entity 102/201/301 and time constraints (entity 311), jeopardised his aim of finishing a quality thesis on time. Lacking motivation threatened his enjoyment in doing a thesis (entity 304), caused the laziness (entity 305), and negative

behaviour (entity 305). The negative consequence of being unmotivated, combined with the other two critical root causes, entities 101 and 103, impacted severely on his improper allocation of time to his thesis tasks (entity 105, 106/310). Unfortunately, a one year Master's thesis seemed not long enough (entity 311: time constraints), the previously mentioned effect-cause-effect links forced Tim to work on his thesis in a rush (entity 313) and this certainly jeopardised the quality of his thesis (entity 212/315). When a poor quality thesis needed revisions (entity 316 and 317) within the time constraints, the most undesirable effect took place, entity 109/318 (I cannot complete a quality thesis on time). The TOC analysis of Tim's case demonstrated what differences it would make, if Tim could have managed the three critical root causes, entity 102, 103, and 302, earlier.

The Current Reality Tree (CRT) for each TOC interviewee (Tarn, Tammy, Ton, and Tim) revealed the current situation of their three performance issues in a format of effect-cause-effect relationships and helped find the answer to the second TOC critical question: what to change. The answers yielded from the CRT of each interviewee, despite being in different thesis stages, had some common factors, like being new to independent study, in their critical root causes. The next TOC tool, the Evaporating Cloud (EC) was employed to help these interviewees find solutions in order to strengthen the weakest link: the critical root causes. The next step of TOC Thinking Processes (TPs) with the EC tool, aims to answer the third TOC critical question, what to change to? – by managing the critical root cause (s) yielded from the CRT.

4.2.3 What to change to?

At this stage, in order to improve the thesis performance of the four TOC interviewees (Tarn, Tammy, Ton, and Tim), the answer to “What to change?” from section 4.2.2, is managed by framing it into a conflict, finding a solution for the conflict, and testing the solution. TOC frames a problem as a conflict, a problem takes place where a conflict existed, and employs TOC Evaporating Cloud (EC) to help frame a problem and find solutions to eliminate the conflicts. According to Dettmer (2007, p.161), the solution yielded from the EC must be new, breakthrough, and win-win, but avoid compromise. By employing the EC to the critical root cause of each TOC interviewee (Figures 4.9-4.12), the root cause can be framed into two-sided conflicts, entity D and entity D' (conflicting prerequisites) within the same system. Entity A, in line with the IO map identified by each student, is a common objective for both D and D'. In order to achieve the objective (entity A), the requirements (entity B and entity C) are required

for each side of the conflict: D and D'. (D' is short for Not D, emphasising the premise that D and D' cannot hold simultaneously). The EC of each TOC interviewee is demonstrated next.

Evaporating cloud (EC): a logic-based tool for surfacing assumptions related to a conflict or problem. Once the assumptions are surfaced, actions to break an assumption and hence solve (evaporate) the problem can be determined. **Cox et al. (2003, p.74)**

4.2.3.1 Tarn's Evaporating Cloud/EC:

The critical root cause of Tarn's performance issues revealed from her Current Reality Tree (CRT) according to section 4.2.2 was entity 101: I am very bad at making decisions. Tarn's primary performance issues were: (I) Knowing how to get started, (II) Keeping the deadlines/timeline, and (III) Feeling my study valuable/worthwhile. The three issues were related; (according to Tarn) *If you do not know where to start, it's difficult to get any work done and This problem creates a time conflict.* In addition, when talking about performance issue III, Tarn said, *This problem makes you uncertain about what you are doing...uncertainty makes you feel less confident, not being entirely sure...* Tarn also said: *The longer I took to decide, the less overall time I had.* Therefore, her performance issues critical root cause was reframed into two-sided conflicts: D (I must spend enough time learning from research experts on my research project) and D' (I must spend enough time on my own working on my research project). The assumption behind the conflicts was that she could not spend too much time on both entities (activities) due to her time constraints. Tarn had certain deadlines to complete her thesis. However, her main goal of doing the Master's thesis according to her IO Map (Figure 4.1) was to gain the skills and education level needed to get a job that would be inspiring and worth doing. Unfortunately, while pursuing a Master's Degree, the ability to make decisions was the constraint, blocking her from achieving her set goal.

As previously mentioned, the common objective of the conflicting actions, D and D', was adapted from Tarn's IO Map's goal in pursuing a Master's thesis: to gain research skills and Master's Degree for future's inspiring and worthwhile job (entity A). In order for Tarn to achieve her objective as she wanted, according to entity D, she must be able to make good decisions on her thesis project (entity B). From the lower side (ACD') of Tarn's EC, the prerequisite enhanced the link between entity A and D' is entity C (Tarn must focus well on her thesis project). Each link between the two entities connected by an arrow, including the

conflict D and D', is existed because of the assumption that underlined the relationship of each demonstrated in the lower part of Figure 4.9.

According to the TOC EC procedure, in order to terminate an existing conflict, at least one of the underlying assumptions of the conflict must be eliminated by creating a vigorous solution that can cause great improvements to the system (Dettmer, 2007). BD (By spending enough time on my own making decision helps making good decisions) is an invalid assumption within a Master's thesis context, including Tarn's. Although a Master's thesis is an independent study in which thesis students select their own research topics, plan their own studies, and conduct their own research, most of the Master's thesis students are doing a thesis for their first time. Therefore, they need research guidance, and supervision. Tarn must not spend time on her own making decisions regarding any critical issues related to her research/thesis, especially when she realised that, *I am very bad at making decisions, I linger a lot*. Once a research student

encounters a serious problem related to his/her research project, it is essential to consult with a supervisor. Injection is a term used in TOC EC, which means a solution that can make the existing assumption invalid. **Good guidelines from my supervisor help in making good decisions on my research project, was the injection to the assumption BD that could evaporate Tarn's EC.** However, this solution needed to be tested before implementation according to the TOC EC processes, section 4.2.3.5.

4.2.3.2 Tammy's Evaporating Cloud/EC:

Tammy's Evaporating Cloud (EC), Figure 4.10, demonstrates underlying conflicts of the critical root cause entity 102/202 (I am not told about any clear research guidelines by my supervisors and others) that yielded from Tammy's CRT (Figure 4.6). The conflicts were: D (I must spend enough time reading related articles/journals, and reviewing the literature) and D' (I must spend enough time writing and analysing the research data of my thesis). According to Tammy: *Getting started is unclear. Where should you start? You have to do the literature review...But do you research until you finish the literature review? Or do you do both at the same time? It is not clear and I am not really sure. I am not told about the clear guidelines.* Tammy was analysing data when she joined the TOC interview. She was confused and having conflicts whether or not to continue reading while analysing data, because there were no clear guidelines given.

Despite being on a different side of the conflict cloud, D and D' had a common objective of getting a qualification or a Master's Degree (entity A). In order to achieve the objective, entity B (she must produce a quality thesis) or entity C (she must complete her thesis) were the requirements for the upper side and the lower side of the conflict cloud respectively. For example, in order for Tammy to get a qualification (entity A), she must produce a quality thesis (entity B) and in order for Tammy to produce a quality thesis (entity B), Tammy must spend enough time reading articles, journals, and review the literature thoroughly (entity D). On the lower side of Tammy's EC, in order to Tammy to get a qualification, she must complete her thesis (entity C) and in order for Tammy to complete her thesis she must spend enough time writing and analysing the research data of her thesis.

Both an upper side (ABD) and a lower side (ACD') of the cloud were valid, because there was at least one underlying assumption of the relationship of AB, BD, AC, CD', and DD' (see the

block of assumptions in Figure 4.10). The aim of employing the Evaporating Cloud (EC) was to frame the core conflict, identify assumptions behind the link of each entity, and find the most promising solution or injection to invalidate the assumption(s) and evaporate the conflict cloud.

The assumption DD'2 (I cannot decide what to do because I do not get clear research guidelines from my supervisors and the school) was invalid. Although Master's thesis study is an independent study, clear research guidelines on certain procedures from the supervisor(s) and/or the school were a must, in order to enhance the students' success. Based on Tammy's story and her Current Reality Tree (CRT – Figure 4.6), lack of clarity not only created uncertainties, but also lost time. Her ethical application took almost two months to be approved and Tammy had to start over again after several months working on her first topic. In the worst case, unclear guidelines could jeopardise all of her objectives, including the chance to get a qualification (on time).

Working on the analysis stage is crucial; the analysis is one of the most important chapters of a thesis, and the poor interpretation in this chapter could become one of the weakest links in the whole thesis. Tammy needed to get clear research guidelines to guide her analysis before it is too late. Therefore, the promising injection or the solution for solving the conflict is that Tammy must organise a special meeting with her supervisor and/or with the postgraduate coordinator of her school. Tammy needs to be provided with clear research guidelines in respect of the remaining research process and procedures, in order to improve her thesis performance and enhance her success of getting a qualification. She also needs close supervision to improve her data analysis. This solution needs to be tested before implementation. The process of testing the solution is discussed in section 4.2.3.5.

4.2.3.3 Ton's Evaporating Cloud/EC

The critical root cause of Ton's performance issues as identified in his Current Reality Tree (CRT) in section 4.2.3.3 seemed different from the other three TOC interviewees (Tarn, Tammy, and Tim). Despite having English as a second language, Ton seemed confident in using English, especially in the stage of writing, and had nearly completed all of his thesis chapters. However, his three performance issues (writing the results section, reporting data, and writing acceptable English) made him stop and think: *The way we express ourselves is influenced by our culture, by our nature, in being polite.* The way Ton expressed himself in his thesis writing became the critical root cause, according to the current reality from his CRT.

Figure 4.11: Ton's Evaporating Cloud (EC)

With reference to Ton's EC (Figure 4.11), Ton's current critical root cause created a conflict; he could not decide if he should keep his own voice in his thesis (entity D) or he should change his writing style according to his supervisor's advice (entity D'). The conflicts challenged Ton's ego (Ton's words), thinking that his supervisor might have overlooked or not recognised good parts of his writing (entity 105, Figure 4.7). Ton mentioned: *He questions more about what I have not done or what I have done wrong, rather than what I have done. To me, if I compare myself with others, I have accomplished more, but my supervisor seems not to recognise that.* The conflicts became the main constraint that blocked Ton from achieving his goal. Within Ton's system, the two conflicting entities in Ton's Evaporating Cloud (EC), strive for the same objective: to produce a quality thesis (entity A). There are two prerequisites entities, entity B (I must have my own identity in my thesis) and entity C (I must write standard academic English in my thesis), for the upper side (ABD) and the lower side (ACD') of Ton's

EC. Furthermore, each side of the cloud is connected by an arrow with underlying assumption(s) validated the relationships of the two entities: AB, BD, AC, CD, and DD' (conflicted).

To evaporate Ton's EC, the underlying assumptions, AB (I believe that my own identity is crucial for a quality thesis) and DD' (I cannot do both because of time constraints), can be injected or eliminated. Based on Ton's Current Reality Tree (CRT), being asked to revise the thesis and losing the identity in his masterpiece of work, the Master's thesis, Ton was unhappy (entity 191/293/391), which jeopardised one of his milestones (Critical Success Factor/CSF3), as stated in his IO Map (Figure 4.3). He needed clear explanations that an English language Master's thesis must be written to the required standard and accepted by the school's academic examiners (Injection 1). Furthermore, the assumption behind his conflicts, DD': I cannot do both because of time constraints, was valid, due to the fact that Ton was a deadline-oriented student (entity 121/209). In fact, students' own voices can be maintained in their thesis, but the main context must be written according to standard academic English: injection 2. The solutions (injections1 and 2) found will be tested.

4.2.3.4 Tim's Evaporating Cloud/EC

According to Tim's Current Reality Tree (CRT), Figure 4.14, the three related critical root causes, entity 101 (I have other commitments in my life besides doing a thesis), entity 103 (I do not prioritise my thesis as the first priority), and entity 302 (I am not motivated for doing a thesis), were reframed into two conflicting entities: D (I must spend enough time sharing my thesis experiences with people around me), and D' (I must spend enough time learning from my supervisor and related sources how to do a quality thesis), Figure 4.15. The critical root causes encountered by Tim may reflect a part-time students' life (working full-time and doing a Master's thesis at the same time). According to Tim's storyline and CRT (Figure 4.8), the three root causes made it hard for Tim to decide how to allocate his busy time to perform several important tasks, including personal life commitments, in order to achieve his objective of producing a quality thesis that equips him for his future (entity A). To accomplish the objective, there are two requirements (one on each side of conflict in Tim's EC): Tim must be motivated well by people (family members, supervisors, friends, and officemates) around him (entity B), and Tim must learn how to produce a quality thesis (entity C).

There are underlying assumptions, AB, BD, AC, CD, and DD', that validate the existing relationships between the two-sided conflicts: ABD and ACD' (Figure 4.12). However, the typical assumption DD' (I have time constraints) among Tim, Tarn and Tammy was, in fact, invalid for Tim. Tim identified NC211 in his IO Map (Figure 4.4) that "time management" was one necessary activity that could enhance his goal's achievement. Although Tim was a 9 to 5 office worker, he could allocate his time by meeting his good friends and family members after his office hours during the week, and spending his weekends working on his Master's thesis. In addition, Tim could also use his annual leave as a buffer (providing additional time) for his thesis (Injection DD'). According to TOC buffer management, an additional 30% is required for normal projects. The injection to DD' was tested by applying TOC's Negative Branch Reservation (NBR) tool (see Tarn's NBR and an explanation of method below).

Figure 4.12: Tim's Evaporating Cloud (EC)

The Evaporating Cloud (EC) of each TOC interviewee, not only revealed the hidden conflicts of their critical root causes discovered from the Current Reality Tree (CRT), section 4.2, but revealed solutions for these students to implement, in order to improve their thesis performance. The solutions found are tested next.

4.2.3.5 Testing the solutions by Negative Branch Reservation (NBR) method

In this process, both the effectiveness of the solutions and their possible negative impacts were tested. Kendall (1998, p.55) argues that the ideas and the resulting positive effects must exist for the resolution to be practical and acceptable. To test solution(s) yielded by the Evaporating

Cloud (EC), TOC offers a method called Negative Branch Reservation (NBR) to test the solution(s) for both positive and negative consequences. Cox et al. (2003, p.940) state that *NBR is a tool that provides the logical framework for testing your injection and determining additional actions to structure the complete solution. After all, identifying the first action of a win-win solution provides little consolation to a conflict if the resolution is not implemented and the conflict escalates to a chronic conflict.* In addition, Dettmer (2007, p.211) suggests that the negative branch enables you to expose the hidden undesirable outcomes that might proceed from any action you are contemplating. Once the undesirable outcomes are known, a system owner can take appropriate action to prevent or eliminate them beforehand.

Negative branch reservation (NBR): an iterative process used to develop the causal logic from the current situation and a proposed action to the negative effects created by that action. Additional actions are proposed and tested to determine their effects until a satisfactory solution (desirable effect) is determined. The product of the NBR is a future reality branch.

Cox et al (2003, p.74)

From the above box, Cox et al.'s definition of NBR includes one of the TOC Thinking Process tools: Future Reality Tree (FRT)/ Branch. The FRT presents the forecasted picture of what to change to, if the solution yielded from applying the Evaporating Cloud (EC) is implemented. Therefore, in this section, the researcher demonstrates a combination of NBR and FRB for Tarn's case, see Figure 4.13. Due to space limitations, the researcher displays only Tarn's NBR and FRT in this thesis.

Figure 4.13 presents negative branch testing of the solution yielded from the EC for Tarn and her FRB. Her solution, *I consult /discuss with my supervisor in order to make decision on my thesis project (instead of spending time working on my own)*, was tested by using NBR method to ensure its effectiveness. The effectiveness or positive effects are demonstrated by pink highlighted entities, while the possible negative effects are represented by the yellow highlighted entities. A non-colour highlighted entity (entity 9) is neutral. The potential positive effects are entity 1 (I learn a lot from my supervisor's advice), entity 2 (I can see more angles of my research issues from my supervisor's point of view), and entity 3 (I have better understanding with my supervisor). In contrast, the possible negative effects are entity 4 (I do not know what to prepare for the meeting), and entity 5 (My supervisor is busy).

The Negative Branch Reservation (NBR) method offered Tarn an opportunity to take preemptive action to prevent negative effects, before implementing the solution found from the Evaporating Cloud (EC). As Dettmer (2007, p.208) suggests, “negative effects can be anticipated, located, and prevented” by using the NBR. Figure 4.13, the negative effect, entity 5 has a negative impact and causes entity 8 (I have difficulty making an appointment with my supervisor). To turn this negative link into positives by using the NBR, injection 1 (I contact my supervisor earlier) was required. After the injection (1), the consequence turned positive, entity 11 (I receive my supervisor’s extra appointment).

Figure 4.13: Tarn's Negative Branch Reservation (NBR), and Future Reality Branch (FRB)

However, at certain stages, the positive link may be weakened by its own inertia or another negative link. Therefore, within NBR processes, another injection may be required in order to strengthen the links or turn the negatives into positives within the link. Although Tarn might have received an extra appointment from her supervisor (entity 11), as a new researcher who

was struggling with making decisions (Referring to Tarn's CRT: Figure 4.5), she might not know what to prepare for the meeting (negative effect, entity 4). At this stage, Tarn must not hide anything that may impair her thesis. Hesitancy in admitting, "I don't know how to do...", is a tendency among Master's thesis students that may prevent their success, according to a VUW supervisor interviewed by Pongsart (2005, p.137). Thus, Tarn must tell the truth to her supervisor with injection 2 (I inform my supervisor that I am struggling with making decisions). Injection 2 enhances the success of Tarn's meeting with her supervisor (entity 12). The entity 12 is joined with the other positive link at entity 14 (I am motivated) which later cause Tarn to archive her goal: I gain skills in making decisions and complete my quality thesis on time.

4.2.4 How to cause the change

After testing the solution found from the Evaporating Cloud (EC) using the NBR method, comes the last step of the TOC Thinking Process (TP). This involves implementing the solution or 'causing the change'. The TOC TP offers one of the most frequently used tools, the Prerequisite Tree (PRT), to help implement the solution. Cox et al. (2003, p.116) conclude that the logic of the PRT is to (1) surface the obstacles (reasons that an idea will not work) from all parties concerned (2) identify intermediate objectives to overcome each obstacle and (3) determine if the intermediate objective is obtained. The obstacles, within the context of the four TOC interviewees, are from the Negative Branch Reservation (NBR) and from their storylines. Dettmer (2007, p.264) explains that intermediate objectives are the tasks or activities required to achieve a limited objective, not just to eliminate the obstacles. He also argues that the PRT helps determine the sequence of the tasks or activities (intermediate objectives).

Prerequisite Tree (PRT): a logic-based tool for determining the obstacles that block implementation of a problem solution or idea. Once obstacles have been identified, objectives for overcoming obstacles can be determined.

Cox et al (2003, p.74)

In order to implement the solution to help improve outcomes for the 4 TOC interviewees by applying the TOC Prerequisite Tree (PRT), there are three main components of the PRT that each student needs to identify, an objective (solution that has been tested by using NBR), obstacles (what keeps you from achieving the objective), and intermediate objectives (activities or actions to be taken to overcome the obstacles and to achieve the stated objective).

4.2.4.1 The Prerequisite tree (PRT)'s Objective

From the previous section, the objective of each TOC interviewee is the solution yielded from the Evaporating Cloud (EC) (section 4.2.3.5), based on their current reality, as discussed in section 4.2.2. Tarn had to consult/discuss any issues related to her research project with her supervisor in order to help improve making decisions on her thesis. Supervisors are the only university staff members who work closely with the research students, under their supervision. According to VUW supervisor "A" interviewed by Pongsart (2005, p.141), *good supervision is one of the key success factors for research students*. In addition, *"the supervisor must have expertise in what you are doing"*, VUW supervisor "D" interviewed by Pongsart (2005, p.139). As a new researcher, Tarn should discuss things regularly with her supervisor regarding how to improve and make better decisions on her research.

The PRT's objective for Tammy was similar to Tarn's in terms of getting help from the supervisors. Tammy's critical root cause was *I am not told about any clear research guidelines by my supervisor and others* (entity 102/202, Figure 4.9). After applying the TOC Thinking Processes (TPs) step by step, her solution to this root cause (and her PRT's objective) was that Tammy must organise a special meeting with her supervisor (outside her regular research meeting) and/or with her school's postgraduate coordinator to provide her with clear research guidelines of the remaining research process and procedures in order to enhance her thesis success. The research supervisors' role is also to *help students to get it clear and get through*", according to a VUW supervisor "D" interviewed by Pongsart (2005, p.139). VUW supervisor "D" also advises that *students should ask questions of your supervisor and need to keep coming back to your supervisor until understood*. Therefore, Tammy must get clear guidelines for procedures to apply to the remainder of her research project, by organising a special meeting with her supervisor and/or her school, as per the proposed PRT's objective.

Ton was an international student, with English as a second language. Ton's writing style was influenced by his homeland culture. He critiqued his English expression as "flowery, diplomatic and flamboyant". The PRT's objective or the solution found from Ton's Evaporating Cloud (EC), and tested using the NBR, was that he should write according to standard academic English suitable for a thesis accepted by his school's academic examiners, and maintain his own voice where applicable.

Tim was striving to balance his life's commitments and motivation, while pursuing a Master's thesis. His PRT's objective was being able to allocate his time to socialise with his best friends and family members after office hours, and to spend time on weekends working on his thesis. Tim's case can be a good example for many other part-time thesis students, who should be able to allocate their time appropriately and balance things in life well, in order to enhance their thesis success. Tim and, arguably, many other part-time thesis students, find the Master's research experience especially challenging, given all the necessary conditions for successful on-time completion. According to the four VUW supervisors interviewed by Pongsart (2005, pp.141-142), these NCs are: the ability to plan, being better organised, being motivated, working hard, giving enough time to their thesis, being consistent, and being committed.

The PRT objectives of the four TOC interviewees were presented according to the TOC analysis. In order for the four students to achieve each individual (PRT) objective, the second component of the PRT is to identify what may prevent them from achieving the objective.

4.2.4.2 The Prerequisite Tree (PRT)'s Obstacles (Obs)

Obstacles (Obs): Octagons reflect obstacles that can frustrate progress toward the objective. Notice that where obstacles exist, one or more IOs are collated to overcome them. The IOs are positioned to partially overlay the obstacle, conveying the idea that the IO overcomes the obstacle.

Dettmer (2007, p.267)

After identifying the objectives in the Prerequisite Tree (PRT), the next step is to determine obstacles that might block a system owner from achieving the stated objective. According to Dettmer (2007, p.270), the obstacles within the PRT context might include insufficient or non-existent knowledge, lack of adequate resources, law or regulations that limit or forbid certain kinds of activity, and human resistance. The obstacles can be obtained from the Negative Branch Reservation (NBR) and/or brainstorming with others more knowledgeable than you, (Dettmer, 2007, p.272). In this research, the obstacles came mainly from the NBR (Section 4.2.3.5), and from each student's storyline.

The obstacles that might block each TOC interviewee varied, depending on the individual objective. Tarn, who wanted to consult/discuss with her supervisor to help enhance her research understanding, improve her time management, and prioritise research activities, might experience that her supervisor is busy (Obs1), uncertainty about what to prepare for the meeting

(Obs2), and time constraints (Obs3). Normally, each supervisor supervises more than one research student, besides the routine role of lecturing. Therefore, there is a high possibility that supervisors are busy with other commitments at the university. The second obstacle (Obs2) was caused by Tarn being a new researcher (CRT's entity 302) combined with her humble attitude (CRT, Figure 4.8), that she was not highly educated (CRT's entity 303), and she lacked knowledge to do research (CRT's entity 301). In addition, Tarn's observation *I linger a lot* (Figure 4.5) could also cause the Obs2. The third obstacle (Obs3), time constraints during her data collection stage when Tarn had to handle a lot of tasks (searching for her research participants, collecting data, and many other activities), might also keep her from achieving the objective.

Although Tammy and Tarn had similar objectives, organising the meeting with their supervisors, Tammy's situation was more complicated. According to Tammy, *Lack of guidance is also a big thing. It is not just a lack of guidance from my supervisor, but a lack of guidance from the entire department.* Therefore, the school's postgraduate coordinator must also step in. Unfortunately, having more parties involved could cause Tammy a problem in organising the meeting time to suit all concerned (Obs1). Furthermore, freeing Tammy's own time from distractions (Obs2) was also difficult. Being a local student with friends and family members around might prevent Tammy from achieving the objective of meeting with her supervisor and the school's postgraduate coordinator, in order to get clear guidelines.

The unclear guidelines for Master's thesis writing combined with his preferences and homeland cultures might have caused Ton's difficulties in figuring out how to keep his own voice (Obs1), as well as his original writing style: unclear with flamboyant, flowery, and diplomatic expression (Obs2). Ton needed to overcome these two obstacles in order to meet his objective: to produce a thesis acceptable to his school's academic examiners and maintain his own voice where applicable.

Being a local, part-time thesis student caused Tim's difficulties in balancing his time (Obs3) to socialise with his good friends and family members after hours and to spend time on weekends working on his thesis (Tim's objective). As a full-time office worker, at certain times Tim's obstacles were: 'too busy with his office work and commitments' (Obs1) and 'too tired to work on his thesis over the weekend' (Obs2). After identifying obstacles, the next step of applying

the TOC Prerequisite Tree (PRT) is to obtain intermediate objectives in order to overcome those obstacles.

4.2.4.3 The Prerequisite Tree (PRT)'s Intermediate Objective (IO)

Intermediate Objectives (IO): Rectangles arranged in a vertical hierarchy, indicating the activities or tasks that are components of the effort to achieve the objective.
Dettmer (2007, p.267)

To complete the Prerequisite Tree (PRT), the intermediate objectives (IO) to overcome the identified obstacles must be obtained. However, in order to select the effective IO for the effective outcomes, Dettmer (2007, p.270) recommends certain criteria for IO's selection as follows:

- Which is the fastest to complete?
- Which does the job most effectively?
- What is the first one to that comes to mind that does the job with minimum required effectiveness?
- Which IO is the easiest to do?
- Which IO incurs the least expense?
- Which IO produces the fewest negative or collateral side effects?

The proposed PRT's intermediate objectives among the four TOC interviewees, were simple, practical, cost-free, and in line with Dettmer's criteria, but needed high commitment, determination, and willingness to learn (Hart, 2006, p.23) from the system's owner: Tarn/Tammy/Ton or Tim.

To organise the meeting with her supervisor to improve her research performance (Figure 4.14), Tarn needed to contact her supervisor earlier (IO11) and ask for extra time (IO12) on top of their regular meeting, so that they could focus on a particular issue to help improve Tarn's decision making. By performing according to IO11 and IO12, Tarn should be able to overcome Obs1 (My supervisor is busy). Before the meeting, Tarn should make a list of things (in relation to her research project) that required decision-making (IO21). Furthermore, during the process of listing things, Tarn should also allocate her time to gain knowledge on the thesis stages and procedures (IO22), and to share her thesis experience with other thesis students (IO23). IO21 – IO23 should enhance Tarn's preparation and overcome Obs2 (I do not know what to prepare for the meeting). Time constraints (Obs3) can occur at any time for inexperienced research students, especially Tarn, who identified Keeping the

deadlines/timeline, Not knowing how to get started, and Feeling her study valuable or worthwhile were her major performance issues (Figures 4.5-4.7). The linkage of these three issues might make Tarn's thesis tasks less manageable and delay her thesis stages. Therefore, the proposed IO31-IO34 for Tarn's action in sequence should help overcome her time constraints (Obs3). Starting from planning and prioritising her thesis tasks (IO31) after meeting with her supervisor, Tarn should provide a buffer (additional time) to all thesis activities (IO32). For example, if Tarn plans to spend 2 months for her data collection she should allocate 2.5 months (30% or approximately 15-18 days more) for her data collection plan. After that Tarn might need to start working on each of her thesis tasks earlier (IO33) or work longer hours to speed up her thesis tasks, especially when feeling productive (IO34).

Figure 4.14: Tarn's Prerequisite Tree (PRT)

With a similar aim to Tarn, Tammy was recommended to meet with her school's postgraduate coordinator in order to get clearer research guidelines for the remaining research process and procedures (Figure 4.15). The two separate sets of IOs, IO21-IO24 and IO11-IO15 were recommended for Tammy in order to triumph over Obs1 (I experience a lot of distractions) and Obs2 (My supervisor and my school's postgraduate coordinator are busy) respectively.

Two separate meetings (IO11) could be held for Tammy, if the time of her supervisor and school postgraduate coordinator could not be matched. After each meeting, Tammy should summarise the minutes and circulate to both the supervisor and school postgraduate coordinator for final confirmation (IO12), and she should follow the received guidelines (IO13).

Another set of IOs, IO21-IO24, could be performed separately with an aim to overcome Obs2 (I experience a lot of distractions). Tammy must set up a clear goal that doing a Master's is her first priority (IO21). However, there could be some distraction that Tammy might not be able to cope with. It would be better to consult with the university counselling service which is free of charge (IO22) in order to minimise or overcome the distractions (IO23). After that, Tammy should be able to concentrate on her thesis (IO24) and to handle distractions well.

Ton had a specific set of intermediate objectives (IOs) in order to overcome the two main obstacles (Obs): Obs1 (I have difficulties figuring out where to keep my own voice) and Obs2 (My thesis writing is not clear and often expressed in flamboyant, and flowery way influenced by my homeland cultures). The two sets of IO (IO11 – IO15 and IO21-IO27) were recommended for Ton to perform in order to overcome Obs1 and Obs2 respectively, and to achieve his objective.

According to Figure 4.16, firstly, Ton needed to discuss and to get his supervisor's advice about where to keep his own voice on his thesis chapters (IO11). Next, Ton should hire a PhD graduate or professional proofreader to help proofread his thesis (IO12). By hiring the experienced person for proofreading, Ton should learn (IO13), not only in terms of where to keep his own voice, but also how to express academic English style. However, Ton should meet and discuss with his supervisor regularly to review/revise his writing (IO14) in order to improve his writing. By doing that, Ton should also benefit from his supervisor's constructive feedback (IO15).

Secondly, another set of IOs was recommended for Ton to perform, in order to overcome Obs2: To improve his thesis writing, Ton needed to read academic English books, as well as previous theses from the library (IO21). VUW Student Learning Support Service (SLSS) provides individual advisors to help students improve their studying skills: reading, writing, and other related learning skills. Ton should also bring some of his writing problems to discuss and learn from SLSS experienced advisors (IO22 and IO23). Coincidentally, the action linked from IO24

– IO27 were the same sequence of actions linked from IO12-IO15. Therefore, the two sets of IO could be merged into one link from IO24 and IO12 till IO27 and IO15 continuously.

Tim had already submitted his thesis. According to Figure 4.17, there were two sets of intermediate objectives if he could have gone back in time and socialised with his good friends and family members after his office hours on weekdays and spent time over the weekends working on his thesis (Tim's PRT objective). The first set of IOs, IO11 – IO19, was to be performed in order to overcome Obs1.1 (I get busy with my office work and commitments), and Obs1.2 (I am very tired and cannot work on my thesis over the weekend). The second set of his IOs, IO21- IO26, were actions to overcome Obs2: I cannot balance my time well.

According to Figure 4.17, the first set of IOs performed by Tim, would have been to take a break or take sick/annual leave whenever he was too tired or did not feel well (IO11). Next, Tim could choose any good day during weekdays to socialise with his good friends and/or with his family members (IO12). Tim should take the opportunity as per IO12 to share his thesis experiences with his good friends and family members (IO13) as well as to make friends with other thesis students at school (IO14). Then IO15 could merge with IO21 (Tim puts his thesis as a top priority task and set up his goal clearly as to what he wants to achieve) and IO16 could also merge with IO22 (Tim creates a timetable for his thesis study plan and work closely with his supervisor to plan his thesis work to be submitted to his supervisor in order to meet his goal of producing a quality thesis). After that, IO17 (I work on my thesis over the weekend) and then IO18 (I meet with my supervisor and submit my work as planned) could be performed separately from the second set, IO23-IO26.

After performing IO16/IO22, whenever Tim felt down or in need of motivation, he must talk to his good friends/buddy/supervisor or his family members who can motivate him well (IO23) and then (IO24) he should share his problems with the one he chose to talk with (from IO23). By sharing problems or thesis performance issues with the people around him, Tim should learn how to give and take with the people around him and help motivate them, not only asking them to motivate him (IO25). By taking actions as per IO25, Tim had created a friendly and supportive environment among his good friends, buddies and family members, and with his supervisor. However, as some of his thesis tasks might take longer than expected, Tim must use his annual leave to work on a buffer to speed up his thesis tasks in order to compensate for time lost whenever he might be behind his thesis schedule (IO26). The next activity after IO18

and IO26, Tim should reward himself when he achieved each stage of his thesis tasks. IO19 should be a motivating factor for Tim to balance his time well and overcome Obs 1.1, 1.2, and Obs2 accordingly.

Due to the limited space of this thesis, the researcher has not presented the two formats of PRT: the table and the tree (Figure). For Tammy, Ton, and Tim, their PRTs are presented in tree format only (Figures 4.15-4.17).

Based on the four TOC interviewees' performance issues, TOC has the capability to manage different performance issues from different stages: data collection stages, data analysis, write-up, and finishing. Despite the complexity of each student's performance issues, the TOC Thinking Processes (TPs) handled those issues by addressing, not symptoms, but critical root causes of the issues (Table 4.5). The TPs then provided simple, practical, and straightforward solutions for each student to eliminate their weakest links, in order to strengthen their thesis performance. In addition, TOC offered a method of framing the critical root causes into Evaporating Cloud/EC in order to surface the underlying assumptions of the conflicts and find solutions to evaporate the conflict clouds. Before implementing the solution(s), to prevent negative side effects, the Negative Branch Reservation (NBR) tool (for testing solutions) was applied. The process provides the Prerequisite Tree (PRT) to aid implementation. By employing the PRT, the objective (tested solution by NBR method), obstacles, and intermediate objective (IO) were identified. The IOs (or activities to overcome the obstacles in order to achieve the objective) must be performed in chronological sequence, according to the PRT's process.

Objective: I organise a special meeting to consult/discuss any issues related to my research project with my supervisor, in order to enhance my research understanding, improve my time management, and prioritise my research activities.

Obstacles (Obs)	Intermediate Objectives (IO)
Obs1. My supervisor is often busy	IO11: I contact my supervisor earlier.
	IO12: I ask my supervisor to provide me extra time once a month besides our normal meeting to discuss things in order to archive my objective.
Obs2. I do not know what to prepare before the meeting (I was not given enough information what/how to do thesis works).	IO21: I inform my supervisor that I am struggling with making decisions and unclear research guidelines.
	IO22: I share my research experience with my friends/colleagues.
	IO23: I read about the thesis process from textbooks and previous years' theses to gain knowledge on the thesis stages and procedures.
	IO24: I make a list of things that I do not know and/or things that I have to make decision on before the meeting with my supervisor.
Obs3. I have time constraints	IO31: I discuss with my supervisor how to prioritise my research activities.
	IO32: I add a buffer to my research activities.
	IO33: I start working earlier
	IO34: I work longer hours to speed up my thesis tasks.

Table 4.4: Tarn's Prerequisite Tree (PRT)

Figure 4.15: Tammy's Prerequisite Tree (PRT)

Figure 4.16: Ton's Prerequisite Tree (PRT)

Figure 4.17: Tim's Prerequisite Tree (PRT)

Interviewees ----	Tarn	Tammy	Ton	Tim
Thesis stage -----	Data collection	Data analysis	Write-up	Finished
IO map's goal	To gain skills and education level needed to get a job that will be inspiring and worth doing.	To get a qualification.	To produce a quality piece of research that would fill up research gap of the subject I study in my home country.	A quality thesis that equips me for my future.
Three Performance issues	<i>Issue I: Knowing how to get started (A15)</i> <i>Issue II: Keeping the deadlines or timelines (A8),</i> <i>Issue III: Feeling my study valuable or worthwhile (A10)</i>	<i>Issue I: Knowing how to get started (A15)</i> <i>Issue II: Designing my study (A16)</i> <i>Issue III: Not knowing when to stop reading the literature (A19)</i>	<i>Issue I: Writing the results section (A34)</i> <i>Issue II: Reporting Data (A31)</i> <i>Issue III: Writing acceptable English (A22)</i>	<i>Issue I: Keeping the deadlines or timelines (A8)</i> <i>Issue II: Staying motivated (A1)</i> <i>Issue III: Writing a thesis (A37)</i>
Critical root cause (from CRT)	I am very bad at making decisions.	I am not told about any clear research guidelines by my supervisor and others.	My English expression is influenced by my homeland's cultures.	I have other commitments in my life besides doing a thesis. I do not prioritise my thesis as the first priority. I am not motivated for doing a thesis.
Conflicts from EC	I must spend enough time learning from research experts on my research project. I must spend enough time on my own working on my project.	I must focus well on reading the literature, articles, and journals related to my thesis. I must not focus on reading the literature, articles, and journals related to my thesis.	I must keep my own voice in my thesis. I must change my writing style according to my supervisor's advice.	I must spend enough time socialising with my friends and family members. I must not spend enough time socialise with my friends and family members.
Solution from EC or PRT's objective	I organise special meetings to consult or discuss any issues related to my research project with my supervisor in order to enhance my research understanding, to improve my time management, to prioritise my research activities.	I organise a special meeting with my supervisor and/or with my school's postgraduate coordinator to provide me clear guidelines of the remaining research process and procedures in order to enhance my thesis success.	I write according to standard academic English for a thesis accepted by my school's academic examiners and maintain my own voice where applicable.	I allocate my time to socialise with my best friends and family members after office hours and to spend time on weekends working on my thesis.
Obstacle from PRT (1) (2) (3)	My supervisor is often busy.	My supervisor and the school's postgraduate coordinator are busy.	I have difficulties figuring out where to keep my own voice.	I get busy with my office work and commitments.
	I do not know what to prepare for the meeting	I experience a lot of distractions.	My thesis writing is not clear and often expressed in flamboyant, flowery, and diplomatic way influenced by my homeland's cultures.	I am very tired and cannot work on my thesis over the weekend.
	I have time constraints.	-	-	I cannot balance my time.
Intermediate objective	See Figure 4.14	See Figure 4.15	See Figure 4.16	See Figure 4.17

Table 4.5: Summary of key entities of each TOC interviewee after applying TOC

4.3 Coaching session (Action Research)

The last phase of this research entailed coaching sessions or action research. The main purpose for conducting the coaching sessions, with the selected volunteer interviewee, after completing

the individual interview with that student, was to provide feedback after applying TOC tools to his/her critical problems from the interview (Referring to section 4.2). Two more sessions were spent with the student over time, in order to further improve his/her performance.

4.3.1 TOC coaching session with Tarn

The researcher recruited Tarn, who had already taken part in the individual interview, based on the criteria stated in Chapter Three: the research methodology. The action research with Tarn was conducted twice, in November and December 2009, and each session lasted 60 minutes. The results of the action research with Tarn are reported and analysed next.

4.3.1.1: Coaching I (November 2009)

Meeting agenda:

- (1) The researcher presented the results from the individual interview with Tarn in June 2009, after applying TOC tools according to Figure 4.1 (Tarn's Intermediate Objective Map/IO Map), Figure 4.5 (Current reality Tree/CRT), Figure 4.9 (Tarn's Evaporating Cloud/EC), and Figure 4.14 (Tarn's Prerequisite Tree/PRT).
- (2) The researcher discussed the issues with Tarn, and proposed solutions were presented.
- (3) Tarn updated her latest performance issue by filling the questionnaire survey #22 (the degree of difficulty on each performance issue) and the "Highs and Lows": Feelings about her Master's thesis.
- (4) The researcher and Tarn discussed the new critical performance issues based on (3)
- (5) The researcher recommended some TOC Thinking Process tools to help Tarn improve her performance.

Step 1: The individual interview's results (in June 2009)

The researcher presented Tarn with the TOC analysis of her performance issues, as she identified during the interview in June 2009. With reference to the findings and analysis in section 4.2, the critical root cause that Tarn needed to address was entity 101 (Figure 4.5/ CRT): I am very bad at making decisions. Then, the researcher proposed the solution revealed by Tarn's EC (Figure 4.9): I (Tarn) consult/discuss with my supervisor in order to improve my thesis performance on my thesis project. In addition, the list of activities (Figure 4.14/Tarn's PRT) in order to achieve the proposed solution was explained in sequence step by step.

While listening to the researcher's explanation, Tarn was amazed by how TOC tools could help present her current reality (CRT), based on the individual interview. She could see the effect-

cause-effect diagram of her problems clearly, which confirmed the value of the clearly presented CRT.

Step 2: Discussion on the proposed solution from applying TOC

After the researcher's presentation of the findings, analysis and solution, Tarn agreed that the proposed solution was well addressed and useful. Coincidentally, after the completion of Tarn's data collection, her supervisor proposed having a meeting with Tarn more often. She was now having a weekly meeting with her supervisor, and was preparing a list of things she needed to perform for the next meeting (in line with PRT's IO22 proposed by the researcher according to TOC PRT's procedures).

Some other activities performed by Tarn after the first interview, and before the coaching sessions took place, were similar to the Prerequisite Tree's intermediate objectives proposed by the researcher (See IO with red colour highlighted, Table 4.4). Tarn seemed happy that her supervisor had offered to meet with her on a weekly basis (IO11-IO13). In addition, Tarn had also spent some time learning from previous years' Master's student's theses (IO23). On top of this, to cope with time constraints, Tarn had been trying to do her thesis tasks earlier (IO33), and worked longer hours to speed up her thesis, especially whenever she felt productive (IO34).

This is what I am missing, Tarn replied when she saw IO24: I share my thesis with my friends/colleagues. *We designed the space for students studying to work together. Students can also motivate each other*, supervisor "A" and "D" commented on VUW university policy on postgraduate students' office space (Pongsart, 2005, pp.138-139). Tarn shared her office with a few other Master's thesis students from the same school, and should use this opportunity to share her thesis experiences with the others within the same office. Although each research student is conducting a different type of research, researchers can learn much more by exchanging information and talking about his/her own topic with the others.

On top of this, there was one TOC technical term, the buffer, Tarn inquired about. The researcher explained that Tarn's original plan to submit her final thesis by the end of February 2010 could be revised to include a provision of extra time, for example, of one month (normally TOC's buffer is 30%). Therefore, with a one month buffer, Tarn could plan to submit her final thesis in January 2010 instead of her original deadline: February 2010. *I was going to aim for January actually, to allow myself one month to let it mature*, Tarn said of her own plan. By

including a buffer at the end of the thesis project plan, awareness of the unexpected is raised, which should enable research students to cope better with future uncertainties.

Step 3: Tarn's latest "Highs and Lows" and performance issues (Questionnaire survey #22)
Figure 4.18 demonstrates Tarn's feelings about her Master's thesis as of 3 November, 2009. Tarn's feelings at this writing stage seemed to have an upward trend from neutral and improving, to positive. Tarn was doing better than the majority (60%) of the interviewees, who were in the same stage and plotting their highs and lows. In order to help Tarn join the top 40%, what were the current constraints that needed to be addressed? According to the research design, Tarn was asked to identify the degree of difficulty of the current performance issues that she experienced (Questionnaire Survey #22), next.

Figure 4.18: Tarn's Highs and Lows (Feelings about her Master's thesis) as of 03/11/2009

Table 4.6 presents some of the performance issues with five levels (very low, low, medium, high, and very high) degree of difficulty experienced by Tarn during her thesis writing stage as at 3 November, 2009. Tarn's current degree of difficulty on the same issues compared with June 2009 varied: some remained the same, some were higher, and some were lower:

Degree of difficulty
Problems encountered in completing theses	Very low	Low	Med	High	Very high	N/A*
A1.Staying motivated for my thesis				XY		
A2.Meeting family obligations		X		Y		
A3.Meeting job obligations		X		Y		
A4.Meeting social demands				XY		
A5. Financing my thesis/degree		X		Y		
A6.Finding time for thesis				XY		
A7.Keeping healthy/fit		X		Y		
A8.Keeping my deadlines/timeline				Y	X	
A10.Feeling my study is valuable or worthwhile			Y		X	
A12.Meeting with my supervisor	Y	X				
A13.Feeling supported/motivated			X	Y		
A14. Getting supervisor's timely feedback	Y	X				
A15. Not knowing how to get started	Y				X	
A16.Designing my study			Y		X	
A22.Writing acceptable English		X	Y			
A23.Writing the literature review		XY				
A24. Writing the method section			XY			
A30. Analysing & interpreting data			Y			X
A31.Reporting data		Y				X
A32. Using the computer for word processing		Y				X
A33. Using computer for database organising			Y			X
A34. Writing the results section				Y		X

N/A* = Not Applicable

Table 4.6: Tarn's questionnaire: degrees of difficulty June 2009 (X = during data collection stage), and November 2009 (Y = during writing stage)

Interestingly, all Tarn's three major performance issues (A8: Keeping the deadlines/timeline, A10: Feeling my study valuable or worthwhile, and A15: Knowing how to get started) discussed during the individual interview with "very high" degree of difficulty, were all now indicated as a lower degree of difficulty: "High" Keeping the deadlines/timeline (A8), "Medium" Feeling my study valuable/worthwhile (A10), and "Very low" Not knowing how to get started. What Tarn had learned from the weekly meetings with her supervisor would be one of the factors helping to overcome the high degree of difficulty of those issues she mentioned in step 1. The meeting with her supervisor was also the main proposed solution after applying the TOC Thinking Processes and tools by the researcher (Table 4.5). However, Keeping the deadlines/timeline (A8) was rated as "high" degree of difficulty. Further discussion on this issue is presented in the next step.

Unfortunately, there were four performance issues (Table 4.6) that had increased their degree of difficulty drastically from low to "high": Meeting family obligations (A3), Meeting job obligations (A4), Financing my thesis (A5), and Keeping healthy/fit (A7). In addition, as a new researcher in the thesis writing stage, Writing the results section, was also indicated as a high degree of difficulty. On top of this, there were three remaining performance issues unchanged from "high" degree of difficulty: Staying motivated (A1), Meeting social demands (A4), and Finding time for my thesis (A6). These eight performance issues including Keeping the deadlines/timeline (A8) and Feeling supported/motivated (A13) which were currently on "high" degree of difficulty, might have connection with Tarn's part-time job. More discussion on some of these issues is presented next.

Step 4: Discussion on the latest findings

Tarn's current 10 major performance issues (A1-A8, and A13 – Table 4.6) with "high" degree of difficulty presented in Step 3 seemed complicated, with several factors involved. At this stage, Tarn needed to concentrate on her writing, but she had to allocate some hours working part-time, as the scholarship she received was not enough. *I am working 20 hours (part-time job) a week to pay my rent. At the same time I have to write which means I am going to be quite busy*, a conflict told by Tarn during the discussion. Tarn still had difficulties managing her time (Time management was one of her Critical Success Factors according to her IO Map – Figure 4.1). The part-time job and other activities seemed demanding and had a negative impact on her thesis tasks. *My supervisor thinks that my progress is going slowly*, Tarn told the researcher with disappointment. *It's not really my choice. I have to complete my thesis on time*. When the

researcher inquired if she could reduce number of hours of her part-time job, Tarn replied, *It's impossible to reduce because I cannot pay the rent. She also mentioned, It's kind of bad because my supervisor really thinks that I should not be working while writing.* This financial issue is sensitive and might be involved with many other personal issues that the system owner may know well and prefer to address on his/her own. However, the researcher's and her supervisor's suggestions about Tarn's part-time job might have raised her awareness on the financial issue.

In addition, Tarn needed to socialise with her friends and flatmates. She said: *My friends are very important because they are my family in NZ. My family is far away from me. Motivation and support are very important to me.* According to Tarn's IO Map (Figure 4.1), gaining support from people around her was one of her Critical Success Factors (CSFs) in order to achieve her goal.

That's true, Tarn replied when the researcher mentioned, "According to TOC, each system or a person should have a clear goal what want to achieve". *The thing is that it's not tangible enough,* argued by Tarn. Then she admitted, *But I don't know exactly what it is. It's not a concrete target.* Tarn referred to her IO Map's goal: To gain skills and education level needed to get a job that will be inspiring and worth doing (Figure 4.1). The researcher's advice, in line with Dettmer's (2007) two level goal in a system, was to set a closer goal (see next step, Proposed TOC tools, to deal with Tarn's major issues).

On top of the closer level goal setting, Tarn also needed to eliminate distractions that prevented her from focusing well on her thesis writing. *It's a job, and it's relationships with people that are quite distracting to me,* Tarn summed up the negative side-effects of working a part-time job and student's life outside the campus, while embarking on her Master's thesis. Then, the researcher introduced one of the TOC tools that can be a stand-alone tool to help Tarn overcome these distractions, next.

Step 5: Proposed TOC tools to address Tarn's new performance issues

- (1) A second level Intermediate Objective (IO) Map:
- (2) Prerequisite Tree (PRT) to eliminate distractions:

Step 5.1: A second level Intermediate Objective (IO) Map

Figure 4.19: Tarn's revised IO Map during "Coaching I"

With reference to the discussion with Tarn during the "Coaching I" session, the researcher proposed Tarn set a closer goal: a process level IO Map. If Tarn was working in an organisation as a section head, sometimes it would be too difficult for her to focus on the organisation level IO Map. Each section head must have his/her own departmental or sectional IO Map in accordance with the organisation ones. Figure 4.18 demonstrates Tarn's revised IO Map focusing on the writing thesis stage. However, this revised IO Map was revised again by Tarn, with more Critical Success Factors (CSFs) so that Tarn could have a clearer and closer goal to focus on.

Step 5.2: Prerequisite Tree (PRT) to eliminate Tarn's distractions

Objective: To minimise distractions that prevent Tarn from focusing on her thesis	
Obstacle (Obs)	Intermediate Objective (IO)
Obs1: Distractions by friends	IO11: I remind myself that thesis is my first priority
	IO12: I create a daily timesheet of major activities that I have to do including time for my thesis and for my friends.
	IO13: I explain to my friends that I must work on my thesis first and complete my thesis on-time.
	IO14: I explain to my good friends that I need their support and motivation in order for me to work on my thesis as a first priority.
	IO15: I reward myself whenever my thesis is progressing well.
Obs2: Distractions by other things	IO21: I use my IO Map to navigate my thinking.
	IO22: I follow the timesheet strictly.

Table 4.7: Proposed PRT for Tarn to eliminate distractions during "Coaching I"

Tarn also needed to eliminate distractions urgently, in order that she could concentrate well on her thesis writing. At this stage, the TOC Prerequisite Tree (PRT) could be employed as an individual tool, not integrated with the Evaporating Cloud (EC). The first component of the PRT identified by Tarn, was her objective to eliminate all distractions that prevented her from focusing on her thesis. With reference to the last part discussed in Step 4, the researcher classified the obstacles that prevented Tarn from achieving her objective into two categories: distractions by friends (Obs1) and distraction by other things (Obs2). In order to overcome the obstacles 1 and 2, the researcher proposed Intermediate Objectives or activities for Tarn to perform, including employing the timesheet recommended by her supervisor. Tarn was very happy with this (See Table 4.7).

4.3.1.2 Coaching I Summary

The coaching session offered both the researcher and Tarn an opportunity to discuss the problematic issues experienced since June 2009, and the solutions after applying TOC (by the user alone), as well as to follow up and address what the current problems were. However, by the time coaching session I took place in November 2009, Tarn's supervisor had already helped improve Tarn's thesis performance by offering more frequent meetings. The action taken by

Tarn's supervisor enhanced the feasibility and validity of solutions yielded from applying TOC, and proposed by the researcher (Table 4.5). Moreover, the researcher was able to recommend TOC tools, in order to deal with the new problematic issues experienced by Tarn during the coaching I, the unclear goal and distractions (see Figure 4.18 and Table 4.7). However, one of Tarn's personal issues, working part-time to earn extra income for her living while pursuing a Master's thesis, had been discussed, but had not yet been managed properly. A further coaching session in December 2009 would reveal how the issue would be managed, including the answer to why distractions still took place. As Tarn said: *It's up and down*.

4.3.1.3: Coaching II (December 2009)

Meeting agenda:

- (1) The researcher followed up with Tarn the implementation of the solutions discussed in "Coaching I".
- (2) Tarn updated the researcher about questionnaire survey #22 (the degree of difficulties on each performance issue) and the "Highs and Lows": Feelings about her Master's thesis.
- (3) The researcher and Tarn discussed the new critical issues based on (2)
- (4) The researcher again recommended some TOC Thinking Process tools to help Tarn improve her performance.

Step 1: The researcher followed up from Tarn the implementation of the solution discussed in "Coaching I"

Financial issue (and working part-time):

To help improve her financial issue, Tarn decided to borrow the money from her parents. She said: *They're willing to help me out until I complete my thesis*. It was good news, because Tarn had been made redundant from her part-time job after the "Coaching I". In this case, Tarn seemed to know best and decided to seek help from her parents. According to Goldratt (1990, p.3), "Intuitively, we do know the real problems, we even know the solutions". His main concern is verbalising; "if we don't bother to verbalise our intuition, we ourselves will do the opposite of what we believe in". Verbalising has been used consistently in TOC to enhance communication and surface problematic issues. For Tarn, the issue of her part-time job had been discussed twice: once with her supervisor, and another time with the researcher (during the coaching session I). But Tarn, who admitted that she was not good at making decisions, did not take any action until the redundancy took place. However, by verbalising/discussing it more than once, it must have raised a big concern for Tarn, and signalled to her that she needed to

do something soon before it would highly impact on her thesis performance. Thus, one of the weakest links, the money issue linked with the part-time job which affected her time working on her thesis and her stress/health, had been strengthened. Tarn seemed to have more flexibility of time allocated to her thesis.

Distractions and the relation with friends/flatmates:

It's up and down, Tarn's experience with her friends was analogous to curves, as she explained: *We cook dinner together on Sundays among our flatmates and I have a good friend cooking dinner for me once a week on weekdays. It's invaluable support. It's incredible.* On the downside, Tarn had a friend from overseas coming to stay. This made her feel uncomfortable and stressed. Tarn had to visit the university counselling service in order to cope with the distractions caused by the unexpected visitor plus some others: *I talked to the counsellor and we created strategies how to handle lots of stress, how to make time for myself, and how to prioritise the needs I have now to do my thesis rather than running around and try to do everything*, said Tarn. After visiting VUW counsellor on a regular basis, Tarn was now better able to cope with distractions.

As with the redundancy, the unexpected event, a surprise visit by Tarn's friend from outside New Zealand, was distracting. Tarn found her way out by using the university counselling service to help reduce her stress. After meeting with the counsellor, Tarn talked to her unexpected visitor and indicated that she needed to focus on her thesis which was her major mission. Finally, her visitor moved out from her flat. To let your friends know that you must focus on your thesis and complete your thesis on time was one of the Intermediate Objectives (see Table 4.7).

Timesheet (to list tasks what Tarn needed to complete):

The timesheet (from the coaching session I) is working quite well. It's motivating me to work because I know that I have to do so much this week, Tarn was feeling positive about her timesheet, *It feels more like a proper job that I have to put so much effort, and of course it's good to see my progress on what I have done.* From the "Coaching session I", one proposed activity (Intermediate Objective) was a timesheet to overcome Tarn's distractions (Table 4.7). This was in Tarn's Prerequisite Tree (PRT), and was in line with her supervisor's advice. Tarn was pleased with this good studying technique, which enhanced her success: thesis completion.

The weekly meeting with her supervisor had been going well and was having a positive impact on her thesis. *I feel that I have learned a lot. I feel that I can handle things a lot better*, Tarn was happy talking about her progress. She also said, *I feel more structured, and focused. Right now, I quite enjoy it actually. It's easy. It's just writing*. The second coaching was conducted on 17 December 2009, and Tarn had done five out of seven chapters of her thesis, which was favourable, as her deadline was the end of February 2010.

Step 2: Tarn updated highs and lows, and questionnaire survey #22 (Appendix A) to identify any new performance issues/experiences.

Figure 4.19: Tarn's Highs and Lows (Feelings about her Master's thesis) as of 17/12/2009

As at 17 December, 2009, Tarn indicated an upward trend of her feelings on the Master's thesis she was pursuing (Figure 4.20). *I like writing, and research*, Tarn told the researcher during the "Coaching II" session. This must be one of important factors that motivated Tarn well at this stage: writing a thesis. Before reaching the writing stage, Tarn had experienced "up and down" syndrome. She was at risk of not reaching this stage, if her critical problems in the past thesis stage ("the lows") were not properly managed.

By indicating a positive trend (Table 4.7), compared with the first of Tarn's coaching sessions in November 2009, the degree of difficulty from 6 out of 11 main issues had decreased from

“high”. Four remained “high”, but one had been increased from “medium” to “high: Feeling my study is valuable/worthwhile (A10) (See Table 4.7).

The six improving issues, in terms of a decrease in degree of difficulty, were: Staying motivated for my thesis (A1), Meeting job obligations (A3), Finding time for a thesis (A6), Keeping the deadlines/timeline (A8), Feeling supported/motivated (A13), and Writing the results section (A34). According to Tarn, the financial support from her parents, the meetings and support from her supervisor, as well as the fact that she did not have to work part-time helped improve the degree of difficulty of these issues.

	Very low	Low	Med	High	Very high	N/A*
A1.Staying motivated for my thesis			Z	XY		
A2.Meeting family obligations		X		YZ		
A3.Meeting job obligations		XZ		Y		
A4.Meeting social demands				XYZ		
A5. Financing my thesis/degree		X		YZ		
A6.Finding time for thesis			Z	XY		
A7.Keeping healthy/fit		X		YZ		
A8.Keeping my deadlines/timeline			Z	Y	X	
A10.Feeling my study is valuable or worthwhile			Y	Z	X	
A12.Meeting with my supervisor	YZ	X				
A13.Feeling supported/motivated		Z	X	Y		
A14. Getting supervisor's timely feedback	Y	XZ				
A22.Writing acceptable English		XZ	Y			
A23.Writing the literature review		XY	Z			
A24. Writing the method section			XYZ			
A30. Analysing & interpreting data			YZ			X
A31.Reporting data		Y	Z			X
A32. Using the computer for word processing		YZ				X
A33. Using computer for database organising		Z	Y			X
A34. Writing the results section			Z	Y		X

N/A* = Not Applicable

Table 4.8: Tarn's questionnaire: degrees of difficulty June 2009 (X = data collection stage), November 2009 (Y = during writing stage), December 2009 (Z = writing stage)

There were five issues with “high” degree of difficulty rated by Tarn as of 17 December, 2009, compared with the first coaching on 3 November, 2009. The five issues are: Meeting family obligations (A2), Meeting social demands (A4), Financing my thesis (A5), Keeping healthy/fit

(A7), and Feeling my study is valuable/worthwhile (A10). A further discussion with Tarn on these issues is presented next: step 3.

Step 3: The researcher and Tarn discussed the latest findings, analysis, and solution.

The goal is much closer. I can see how my thesis can be structured, but before that I could not see it. That is quite motivating, Tarn seemed happy with her thesis progress, and agreed when the researcher demonstrated her revised IO Map (Figure 4.21). In order to achieve the revised goal, the Critical Success Factors (CSFs) or milestones for achieving the goal, and Necessary Conditions (NCs) are presented in Step 4.

At this stage, it would not be so much guidance, but I need support from my supervisor, and people around me, Tarn explained when discussing the first Critical Success Factor (CSF) of her new IO Map. Then the researcher proposed to separate the supervisor from friends and family members. Regarding the supervisor, *I need someone standing there at the finishing line to motivate me,* said Tarn. She needed encouragement from her supervisor as well as timely and constructive feedback. When the researcher inquired about action needed to be taken from her side, Tarn replied, *I have to keep a timeline and submit my draft chapter consistently.* See Figure 4.21

I still have lots of friends, said Tarn when discussing Meeting family (good friends) obligation and Meeting social demands. Then researcher showed Tarn her IO Map milestones from the first “coaching” session. To achieve her goal, Tarn needed “Supportive environments from my good friends, family members, and my supervisor” (CSF2, Figure 4.21). *I don’t have time to see everyone, but to prioritise who I should spend time with,* was the new policy decided by Tarn, and agreed by the researcher. *I should not socialise with those who do not support me because there are people don’t really care and don’t understand me,* Tarn justified her decision, but she would keep in touch with good friends and family members who often motivated and supported her (see new IO Map, Figure 4.21). To narrow down the network’s size, maintaining friendships with the people who motivated and/or supported her, should help minimise distractions and maximise time on her Master’s thesis writing.

I feel so new in a way, Tarn mentioned after being asked by the researcher about a high degree of difficulty on “Feeling my study valuable or worthwhile (A10)”. Tarn had read some other Master’s theses with similar research, but she found out that her analysis was different from

the others, and not good enough. *I read other people's theses, and I look at them--wow-- I have not done this or I have not done that*, said Tarn. Then the researcher asked Tarn about the feedback from her supervisor. *The feedback is very specific to what I am writing, not something like overall*, Tarn replied and complained, *It's hard to get a big picture*. Tarn wished to know if she was doing the right thing (her research design and data analysis). It reconfirmed that entity 302/I am new to a Master's thesis (See Tarn's current Reality Tree/CRT, Figure 4.8) was the root cause of A10 issue. Unfortunately, this root cause was out of Tarn's span of control, and sphere of influence (Tables 4.2-4.3). *I don't know if it is something that I ought to worry about*, said Tarn.

I need to stay fit because my health is not very good, Tarn explained when discussing on the health issue with high degree of difficulty (A7). Tarn continued, *I need access to gyms, and I need time*. According to Tarn's IO Map, she needed to manage her time properly in order to achieve her goal. *I am now more aware of managing my time. I try to utilise my free time. I've never thought that I could read several papers related to my thesis while I was sitting in the graduation ceremony last week. Now I can get a lot more done. I can also work on my thesis on Sunday which is quiet, and I can concentrate well on my work*, Tarn proudly told the researcher. Tarn agreed that in order to manage her time well, she needed good planning for social interactions, studying, and exercising. See Tarn's revised IO Map, Figure 4.21, next,

Step 4: TOC tools applied to Tarn's performance issues

Step 4.1 IO Map for "Coaching II"

Figure 4.20: Tarn's revised IO Map for Coaching II (pink entities were added to the IO Map of Coaching I)

The final revision of Tarn's second level IO Map (Figure 4.21) was constructed based on her preferences. The goal was to produce a quality thesis within January 2010. In order to achieve the goal, Tarn identified four milestones or CSFs: quality time management (CSF1), supportive environments from her good friends, and family members (CSF2), Staying fit (CSF3), and supportive & hands-on supervision.

Compared with Tarn's IO Map from "Coaching I", Tarn had developed new entities (in pink) for both Critical Success Factors (CSFs) and Necessary Conditions (NCs). The new entities indicated that Tarn had been learning and gaining experience from her thesis journey. The IO Map helped illustrate clearer direction.

Step 4.2 Prerequisite Tree (PRT) for "Coaching II"

By the time the "Coaching II" took place, Tarn did not work part-time, and had received financial support from her parents. Thus, the distraction from the part-time job had been eliminated. What still remained, was the distraction from certain friends (not Tarn's good friends). However, Tarn had stated clearly on her IO Map's Necessary Condition that she

determined to prioritise who she should spend time with. Therefore, the only Intermediate Objective added to the new PRT (Table 4.8) for “Coaching II” was entity IO13 in accordance with one of her IO Map’s NCs: I prioritise who I should spend time with and not to spend time with those who do not support me.

Objective: To minimise distractions that prevent Tarn from focusing on her thesis	
Obstacle (Obs)	Intermediate Objective (IO)
Obs1: Distractions by friends	IO11: I remind myself that thesis is my first priority
	IO12: I create a daily timesheet of major activities that I have to do including time for my thesis and for my friends.
	IO13: I prioritise who I should spend time with and not spend time with those who do not support me.
	IO14: I explain to my friends that I must work on my thesis first and complete my thesis on-time.
	IO15: I explain to my good friends that I need their support and motivation in order for me to work on my thesis as a first priority.
	IO16: I reward myself whenever my thesis is progressing well.
Obs2: Distractions from other things	IO21: I use my IO Map to navigate my thoughts.
	IO22: I follow the timesheet strictly.

Table 4.9: Tarn’s PRT for Coaching II

4.3.2: Coaching summary

The coaching sessions offered an opportunity for the researcher and the interviewee to meet and discuss in depth, the performance issues experienced by the interviewee after the individual interview. The researcher, who acted as a coach, had the opportunity to understand the performance issues encountered by the participant (Tarn) over time, from her data collection stage to writing stage. From “Coaching I” to “Coaching II”, the researcher was able to employ

some of the TOC tools, Intermediate Objective (IO) Map and Prerequisite Tree (PRT), to effectively handle Tarn's critical issues. The TOC IO Map and the PRT are stand-alone, handy tools that can be understood readily by new users, including Tarn. Unfortunately, with an aim of finding quick solutions within the limited time of each coaching session, the researcher was not able to employ the Current Reality Tree (CRT) to help find the root cause of Tarn's new issues. However, the coaching session offered not only some practical solutions to be implemented, but also the two handy tools, IO Map and PRT, for future improvements.

Tarn's 1st Interview (June 2009)	Tarn's 1st Coaching (November 2009)	Tarn's 2nd Coaching (December 2009)
Thesis stage: Data collection	Thesis stage: Writing	Thesis stage: Writing
Major performance issues	Major performance issues	Major performance issues
	A1: Staying motivated (High)	
	A2: Meeting family obligations (High)	A2: Meeting family obligations (High)
	A3: Meeting job obligation (High)	
A4: Meeting social demand (High)	A4: Meeting social demand (High)	A4: Meeting social demand (High)
	A5: Financing my thesis (High)	A5: Financing my thesis (High)
A6: Finding time for my thesis (High)	A6: Finding time for my thesis (High)	
	A7: Keeping healthy (High)	A7: Keeping healthy (High)
A8: Keeping the deadlines/timeline (Very high)	A8: Keeping the deadlines/timeline (High)	
A10: Feeling my study valuable or worthwhile (Very high)		A10: Feeling my study valuable or worthwhile (High)
	A13: Feeling motivated/supported (High)	
A15: Not knowing how to get started (Very high)		
	A34: Writing the results (High)	
Critical root causes	Tarn's critical issues	Tarn's critical issues
101: I am very bad at making decisions	Staying focused (Working part-time)	Uncertainties
105: I was not given enough information about doing a Master's thesis	Distractions	Distractions
301: I lack knowledge to do research		
TOC tools employed	TOC tools employed	TOC tools employed
IO Map, CRT, EC, FRB, PRT	IO Map and PRT	IO Map and PRT
Proposed solution	Proposed solution	Proposed solution
I consult/discuss any issues related to my research project with my supervisor in order to help improve my time management, and prioritise my research activities to enhance my success.	Second level IO Map (Figure 4.18) PRT (Table 4.7)	Second level IO Map (Figure 4.21) PRT (Table 4.8)

Table 4.10: Summary of the coaching sessions with Tarn

4.4 Chapter Summary

The Theory of Constraints (TOC) offered the Thinking Process (TP) tools to help improve the performance of four Master's thesis students and address their "lows". Despite the four individual interviewees, Tarn, Tammy, Ton, and Tim, being at different thesis stages, and with various types of performance issues, the researcher was able to utilise TOC TP and tools step by step to manage the interviewees' performance issues and come up with simple solutions to improve each interviewee's performance. A potential limitation of the individual interview research was that the solutions found could not be acted on by the interviewees at the different thesis stages, or, thus, tested through action. To overcome this limitation, the research phase II of the research design included two coaching sessions (action research) with one interviewee (Tarn) from phase I (see Table 4.9). The coaching sessions with Tarn confirmed the feasibility and validity of the TOC solutions recommended by the researcher. The TOC TP single tools, the IO Map and PRT, proved valuable in motivating Tarn and providing her with clearer direction and an implementation plan. Thus, Tarn improved her performance over a relatively brief period of time.

Chapter Five: “Maximising the Highs”: Applying Appreciative Inquiry (AI) to Master’s thesis students’ performance issues (Research findings, and Analysis)

Whereas the Theory of Constraints (TOC) improves performance by identifying and addressing the root cause of a problem, or the lows, Appreciative Inquiry (AI) seeks to focus on the root cause of success, or the highs. Chapter Five presents the findings and analysis of the four selected Master’s thesis students from VUW who took part in the Appreciative Inquiry (AI) individual interviews. This findings and analysis chapter is divided into five main sections: (1) AI interviewees; (2) Applying AI 4-D Cycle (Discovery, Dream, Design, and Destiny) to the four interviewees (AI analysis); (3) Conclusion; (4) Coaching sessions; and (5) Summary.

5.1 Appreciative Inquiry interviewees:

For comparative purposes, the recruited AI interviewees were chosen using the same procedure as TOC interviewees, with similar characteristics to the TOC group. The AI interviewees are referred to as Apinya (AI1), Alice (AI2), Adisorn (AI3), and Alex (AI4) (See Table 5.1). The names used in this research are not their real names. Each of them had some commonalities and differences in their characteristics. The similar characteristics were age, and all being full-time students. However, in terms of thesis stages, Apinya was doing data collection, Alice and Alex were doing data analysis, and Adisorn was finishing. Alice and Alex were local students among the group, while Apinya and Adisorn were international students who speak English as a second or third language.

There were some critical factors (financing, supervisor selection, and goals) that might have had an impact on their thesis performance, as discussed in Chapter Four, section 4.3.2. In terms of financing their theses, all the AI interviewees were on a scholarship. Apinya and Adisorn wanted to pursue a quality and on-time thesis, whilst Alex wanted to produce a quality thesis, and Alice preferred to complete her thesis on-time. There were various reasons for the supervisor selection: Apinya and Alex selected their supervisors by themselves, Adisorn’s supervisor was recommended by the School, and Alice got her supervisor by default.

Apart from the top ten major performance issues, similar to the TOC interviewees, the common performance issues experienced by the AI interviewees, both local and international students,

were writing issues: writing proposal (A20), writing acceptable English (A22), writing the literature review (A23), and writing the results section (A34).

Interviewees' name (not their real names) and their code $\Rightarrow$	Apinya (AI 1)	Alice (AI 2)	Adisorn (AI 3)	Alex (AI 4)
Gender	Female	Female	Male	Male
Age	30&<30	30&<30	30&<30	30&<30
Local/International (Int'l)	Int'l	Local	Int'l	Local
Thesis stage	Data collection	Data analysis	Finishing	Data analysis
Full-time/Part-time study	Full-time	Full-time	Full-time	Full-time
Financing	Scholarship	Scholarship	Scholarship	Scholarship
Supervisor selection	Self	By default	By School	Self
Primary reason for undertaking a thesis	Career enhancement	Career enhancement	Career enhancement	Personal satisfaction
Thesis goal	Quality and on-time	On-time	Quality and on-time	Quality thesis
Major performance issues Refer to Table 7.2 and Appendix A)	A1,A8, A10, A15, A16*, A30, A31*, A34*	A7,A10, A13, A15, A16, A19, A28, A29*, A30*, A38, A39, A40	A1*,A8, A13*, A17, A18, A19*, A22*, A27 A28*, A30	A5*, A10*, A13*, A14*, A15*, A16*, A20, A34

Table 5.1: Characteristics and other important information of the 4 AI interviewees.

Remarks:

1. Red colour highlights the major performance issues representing the top ten major issues.
2. The performance issue numbers (A1, A2, A3,...) with * (Asterisk) symbol on top represent a “very high degree of difficulty”, but those issue numbers without * (Asterisk) symbol mean “high degree of difficulty”.

The performance issues experienced by AI interviewees were used as criteria to match with TOC interviewees for comparison purposes. The issues were identified by each AI interviewee as having a “very high” or “high” degree of difficulty (referring to web-based questionnaire survey#22: Appendix A). Some of the issues were reframed into a positive context, according to the AI procedure for approaching problematic issues. The positive questions of AI (see Chapter Three, Figure 3.2) were employed as a main tool during the individual interviews when applying AI, see next section.

5.2 Applying Appreciative Inquiry (AI) to the four AI interviewees

In this section, the researcher applied Appreciative Inquiry (AI) 4-D Cycle to the individual interview results step by step: Discovery, Dream, Design, and Destiny. Prior to embarking on the AI 4-D Cycle, the affirmative topic choice for each interviewee needed to be identified, as outlined next.

5.2.1 Affirmative Topic:

The whole process of AI 4-D Cycle aims to facilitate a positive change or improvement in the focus area: an affirmative topic. In organisations, there are usually various areas to be emphasised during interventions. Each topic should reflect the positive core of an organisation (Reed 2007, p.29) or anything that the people of an organisation feel gives life to the system and/or a direction that members of the organisation find desirable, or uncovers, and leverages their strengths (Cooperrider & Whitney, 2005, pp.17, 21). In addition, topics should meet the following criteria:

- Topics are affirmative or stated in the positive.
- Topics are desirable. They identify the objectives people want.
- The group is genuinely curious about them and wants to learn more.
- The topics move in the direction the group wants to go.

(Cooperrider et al, 2008, p.41)

Once 3-5 topics are selected, the system owner (s) would reframe the topics into a positive context, if necessary, and elevate the topic contents to a higher level, in order to enhance the best outcomes for the organisation.

In this research, where AI was applied to an individual context, a Master's thesis student, the researcher had to compose each student's affirmative topic, based on his/her answer to the web-based survey, and the results of the individual interviews.

According to the web-based survey's result (question#20, Appendix A), the majority (75%) of participants identified that a quality and on-time thesis was their goal. In addition, from the same web-based survey, another question, "What was your primary reason for undertaking a thesis?" (question #5, Appendix A) fits well with Cooperrider et al.'s criteria, as stated above. The answer to question #5 is the direction that each student (a system's owner) preferred to take. These included career enhancement (Apinya, Alice, and Adisorn) and personal satisfaction (Alex). Therefore, the researcher used the answers to these two questions (#5 and

#20) from the survey conducted prior to the interviews, as the preliminary affirmative topic choice for each AI interviewee.

Apart from taking relevant information from the web-based survey results to compose each AI interviewee's preliminary affirmative topic, the researcher adapted some AI positive questions to the Master's thesis context, and inquired about the interviewee's *positive core*. The adapted positive questions from AI were: "What energises you during your study or Master's thesis journey?" and/or "What do you want more of?" and/or "What are the core factors that give life to your life and your study?" The AI interviewees' answers to the additional AI questions, and the rationale for composing each AI interviewee's affirmative topic, are explained next.

Apinya (AI1)'s answer to the AI questions comprised three main factors to add into her affirmative topic choice. The three main factors were: getting a good job at her homeland, good supervision, and supportive friends and family members. Apinya said: *What drives me to pursue a Master Degree? First of all, I want to go back to my country and get a good job in X (the name of one organisation) in my country. I want to finish as soon as I can.* With an aim to produce an outstanding Master's thesis, Apinya hoped to use her Master's Degree to apply for her dream job and organisation as soon as possible (in other words, she was keen to complete her Master's thesis early). Secondly, Apinya had two supervisors: a primary supervisor (the same she had during her Honours) and secondary supervisor (new). She selected the same primary supervisor that she used to work with during her Honours studies because she wanted to maintain good supervision: *My supervisors have a lot of good suggestions. I just have to make sure they know my progress and I do have good progress. They're quite flexible as long as they knew my progress.* According to an experienced postgraduate supervisor, good supervision is one of the key success factors of research students (Pongsart, 2005, p.141). In addition, Apinya argued: *The third is the support from my friends and family that help with keeping me on track.* Therefore, the researcher combined these three factors with her quality and on-time thesis for career enhancement and composed the affirmative topic for Apinya (See Table 5.2).

Alice (AI2)'s affirmative topic components that differed from Apinya's (AI1), were from her favourite outdoor activities, combined with a project she is passionate about. Alice enjoyed camping and all outdoor activities, *I would not have done a Master's thesis if I had to be in a room all day, every day, no way. Definitely my main motivation was to be able go out.* Alice

always wanted to work on a project concerning conservation and environmental issues. She talked about the project she did during her Honours with pride, *The project is something I am passionate about* (related to environmental issues and conservation). *I really enjoyed my fieldwork. It was incorporating local knowledge and then looking at the environment and the landscape...That was the practical plan and I helped them with that. It was great. I was very happy and seeing the results of your hard work is quite nice.* Alice's Master's thesis also focused on conservation and environmental aspects. The researcher composed her affirmative topic based on Alice's answers, and her desire to complete an on-time thesis for her career enhancement (See Table 5.2).

Similar to Alice, Adisorn (AI3), with his interest in the environment and conservation, combined with wanting to use the Master's degree from NZ to apply for his dream job in his home country were the main part of his affirmative topic. He said: *I like all the papers related to environment and conservation.* He also talked about his passion, *I am passionate about the development area, trying to integrate conservation and development. I also like social justice, especially in my community back home. I am trying to develop my interest in those areas. I am passionate about fairness, to do things that are fair to the people and to promote fairness.* Adisorn's Master's thesis was examining environmental issues in his home country. Therefore, the researcher developed Adisorn's affirmative topic according to AI concepts, (section 5.2.1), based on his passion, favourite subjects, and his future career goal that he wanted to achieve (See Table 5.2).

Similar to Apinya (AI1), in terms of supervision, Alex (AI4)'s learning style matched with the supervision of one of his lecturers (current supervisor), and this was the main component of his affirmative topic. Alex cheerfully talked about the supervision style that he enjoyed, *I think the way my lecturer approached learning was very different from other academics I studied with. It must be more holistic. She cared about our personal development not just the grade we would get. She cared about us as people. I think that she took us seriously. She really wanted to extend us; she challenged us and actually made us go through like a transformative experience.* Therefore, supportive, and hands-on supervision for personal improvement/development was Alex's preference. He was happy that he chose the same supervisor for his Master's thesis.

AI interviewee →	Apinya (AI1)	Alice (AI2)	Adisorn (AI3)	Alex (AI4)
Thesis stage	Data collection	Data analysis	Finishing	Data analysis
Reason for undertaking a thesis	Career enhancement	Career enhancement	Personal satisfaction	Career enhancement
Thesis goal	Quality and on-time	On-time	Quality and on-time	Quality thesis
Desire	To have supportive system, and good supervision, to apply for a good job at one organisation by using a quality qualification	all outdoor activities and with my study	Environments, and conservations, to get my qualification, integrate conservation and development ,social justice, and promote fairness	supportive academic staff, cohort of students, give feedback to one another, challenging
Affirmative Topic	<i>Outstanding quality and on-time thesis with good supervision and support from friends and family members for career enhancement</i>	<i>On-time thesis with outdoor activity, environmental, and conservation research based for career enhancement</i>	<i>Quality and on-time thesis with environments and conservation based research for social developments and career enhancement</i>	<i>Challenging holistic, quality thesis with supportive and hands-on supervision for personal improvement</i>

Table 5.2 Affirmative topic and other important information of each AI interviewee

Further to his desire to produce a quality thesis through good supervision, Alex also wanted to improve himself. He talked about what he valued most about himself: *I really like the way that I was trying to approach learning. That is, I was trying not to focus much on the end —results – the grades, but I was trying to look at learning as a holistic process. I tried to be more holistic.* He valued and appreciated a holistic approach learning process and tried to learn as much as he could from the holistic process.

To answer the AI positive question of what energised him during his study, Alex concluded: *I think having supportive academic staff, who push you, take you seriously and treat you like someone who has knowledge, really helps. They treat you like an adult, so you feel valuable. I think having a cohort of students, who really know one another, work with one another and can give feedback to one another, is so important. And I think these are what motivate me in*

my learning. It may be difficult to work with other students who do not have that kind of way of thinking or worldview. It's quite challenging if you don't want to work in a way that people usually work. Some things that impressed Alex from his previous year's class, for example, classroom environments, might not be applicable or relevant to independent study as with a Master's thesis. However, with proper guidance from his supervisor or SLSS postgraduate tutors, Alex might find a supportive network that could challenge him or provide constructive feedback while pursuing a Master's thesis.

Based on Alex's impression and preferred supervision and learning approach, combined with his quality thesis for personal satisfaction, the researcher composed an affirmative topic for him accordingly (See Table 5.2).

The affirmative topic of each AI interviewee demonstrated in Table 5.2 was unique, based on their own aims and desires, including what they wanted besides completing a Master's thesis. After identifying the affirmative topic or the focused area for each AI interviewee, the next process is to apply AI 4-D Cycle, beginning with the first D: Discovery.

5.2.2 Discovery: identify what gives life, and appreciate the best of what is

The discovery phase is about discovering the organisation's key strengths and appreciating the best of what is (Lewis, Passmore & Cantore, 2008, p.49), and/or past achievements. In order to recognise and appreciate the best of what is or what has been, Cooperrider and Whitney (2005, p.14) argue that at the heart of AI is the appreciative interview. A one-on-one dialogue among organisation members and stakeholders using questions related to: highpoint experiences, values, and what gives life to the organisation when at its best. The successful appreciative interview is one that provides at least one insight into the root cause of success (Hayes, 2007, p.302). In addition, Discovery involves purposefully affirmative conversations among many or all members of an organisation including external stakeholders, "best in class" benchmark organisations, and members of the organisation's local community (Whitney & Trosten-Bloom, 2003, p.8). The conversations in organisations with many organisation members involved, can enhance the "rich" outcomes of the organisation's Discovery.

However, to apply AI to an individual, in the Master's thesis student's context, the outcomes of the one-on-one interview relied on the conversation between the researcher and the interviewee. The researcher employed AI positive questions (Chapter Three) provided by AI

experts, in these individual AI interviews with Apinya, Alice, Adisorn, and Alex. In addition, to enhance the Discovery phase outcomes, the researcher allowed the interviewee to spend sufficient time talking about his/her high point experience and their past achievements. The outcomes of each AI interviewee are outlined next.

The high point experience, and past achievements for Apinya (AI1) were during her Honours studies, a year ago: *The past achievement I value most will be my Honour's qualification, especially as the VUW Honours is known to be really comprehensive and gruelling. It consists of gruelling assessment, presentation, tasks, piles of readings, and research reading. To overcome all those obstacles in a different education system (English is not my first language), to compete with local students, and to achieve VUW Honours, is quite an achievement. My key success factors are perseverance, self-motivation, determination, the whole support system (friends and family members), and good supervision.* Apinya's past success during her Honours classes was a good platform for her to pursue a Master's thesis, especially with the key success factors that she identified above. Besides the ability of students, motivation and support were found to be the two most important factors to enhance Master's thesis students' success, as suggested by four VUW postgraduate supervisors' interviews (Pongsart, 2005, pp.140-141).

In selecting a primary supervisor who she had worked well with during a small project for one of her Honours papers, Apinya is utilising her studying strength factor, common to AI practice. This positive experience could be the main reason why she chose the same supervisor. Apinya said (section 5.2.1) that good supervision was one factor that energised her when embarking on a Master's: *The good thing about research is that you can always follow up your progress, you can get feedback from your supervisor(s), as it's one on one. He wanted you to add, you can always add it. So I guess a good relationship with your supervisor helps.* She added: *My supervisor supervises the same way when I was doing an Honours Degree. We've established a rapport. We know each other's work. It (doing research) is a lot of readings and just keeping up with your supervisor, and always referring to your supervisor.* Thus, good supervision was part of Apinya's whole appreciative support system, while pursuing her Master's thesis.

Within Apinya's appreciative support system, she included her family and friends. Support from her family could be one of her motivating factors to enhance her success, during her Master's thesis journey. At this stage, she was happy: *I also keep in touch with my mother. We usually call each other at least once a week. She motivates me well.* Apinya talked about how

she enjoyed working with her good friends (classmates) when doing her Honour's assignments: *I remember that in one subject that we got several issues and within one issue we got 5 articles. I got quite a pile of articles to read. I remember towards the end we decided that one person (in my group) would do one issue. After that we would sit together, present, and discuss with the class the whole thing. That kind of activity fastens everything together, the whole studying thing. When you do a critique you remember more. When you do a group discussion you remember more.* She concluded, *without my friends, I could not get a good result and be able to overcome the whole stressful time during my Honours year, which was stressful because we have to meet a lot of deadlines.* In contrast, working independently on a one year thesis differs from Honours study. Apinya admitted, *Now I am doing a Master's, but most of my friends during my Honours went back to my country to work there. Because for research paper you cannot really do a group study, so for those we can do group study we always try to support each other and reduce stress. Doing a Master's Degree thesis is really constructive and systematic.* However, the support from classmates that Apinya had been used to, might be compensated for by having good officemates (while doing independent study: a Master's thesis). According to Apinya, *I talk to my officemates a lot. It helps to talk with other people.* Apinya seemed to have adapted well to the new environment of doing a Master's thesis.

Aside from the positive side (high point experience, and past achievements) of Apinya's experience, she also identified the Meeting deadlines/timeline (Issue#A8) as one of her performance issues with a high degree of difficulty (see Table 5.1), according to the web-based survey. However, AI requires its practitioners/users to reframe any problematic issues into a positive context. Therefore, the researcher asked Apinya to talk about her action to enhance submitting her assignments on time or prior to the deadline. In her answer to this positively framed question, Apinya disclosed more of her strengths: *When I did Honours at VUW, I usually submitted the assignments on time, as I work well under pressure.* Being able to work well under pressure was one of her strengths, in order to cope with deadlines. As AI has its focus on strengths, working well under pressure was a useful strength that could help enhance Apinya's success in doing a Master's thesis.

To sum up, Apinya's past achievements and strengths from the AI "Discovery" phase that she would be able to utilise while doing a Master's thesis were perseverance, self-motivation, determination, the whole support system (friends and family members), good supervision, and working well under pressure.

With a different affirmative topic from Apinya, Alice (AI2)'s past achievements and strengths were also completely dissimilar. Alice said: *I love all outdoor activities and with my study, I really value the experiences, the fieldwork and then applying what I learn in the field, applying my knowledge of sciences to my fieldwork and getting the results for analysis. It's good to have a connection to the living environment and the science, the literature, all together.* Furthermore, Alice explained about her thesis and her passion for the environment and conservation research area, *a component of my thesis is interviewing local people and discussing with them their relationship with the subject that I am studying. All these different perspectives, and just seeing everyone's perspective, nobody is wrong, there are so many different ways of looking at it at, science, and the subjects (that I am studying), and the environment. It's really good.* Performing her fieldwork with local people who shared her passion, motivated Alice well while she was embarking on her Master's Degree. She also added: *The result of my thesis is now doing exactly the same thing incorporating the environment to influence what I see in the field. I think there are lots of positive outcomes that will come out of my thesis. I love it because it is practical, and not so abstract that nobody can relate to it at all.* Doing a "Practical" project was another motivating factor that Alice chose to use to enhance the on-time thesis for her career enhancement.

In conclusion, Alice's strengths and preferences were for practical outdoor activity research, closely related to her passion for environmental and conservation issues.

Environmental and conservation issues were also of strong interest to Adisorn (AI3), similar to Alice (AI2). Adisorn said: *I am passionate about the development area, trying to integrate conservation and development area. I like all the papers related to the environment and conservation.* For Adisorn's past achievements and strengths, he described himself as, *a person who can do things regardless [of] being de-motivated and I am a person who can spend extra hours in doing things, I work hard on what I want to achieve. I also have an ability to search for materials. I can search very fast.* "Working hard" enhances Adisorn's success. As one VUW Supervisor (Pongsart, 2005, 141) describes one capability of successful thesis students: *They worked hard and gave enough time to their theses.*

Adisorn's high point experience was long ago: *My high point experience of study is my primary school. I was quite good in mathematics and science. I used to get good grades. I found all the subjects easy to understand. I had plenty of time to play or to socialise. I did not have to work*

hard to get good grades. These past achievements that help enhance his Master's thesis within the AI context, could be utilised well if he was conducting quantitative research, and/or doing a Master's in science. Unfortunately, his thesis is qualitative, and not science based, so he could not utilise his strengths in mathematics and science. However, Adisorn's thesis was related to his passion on environmental and conservation, which should motivate him well and help enhance his quality and on-time thesis for his career enhancement.

The last AI interviewee, Alex (AI4), identified clearly that personal satisfaction was the main reason for pursuing a quality Master's thesis. Therefore, a lot of his impressive stories were related to his personal improvements and/or developments. Alex's answers to the AI positive questions (Chapter Three) related to his past achievements and strengths: *The community-based project, which was the core requirement of the course, was the project that we did with co-researchers in the community. I just found that it was very challenging and really relevant to me in terms of personal learning. That paper was amazing, as it pushed and challenged me. It was absolutely challenging.* He also talked about his relaxed learning style, *I did not work really hard, but I was selective about what I did. I did not tend to overdo stuff, if I knew what I needed to do to get the mark I wanted to get.* He contributed to the classes he took with his strength and creativity: *I like the fact that I usually brought something different to the class. I could challenge people in the class. It's important that we kind of helped one another learn through co-learning and co-teaching. I've found it important. I got some good feedback both from my friends and from my lecturer.* Good feedback from his classmates and lecturer seemed to motivate him well and enhanced his learning, and self-development.

In addition, the researcher used positive inquiry to encourage Alex to talk about the strengths he mentioned in the web-based questionnaire survey #25 (Appendix A). He happily recalled: *I think that I really value creativity now...I think it is something that came more from me which has been very helpful. It will be very helpful for my thesis, and it was definitely very helpful for my fieldwork. It enables me to adapt things and think in a new way. I feel that it's very helpful that I use my ingenuity or adapt new things all the time.* He incorporated his creativity well into his Master's research, *It's a kind of process in my research. I try to do something new. I did not do the same interview every time. I start with a holistic question, and then I start doing other things like getting people to write stories for me. I start getting people to draw stuff for me. I think that is very useful. I am learning it.* Alex's strengths included an ability to use networks/contacts, technical skills in writing, and reading. Furthermore, Alex was trying to

focus more on learning than on the end results. He had an interesting approach, *I am having a very relaxed approach. I just do it when I need to get it done. I do not spend all day in the library. I am a selectively hard working type, and I like getting feedback. I like my work.* “Getting feedback” was also one of the motivating factors Alex often mentioned.

To sum up, Alex’s strengths and past achievements in relation to his study were being relaxed, but creative and challenging, with a holistic approach to co-learning and getting constructive and timely feedback.

“The best of what is” for each AI interviewee was composed by the researcher, based on using AI positive questions, as shown in Table 5.3.

	Apinya (AI1)	Alice (AI2)	Adisorn (AI3)	Alex (AI4)
Thesis stage	Data collection	Data analysis	Finishing	Data analysis
Reason for undertaking a thesis	Career enhancement	Career enhancement	Personal satisfaction	Career enhancement
Thesis goal	Quality and on-time	On-time	Quality and on-time	Quality thesis
Desire	perseverance, self-motivation, determination, supportive system, and good supervision	all outdoor activities and with my study	Environments, and conservations, to get my qualification, integrate conservation and development ,social justice, and promote fairness	supportive academic staff, cohort of students, give feedback to one another, challenging
Affirmative Topic	Outstanding quality and on-time thesis with good supervision and supportive from friends and family members for career enhancement	On-time thesis with outdoor activity research based for career enhancement	Quality and on-time thesis with environments and conservation based research for social developments and career enhancement	Challenging Co-learning quality thesis with supportive and hands-on supervision for personal improvement
“Discovery”: the best of “what is”	<i>Good studying skills, work well under pressure, perseverance, self-motivation, determination, close rapport supervision, good support from friends and family members.</i>	<i>Practical, outdoor activities combined with passionate environmental and conservation research base.</i>	<i>Persistence, determination, and good searching skills. Conduct research related to own passion on environmental and conservation issues to enhance fairness and justice in homeland.</i>	<i>Relaxing, creative challenging holistic approach co-learning with constructive and timely feedback supervision.</i>

Table 5.3: AI interviewees’ Discovery with related information and data

5.2.3 Dream: identify what might be, and envision the results the world is calling for

After appreciating his/her own past achievements and strengths in the Discovery phase, the second phase of applying AI is Dream. The primary purpose of the dream phase is to expand or extend people’s sense of what is possible (Cooperrider et al, 2008, p.44) by lifting up the best of what has been, and inviting people to imagine it even better. Dream amplifies the positive core of the organisation, and stimulates more valued and vital futures (Whitney & Trosten-Bloom, 2003, p.179). Cooperrider et al (2008, pp.132-133) also mention, when applying AI to organisations, that the dream phase is the time to push the creative edges of possibilities and to wonder about the organisation’s greatest potential. Furthermore, dreaming is a strategically significant activity that leads to higher levels of creativity, commitment, and enthusiasm for the organisation and its future. By applying AI to an organisation, its members

can share their stories, and dreams which enhance the Dream phase's outcomes: what might be the future for the organisation?

To apply AI's Dream phase to the individual context of this research (each Master's thesis student), AI interviewees were prompted by another set of positive questions to express their wishes in doing a Master's thesis. During the individual interview, the researcher asked each AI interviewee to identify three wishes that would enhance the vitality of their Master's thesis:

Apinya (AI 1): My three wishes would be to get a distinction for Master's Degree, to finish my thesis by December this year. I can go back, get a job and work in my country as soon as possible. The third wish, I am not too sure about publishing my Master's thesis. When I have achieved my Master's Degree thesis with a distinction, I may feel relieved, very relieved and be looking forward to a new phase of my life, because I want to get a job and work. I am looking forward the next phase for my professional or working life. To use the qualification of Master's Degree to find a good job is what I have been looking forward to. I am also hoping that from my analysis, I can get something for the public sector and hope to find some contribution that will be very useful.

Apinya's answer fulfilled the purpose of AI in Dream phase well; she looked beyond her graduation to use the qualification to apply for her dream career at one organisation in her home country, apart from completing a first-rate Master's thesis. She also wished to make a contribution from her thesis to her field of study. Apinya wanted to do her best on her Master's thesis in order to enhance her life after the thesis. The researcher combined Apinya's answer from Dream phase with the findings from her Discovery phase in the next section: Design (see 5.24).

Alice (AI 2): About the three wishes, I am still in a data analysis stage, I am writing some stuff, from a practical perspective that may be nice know in terms of structure. It's quite difficult to know what to do, when to do it, and when I start to do data analysis and start to write. Sometimes I spend a lot of time reading and then it turns out not to be relevant. I guess certainty in terms of helping with the process of writing, therefore creating the visuality of my thesis, maybe a bit of guidance on which way to approach the thesis would help.

While Apinya looked beyond her thesis, in Dream phase, Alice tended to focus on her current situation. At this stage, data analysis, Alice wanted to overcome some performance issues she was experiencing: analysing and thesis writing. Alice wished to have clear research guidelines as she stated in her dreams, in order to help improve her research analysis and writing.

Coincidentally, Alice's dream was similar to three of the four TOC interviewees' critical root causes (see Figure 4.21), in terms of the impact of unclear research guidelines on doing or writing a thesis. In contrast, according to AI experts, AI focuses on root cause of success rather than the root cause of a problem. To focus on what enhances achievements, AI allows AI participants/users to appreciate past or current success, and employs the Dream phase to envision or expand possibilities. For Alice's dream, which is similar to the three TOC interviewees' critical root causes, it reconfirms that AI approaches problems from a different angle: a positive context. By sharing appreciating stories, people seem to ignore or overlook problematic issues which AI does not focus on. However, Alice's dreams were useful for the researcher to combine with her Discovery outcomes in the Design phase, next section. Alice's dream, which was similar to three TOC interviewees, is discussed further in Chapter Eight.

Similar to Alice in terms of strengthening past weaknesses, Adisorn (AI 3)'s three wishes to enhance his quality and on-time completion thesis were:

1. Good English writing
2. Good literature review
3. Organising my thoughts, and arranging things in order well.

Adisorn had submitted his final thesis by the time this interview took place. He said: *If these wishes come true I will be very happy and enjoy my academic life. I will certainly get a very good grade, but I feel that I will not probably because of these main three things.* "These three main things", the constraints, weakened Adisorn's ability in achieving his goal, in pursuing his Master's thesis. Both Alice and Adisorn's dreams indicated that their serious problems needed to be fixed first, prior to applying AI. Alternatively, the constraints encountered by Alice and Adisorn could be reframed in a positive context as an affirmative topic choice, with the AI 4-D cycle applied around that topic instead. Alice and Adisorn's dreams are further discussed Chapter Eight: Discussion.

In Adisorn's case, the researcher also learned that there is a limitation to applying AI to an individual, rather than an organisation. At certain points, it may not be applicable for many

students who pursue a Master's thesis to utilise their strengths in order to overcome technical weaknesses in the short term. Adisorn, who comes from non-English speaking country, said, *Learning English is very difficult where people don't speak the language.* Writing a thesis in academic English, for students from non-English speaking country, needs special technical support from experts to ease this crisis. However, Adisorn appeared to have used his persistence and a hard-working style of his own to get through the final thesis stage, despite his language difficulties. Dealing with serious problematic issues that require fixing urgently, could be one of AI's limitations, when applied to individuals. More is discussed in Chapter Eight: Discussion.

Like Alice and Adisorn, whose dream focused on their constraints, Alex (AI4) also mentioned things that had gone wrong in his data collection stage in his *three wishes*:

1. *During the designing of my research, I had not programmed in the effect of emotional issues that can come up in this kind of research, because sometimes it was very difficult, challenging, and sad research. One of the wishes I have is to have clinical supervision or counselling support to talk through those emotional things that my participants would be talking about and would stay with me sometimes. I would strongly recommend that to every other research student as well. If you work with vulnerable groups or people who may be upset or may bring up issues that you may struggle with, you should get that kind of supervision.*
2. *When I got to my fieldwork, I did a lot of reading before I started talking. I read a lot before getting to collect data (interviews). I recommend people who do overseas fieldworks that they start talking first and do not keep reading. You still learn to talk and make connections. As soon as I started talking to people, it was not so hard.*
3. *I wish I had been better prepared in terms of research methods. Since when I went overseas and talked with foreign students, I always got the sense that they understood the methodology, the approach and, the way of working a lot better than kiwi students. I feel that I was unprepared sometimes. I feel uncomfortable that I cannot explain nuts and bolts or how you're doing what you are doing.*

To conclude Alex's three wishes, he would like to (1) have clinical supervision while collecting data, (2) have started collecting data without worrying about having done enough reading, and (3) have good knowledge on research methods before doing fieldwork. Alex also commented: *If my three wishes come true, I think I would have much happier experiences. I would have found it a lot easier to do my research, and I think it would have been much quicker. I would*

have been more prepared. I would have more time to produce a deeper analysis for my research. Alex's comment implied that some critical issues needed to be addressed properly prior to this phase, Dream, in order to enhance its success.

The four AI interviewees' dreams, three wishes, are shown in Table 5.4.

AI interviewees	Apinya (AI1)	Alice (AI2)	Adisorn (AI3)	Alex (AI4)
Thesis stage	Data collection	Data analysis	Finishing	Data analysis
Reason for undertaking thesis	Career enhancement	Career enhancement	Personal satisfaction	Career enhancement
Thesis goal	Quality and on-time	On-time	Quality and on-time	Quality thesis
Desire	perseverance, self-motivation, determination, supportive system, and good supervision	all outdoor activities and with my study	Environments and conservation, to get my qualification, integrate conservation and development, social justice, and promote fairness	supportive academic staff, cohort of students, give feedback to one another, challenging
Affirmative topic	<i>Outstanding quality and on-time thesis with good supervision and supportive from friends and family members for career enhancement</i>	<i>On-time thesis with outdoor activity research based for career enhancement</i>	<i>Quality and on-time thesis with environments and conservation based research for social developments and career enhancement</i>	<i>Challenging Co-learning quality thesis with supportive and hands-on supervision for personal improvement</i>
“Discovery”: the best of “what is”	Good studying skills, work well under pressure, perseverance, self-motivation, determination, close rapport supervision, good support from friends and family members.	Practical, outdoor activities combined with passionate environmental and conservation research base.	Persistence, determination, and good searching skills. Conduct research related to passion for environmental and conservation issues to enhance fairness and justice in homeland.	Relaxing, creative challenging holistic approach co-learning with constructive and timely feedback supervision.
“Dream”: what might be	<i>To get distinction, to complete thesis earlier, to use qualification to get a good job in my home country. To find contribution from my research.</i>	<i>To have good analysis, writing structure, and research guidelines.</i>	<i>To have good English writing, good literature review, organising my thoughts and arranging things in order well</i>	<i>To have supervision or counselling support during data collecting, be ready to collect data, have adequate research methods and process skills for fieldworks.</i>

Table 5.4: AI interviewees' Dream with the previous AI phases and related information.

5.2.4 Design: what should be the ideal/co-construct the future design

A provocative proposition is a statement of the ideal organization as it relates to some important aspect or element of organizing: leadership, decision making, communication or customer service, and so on. Successful design involves identifying the elements of organising that need to be designed and crafting the provocative propositions that integrate discovery and dream ideals into the elements.

(Cooperrider, Whitney, & Stavros, 2008, p.45)

The third phase of the AI 4-D Cycle is Design: to construct a provocative proposition based on the strengths found in the Discovery combined with what members of the system or organisation desire. According to Cooperrider et al. (2008, p.45), the design phase involves creation of the organisation's social architecture. This new social architecture is embedded in the organisation by generating provocative propositions (also known as possibility statements or design principles) that embody the organisational dream in the on-going activities. The main activity in this phase is to create possibility propositions of the ideal organisation, articulate an organisation design that people feel is capable of drawing upon and magnifying the positive core to realise the newly expressed dream (Cooperrider & Whitney, 2005, p.16). "Provocative propositions present clear, compelling pictures of how things will be when the positive core is fully effective in all of its strategies, processes, systems, decisions, and collaborations", (Cooperrider et al, 2008, p.162). In organisations, the provocative proposition is composed by a system owner(s), and/or the committees who take important roles in applying AI.

In this research, where AI was applied to individuals within a limited time, each AI interviewee's provocative proposition was composed by the researcher based on the outcomes from Discovery (section 5.2.2) and Dream (section 5.2.3) in accordance with AI procedure as previously outlined in Chapter Three. The provocative proposition of each AI interviewee is presented next and the summary of each AI 4-D Cycle phase, to date, is shown in Table 5.4.

Apinya's provocative proposition:

Producing a Master's thesis with distinction prior to the deadline increases my opportunity to get accepted when I apply for a job at X: a dream career in my home country. The achievements of my Honours study resulted from my personal strength of determination, perseverance, self-motivation and good studying skills, including working well under pressure, together with good supervision. This definitely assures me of my future success in the Master's study. I must treasure and maximise the values of a close and supportive rapport with my supervisor, my family members, friends, other postgraduate students and my officemates, in order to enhance my Master's thesis success.

Apinya's provocative proposition was constructed based on her strengths and past achievements, during her Honours studies, combined with her dreams (three wishes) from the Discovery and Dream phases. Apinya's Discovery empowered her to dream of the possibility of her desired future. Her dreams expanded the possibility of her affirmative topic. Therefore

the combination of her Discovery and Dream, provocative proposition, illustrated clearly what her desired direction would be.

Alice's provocative proposition:

Working on a practical research topic in my area of interest, environmental and conservation issues, is motivating. In addition, a research design that I can enjoy, doing outdoor activities, my favourite hobby, while collecting data motivates me to work well on my research and to produce an on-time Master's thesis for my future career. I must maximise this factor to motivate myself well in order to complete my Master's thesis successfully. Apart from the motivating factors, getting clear research guidelines from my supervisor/school is a must in order to improve my analytical and writing structures to promote my on-time thesis' success for my future career enhancement.

Alice's provocative proposition reflected her chosen research area, favourite outdoor activities, combined with her dreams: clear research guidelines to improve her thesis analysis and writing.

Adisorn's provocative proposition:

Producing a quality and on-time thesis for my future career enhancement is my current mission. In addition, my lifelong passion is to create justice and fairness to societies as well as to promote environmental and conservation awareness. My thesis indirectly involves promoting environmental and conservation awareness. I must contribute all my efforts, my personal persistence, determination, and good searching skills to work on my Master's thesis in order to achieve my mission. Lastly, I must work hard to improve my English writing, good thinking process, and organising skills to enhance my thesis' success.

Adisorn's provocative proposition was constructed within AI's given guidelines (see Chapter Three). In composing Alex's provocative proposition, the researcher combined some information yielded from his Discovery and Dream which were relevant and would enhance his affirmative topic (see Table 5.4). Adisorn's provocative proposition included his aim of completing a quality and on-time thesis for his future career enhancement, having a research topic that related to part of his passion at home, his strengths as well as some certain skills he needed to improve. However, one limitation that Adisorn was experiencing was to improve his English proficiency skills in a short period of time, where there were a lot of things to be performed during his final Master's thesis process. To apply AI to help improve his

performance in this regard, the factor of time constraints needed to be taken into consideration in the next AI 4-D Cycle stage: Destiny (see section 5.2.5).

Alex's provocative proposition:

A holistic co-learning approach for my personal development is the most important motivating factor for my learning. I must be challenged to learn new things under caring and timely constructive feedback supervision that enhances my personal improvement, and my future career with a quality co-learning approach while producing a distinction Master's thesis.

Alex's provocative proposition, composed by the researcher in accordance with AI guidelines (see Chapter Three: AI literature review), exhibited his high point experience, past impression, strengths, and his aim in pursuing a Master's thesis combined with his dreams: the three wishes. Although AI Dream aims to help AI practitioners expand "what is possible?" to enhance the success their affirmative topic, Alex, who was experiencing some problematic issues during his research data collecting, tended to focus on his critical issues and wished to go back in time and improve them instead of looking ahead and thinking of something to enhance the rest of his remaining thesis. Again, this appeared to be a limitation of applying AI to individual where "sharing" or "brain storming" was not available. Therefore, the individual tended to focus on his/her own issue, especially problematic issues. More discussion is presented in Chapter Eight: Discussion.

However, Alex's three wishes were applicable to his affirmative topic (Table 5.4) and useful for the next AI 4-D Cycle step: Destiny. Within the Master's thesis context, good supervision, enough readings, and strong a research methods background, are still useful in data analysis and writing a thesis.

Alex's and the other 3 AI interviewees' provocative propositions are improvised/empowered, next: Destiny.

5.2.5 Destiny: What will be?

The last phase of AI 4-D Cycle is Destiny. Cooperrider et al. (2008, p.201) explain that Destiny phase emphasises planning for continuous learning, adjustment, and improvisation in the service of shared ideas. It is time for action planning, developing implementation strategies, and dealing with conventional challenges of sustainability. The three AI experts (2008, p.206)

argue that there is no best way to carry out the destiny phase. Each organisation must choose its own approach to implement and sustain the design based on the dream that it discovered.

If the rule of choosing a different approach to implement and sustain AI Design is applied to individuals (as well as to organisations), the four AI interviewees in this research would have to choose what they want to implement (action planning) by themselves. In this research design, under the limitation of the interviewees' recruitment and timelines, as discussed in Chapter Three, Research methodology, the researcher could only meet with the interviewees during a one hour individual interview. Therefore, the task of selecting an approach to implement in AI Destiny phase was done by the researcher. However, the researcher developed action planning for each AI interviewee from his/her provocative proposition in Design phase to suit their pattern of study, based on the interview results (each student's storyline), as much as possible. The limitation issue is discussed in Chapter Eight: Discussion.

Apinya's Destiny:

1. ***Outstanding Master's thesis:*** to discuss the criteria of a good thesis with my supervisors and related sources and to perform accordingly, based on my strengths.
2. ***Good studying skills:*** to use good reading techniques from my Honours to read articles or textbooks, good writing and analytical techniques, and to improve analytical skills by studying from the previous year outstanding theses and by submitting works to my supervisors and to learn from their constructive feedback.
3. ***Good supervision based on close rapport:*** to maintain the same good supervision, to submit works to my supervisors regularly and get constructive feedback & criticism, to update work in progress to my supervisors, and to feel free to discuss any issues related to my thesis with my supervisors at any time.
4. ***Meeting the thesis deadlines:*** to motivate myself by thinking of the achievement with an aim to produce the outstanding thesis so that I can use this qualification to apply and get a job at the organisation that I always want to work with in my home country, to make the most out of the ability to work well under pressure, be prepared so that I have had enough readings/get timely & constructive feedback from my supervisors, to stay focused on my thesis, and to set up a timetable in order to submit my thesis chapters earlier.
5. ***Friendly and supportive environment:*** to visit my office regularly and share research experience and/or discuss some issues with my friends, other postgraduate students, my officemates (to give and take willingly), to call home and get support from my family members.

There were five main criteria for Apinya, which the researcher extracted from her provocative proposition, to develop an action plan for her to implement to enhance her success, (1) outstanding Master's thesis, (2) good studying skills, (3) good supervision based on close rapport, (4) meeting the thesis deadlines, and (5) friendly and supportive environment (during her studies). The details of what to do in each criterion were mainly from her past achievements, strengths, and her own pattern of studies and preferences described by her, after applying AI positive questions (sections 5.2.1 and 5.2.2). However, to strengthen Apinya's action planning the researcher included some best practices from postgraduate literature. For example, Hart, 2008; Kearns et al, 2006; VUW SLSS studying skill brochures, the interviews with VUW supervisors (Pongsart, 2005), and many other sources. Fortunately, Apinya took part in the coaching sessions where her action planning was discussed and she was happy with this action plan developed by the researcher. Only minor things in this plan were revised (see Coaching session, section 5.4). Apinya's satisfaction, discussed in the coaching sessions, is evidence that indicated the effectiveness of AI 4-D Cycle and its positive questions.

Alice's Destiny:

1. **Motivating factor:** *I am working on a topic I am passionate about. I must be able to contribute something from my research to the subject area I am working with. In addition, the local people whom I interviewed should be rewarded by the contribution of my findings. I must use this fact to energise me to work continuously to complete my thesis on-time. In addition, by working on my passionate research topic I should be able to engage more or work for longer hours. I am curious to find out what would be the final outcomes of my thesis, so I enjoy working on my thesis. I am happy and willing to learn to improve my thesis.*
2. **Research guidelines:** *I must contact my school postgraduate coordinator and/or my supervisor to get clear research guidelines so that I can continue working on the right direction for my research project and enhance my on-time completion.*
3. **Improving analytical and writing skills:** *I must improve my thesis analytical skills by attending some related seminar conducted by SLSS, reading Master's theses from the library or internet with similar topic or analysis.*
4. **Completing on-time:** *I must set up a timetable to plan my thesis task and discuss with my supervisor when to submit each chapter for feedback and revision.*

The same process of constructing the action plan for Apinya was applied to Alice. However, as stated by Cooperrider et al. (earlier in this section), each organisation must choose their own approach to implement. Although Alice was doing a Master's thesis, the same Degree as Apinya, Alice had her own topic in a different discipline, and in a different thesis stage. Most importantly, within the AI context, Alice's past achievements, strengths, and dreams were

different from Apinya and others. Therefore, her provocative proposition and action planning were different. Alice's action planning comprised four main factors: (1) motivating factor, (2) research guidelines, (3) improving analytical and writing skills, and (4) completing on-time. Alice and Apinya also had one common criterion in their Destiny's action planning: completing on-time (Alice) or meeting the deadlines (Apinya). Some details under the same criterion were similar, for example, to create a timetable to plan their thesis tasks as recommended in postgraduate study-skills literature, while Apinya's action plan under this criterion provided much more detail, compared to Alice. This might be one limitation in one-on-one AI interviews in an individual context. More is discussed in Chapter Eight: Discussion.

Adisorn's Destiny:

In Adisorn's Destiny phase, there were two outstanding strategies based on his provocative proposition that needed to be implemented:

My interesting topic enhances a quality and on-time thesis:

- ***Engaging with my thesis:*** Although the research topic I chose was not directly about environmental or conservation issues or on promoting justice and fairness in societies, it provided good information to concerned parties, the government and business sectors, to help develop my country. To develop my country means to open up the opportunity for justice and fairness to taking place. Therefore, I should be motivated to work on my best, in order to meet my current mission: producing a quality and on-time thesis. The more quality time I spend working on my thesis the sooner my thesis will be published to public to promote developing of my country.

Improving skills for my future career through a Master's research/thesis:

- ***VUW Student Learning Support Service (SLSS):*** One of my aims is to use a Master's thesis qualification to apply for a job in my country. The more I learn from a Master's thesis process the better "Adisorn" I will be. VUW SLSS offers skill learning seminars in each trimester. If I miss the first trimester's I can still attend in the second trimester seminars. By attending seminars it opens up my views to learn and see more of the world in order to make a better world myself. Furthermore, I will have an opportunity to meet and share my research experience with other postgraduate students from the seminars. According to Whitney and Trosten-Bloom (2003, p.54), the AI Constructionist principle, words create worlds, which are socially created through language and conversation (see Chapter Two). I must take this chance to improve my skills to develop myself for my future career and my better future.

In addition, there are various courses provided by SLSS that I can choose appropriately for my learning, for example, "time management" to be a better organised person that

I need to improve myself, or “literature review” that I can fully utilise one of my strengths, searching skills, to improve and enhance the quality of my thesis. Most importantly, I can use the one-on-one SLSS tutorial service to improve my writing and English language. The one-on-one tutorial offers me a chance to inquire, and to be inquired of, which enhances my understanding and learning. According to Cooperrider et al. (2008, p.9) in The Principle of Simultaneity, Inquiry is intervention; the seeds of change are the things that people think and talk about, the things that people discover and learn, and the things that inform dialogue and inspire an image of the future (see Chapter Two: AI Literature review). I must make the most out of the sessions I attend and the questions I get asked.

Although there were only two strategies (action planning) for Adisorn to implement, based on his provocative proposition, the two needed to be explained in depth, in accordance with AI principles and practices. The main reason to require an in depth explanation was because of a missing link from Adisorn’s interview results (storylines), to link fairness, justice, environmental, conservation, and the usefulness of his research topic. Furthermore, to gain consensus from the system’s owner, Adisorn, on the action planning proposed by the researcher within an AI context, in depth explanation was needed. In addition, the benefits of attending research skills seminars (Adisorn’s second strategy) have a close link with two AI principles, which revealed the effectiveness of AI in research studies.

Alex’s Destiny:

Alex’s strategies were set up according to his main aim of embarking on a Master’s thesis: to improve himself through the process of learning (personal satisfaction). Alex often said that he focuses more on learning rather than on the end results. Alex can choose what he wants to study, and what he chooses to study makes a difference. Alex’s studying style can be explained by one of the AI principles: The AI Poetic principles, a system or organisation is like an open book – the endless source of studying and learning (Whitney & Trosten-Bloom, 2003, p.54). Besides learning from his supervisor’s feedback, Alex could learn by attending seminars conducted by Student Learning Support Service (SLSS), and from former Master’s or PhD thesis students from his school, as explained in Adisorn’s Destiny. Alex’s strategies are organised into 3 categories: technical skill improvements, supervision, and research economy.

Technical skill improvements:

- ***Research methods and research process for personal improvements:*** *Thesis processes are new to me and challenging; I must take this opportunity to learn new things and*

make the most out of doing a Master's thesis to improve myself and my learning. I must set up a strategy to learn and improve research methods and processes. I will meet with SLSS tutors regularly to discuss the research methods and processes that I need to know in order to enhance my understanding and to continue working on the remaining thesis processes and steps accordingly. Furthermore, I must learn from my supervisor by submitting my thesis work regularly in order to meet and discuss with my supervisor on the given feedback. I must attend SLSS relevant seminars to learn new things on research processes and share my research experiences with other postgraduate students and tutors.

Supervision:

- ***Supervision for personal development that enhances future life and career:*** *I must meet, discuss, and share with my supervisor regarding the appreciative experience I was impressed with during our research project that I took part in under supervision of my current supervisor. I will let my supervisor know about my provocative proposition and the type of supervision that I expect. Most importantly, I must let my supervisor know that I want to improve myself through transformative experience to enhance my future life and career.*
- ***Regular meetings to be challenged and learn:*** *I must discuss with my supervisor to set up a meeting schedule that both of us are happy with and provides me opportunities to creatively work on my quality thesis, as well as to give enough time for my supervisor to review and provide me timely, constructive feedback. This is a time for me to learn from the feedback of my supervisor.*

Alex's action planning in Destiny phase was composed based on his provocative proposition, in accordance with his storylines (interview's results), following the same procedure of action planning as constructed with the three other AI interviewees: Apinya, Alice, and Adisorn.

According to Cooperrider et al.'s statement, quoted earlier in this section, the Destiny phase highlights ongoing learning; this process includes adjustment and improvisation. This implies that the action planning for implementation can be modified or adapted or changed according to AI's system owner(s). The flexibility at this AI stage can also mean that AI can be integrated with some other useful/effective approach. Chapter Six, next, presents the Hybrid model, where AI and TOC are integrated.

5.3 Conclusion

Applying Appreciative Inquiry (AI), a strength based approach, to four Master's thesis students' performance issues, in order to help improve their performance, worked well at certain levels. AI helped recognise each student's strengths, as well as reminding each student

that they could utilise their strong points and past achievements, while pursuing their Master's Degree thesis. Selecting an interesting research topic (to suit their strengths), selecting their preferred supervisor, combined with good studying skills, determination, and self-motivation within friendly and supportive environments, helped enhance their success. However, pursuing a Master's thesis, with its unique and independent study, is different from the collective systems or organisations to which AI usually refers. A Master's thesis is a short period, a one year mission for full time students. Each student has his/her own research to conduct, which varies from student to student. The high point experiences from classroom environments, working in a group or getting feedback from other students, may not be applicable to bring into a Master's thesis context. In addition, a past achievement in a different subject (Adisorn's – mathematics and science) cannot be directly applied to enhance the current mission, if Master's students choose to study subjects or methods completely different from their past achievements. Furthermore, Adisorn and Alex tended to focus on what went wrong in the past (lack of English proficiency and difficulties in data collecting), and were not able to utilise the Dream phase to extend what AI expects them to dream: possibilities. The last AI stage, each student's Destiny, which relied on his/her provocative proposition, absolutely reflected their strengths and preferences, according to his/her Discovery and Dream.

The researcher continued conducting action research with Apinya as a volunteer, to communicate the 4-D Cycle results and re-apply the cycle to her new performance issues, in order to understand and improve Apinya's thesis performance, next.

5.4 AI coaching session (Action research)

Similar to TOC section 4.3 (Chapter Four), the last phase of this exploration of AI is a coaching session, or action research. The two coaching sessions were conducted (Figures 5.1 and 5.3). The researcher recruited Apinya (AI1), who had already taken part in the individual interview, based on the criteria stated in Chapter Three: the research methodology. The action research with Apinya was conducted twice, in November and December 2009, and each session lasted 60 minutes. The results of the coaching sessions with Apinya are reported and analysed next.

5.4.1 AI coaching sessions with Apinya

5.4.1.1: Coaching I (November 2009)

Meeting agenda (Figure 5.1):

- (1) In June 2009, the researcher presented Apinya with the results from her individual interview, after applying the AI 4-D Cycle.
- (2) The researcher discussed the issues with Apinya and presented the solutions to her.
- (3) Apinya updated the researcher questionnaire #22 (the degree of difficulty on each performance issue) and the “Highs and Lows”: Feelings about her Master’s thesis.
- (4) The researcher and Apinya discussed the new performance issues, based on (3)
- (5) The researcher applied AI positive questions to help Apinya improve her performance based on (3) and (4).

Step 1: The individual interview’s results applied with the AI 4-D Cycle presentation

The researcher explained the main principles of AI to Apinya. Then, the researcher presented the results of Apinya’s individual interview.

Figure 5.1: Coaching I agenda with Apinya (November 2009)

Step 2: Discussion on the proposed solution from applying AI

After listening to the researcher from step 1, the main issue that Apinya wanted to amend was one of her wishes in Dream phase: the deadlines to complete the thesis. She agreed that the thesis tasks always took longer to complete, *I have to extend the deadlines. It's always the case.* Originally, Apinya had intended to submit her thesis in December 2009, but according to the conversation with her during the first coaching session (November 2009), she said that she needed more time to work on it and that she would submit the final thesis in March 2010.

At this point, it raised a concern that might be a limitation of AI Dream, when applied to contexts like this. AI encourages Apinya to appreciate her past achievements and strengths, in order to amplify these positive cores beyond any boundaries in Dream phase, by not including reality or any limitation of the boundary. In fact, many research students are experiencing a lot of uncertainties, for example, ethical issues that may delay the approval process, or low response rate of research participants. There are a lot of new things that researchers, especially new ones, can hardly predict, as per the quote attributed to Albert Einstein, *If we knew what we were doing, it wouldn't be called research, would it?* However, there was also a limitation of this research in recruiting action research participants and a timing issue so that the results of Apinya's 4-D Cycle were not presented to her sooner in June or July, after the first interview, but in November. If Apinya had been recruited and had accepted joining the action research earlier, the researcher and Apinya could have discussed and adjusted or revised the provocative proposition and the destiny plan properly.

Step 3: Apinya updated her highs and lows, and question #22 to identify any new performance issues experienced.

Figure 5.2: Apinya's Highs and Lows as of 1st Coaching, November 2009

Figure 5.2, from data collection to half way through her data analysis, Apinya's feelings on her Master's thesis hit the lowest point of feeling neutral for the second time. The latest point indicated by Apinya was lower than Tarn (T1), at the same stage. The next table, Table 5.5, with several performance issues rated as "High" and "Very high" degree of difficulty by Apinya, reflects her low feelings on the Master's thesis.

Table 5.5 presents the latest performance issues experienced by Apinya and rates the degree of difficulty. According to the degree of difficulty rated by Apinya, there are 14 main performance issues with 8 "Very high" and 6 "High" respectively, which could explain the second hit to the bottom of Neutral stage (Figure 5.2). Keeping the deadlines/timeline, Feeling

supported/motivated, and Knowing when to stop reading the literature were three of the 11 other main issues that related to writing, scoring or coding, and interpreting data. The next step is the discussion with Apinya, regarding the main issues that she wanted to address.

Degree of difficulty	Very low	Low	Med	High	Very high	N/A*
Problems encountered in completing theses
A1.Staying motivated for my thesis				XY		
A8.Keeping my deadlines/timeline				X	Y	
A10.Feeling my study is valuable or worthwhile			Y	X		
A13: Feeling supported/motivated			X	Y		
A16.Designing my study				Y	X	
A17: Gathering info for the literature review			X	Y		
A18.Organising the literature found				X	Y	
A19.Knowing when to stop reading literature			X		Y	
A23.Writing the literature review				X	Y	
A24. Writing the method section				X	Y	
A28.Scoring/coding data				X	Y	
A29: Using computer for statistical analysis				Y		X
A30. Analysing & interpreting data					XY	
A31.Reporting data					XY	
A33: Using computer for database organising				Y		X

N/A* = Not Applicable

Table 5.5: Apinya's questionnaire: degrees of difficulty June 2009 (X = data collection stage) and November 2009 (Y = data analysis stage)

Step 4: The researcher and Apinya discussed the latest findings.

Keeping the deadlines/timeline was one of the main issues, with a very high degree of difficulty (found according to Step 3) that needed to be improved. This issue was the second top ranking experienced by 35 VUW Master's thesis students who took part in the web-based survey of this research. However, when discussing within AI contexts, the researcher needed to employ positive questions and/or to reframe any problematic issues found during the conversation into positive contexts of AI, to allow Apinya appreciate her past achievements or her strengths, and/or amplify her positive cores.

In order to create positive environment/contexts, the researcher reminded Apinya about her dreams (Section 5.2.2.3) to complete the degree, as well as her strengths to improve the deadlines issue. Apinya wanted to complete early and use the Master's qualification with distinction to apply for her dream job in her home country, as a motivating factor to speed up her thesis pace and be on track. In addition, based on the first individual interview with Apinya in June, there were a lot of factors in Discovery (section 5.2.2.3) that she could utilise in order to enhance her affirmative topic: Outstanding quality and on-time thesis with good supervision and supportive from friends and family members for career enhancement.

There was another crucial moment related to the deadline issue, described during the coaching session, when the researcher had to recreate a positive environment/context. Apinya said, *It stopped my momentum*. Apinya had taken two weeks off during the recent school break visiting her parents overseas. She thought that might be one of the causes that delayed her thesis work. At this point, in the spirit of AI, the researcher chose to share his own experience with Apinya of taking a three week break during Christmas and going back to his homeland, while writing a Master's thesis few years ago. The researcher told Apinya that, "After the three weeks break, I sped up a little, and my thesis work was on back track". In addition, the researcher reminded Apinya that she could think of taking a break to meet with her parents as a "reward" after completing her data collection or certain stage of her thesis. Later, Apinya must have felt better and gained confidence, *The good thing about postgraduate study is that it is quite flexible. During the mid-term break I did not go anywhere. So I thought I could take two weeks break*. She also intended to work on her thesis during the Christmas break in December when local students usually celebrate the holidays, *We don't celebrate Christmas in our country so I can continue working on my thesis, but I might go shopping on Boxing Day*. The researcher also re-visited the same strategy that, "You can use that as another reward after spending time working during the Christmas". Many VUW SLSS tutors often advise students to use a reward system to enhance their studies, after achieving each important milestone of study.

In addition to using positive questions in AI, sharing positive experiences and/or past achievements is one of the most important essences of the 5 AI principles, especially the anticipatory principle: image inspires action (Whitney & Trosten-Bloom, 2003, p.54). Sharing promotes collective imagination, according to Cooperrider et al. (2008) and discourses and

collective imagination inspire action. The collective action is needed to enhance positive changes in organisation where AI mainly aims for intervention.

In contrast, for individual intervention on the deadline issue, the researcher learned that sharing a similar non-achievement situation was needed in order to neutralise the environment from negative feelings. Apinya might have encountered uncertainties when taking two weeks break and she needed to be re-convinced that what she did was not wrong. However, on listening to the researcher's own experience of a similar situation to her own, it indirectly confirmed to Apinya that there was nothing wrong with her decision to take a break.

Besides the deadline issue, there were several performance issues experienced by Apinya at this stage, relating to her data collection and analysis. Issues included coding or scoring data, writing the literature review, the methodology, and the results section. Apinya admitted that, *Data analysis is tough and tiring, it's up and down*. She said she had bits and pieces of quotations, and ideas in some several chapters, but she had not fully written in full sentences or had not started writing a chapter yet, *When I write I like to get a flow. To the get the flow, I want to get the whole picture first*. The researcher asked Apinya if she could incorporate good study skills from her Honours to the Master's. She replied, *Yes, I remembered that one Honours paper, I read several articles and textbooks and then I did my own chronological order. I find it's easy to write when you have already had the sequence and the flow. For me the flow and the whole idea, after I read everything, is very important*. The researcher was quite convinced that Apinya should be able to improve her performance issues as long as she was comfortable with her learning style and pace.

Step 5: The researcher applied AI tools to deal with new issues and proposed solutions for Apinya.

The researcher asked some more positive questions, adapted from those provided by experts in AI literature, to facilitate Apinya's positive core. For example, what are the high point experiences of your Master's thesis at this stage? What are the positive things that come out from your learning process? Apinya said:

*Data collection is always challenging. I have already got all the data for my analysis. That is huge progress. After completing each stage, I think that is my **high point experience that I can see it is progressing**.*

*What I have learned from the Master's thesis are self-discipline and self-motivation. **Those are the two things.** It's very hard to get self-discipline when you don't have deadlines, or if you are **not tied to particular office hours** or when you don't have any class. It's really your own pace and motivation. Doing a Master's thesis, you **don't have clear guidelines on how to do your research or your whole thesis.** You have to study basically by yourself. A lot of the things you do are based on your self-initiative, for example, you do the literature review by yourself and choosing the literature from the whole lot of data bases. You also have to create your own framework. **The supervisor only guides you, but they don't tell you what to do. Yes, it's a self-study that requires self-initiative.***

Despite being asked only positive questions, Apinya's answers yielded both positives and negatives. Apinya explained good points that she had learned and some problematic issues experienced. Some of the good points re-confirmed her own strengths of self-motivation (Table 5.3). Of the problematic issues she mentioned, *not having clear guidelines*, was one of the common critical root causes of three TOC interviewees, Tarn (entity 105), Tammy (entity102/202), and Tim (entity 202).

At this stage where Apinya's feelings on her thesis hit the lowest point of Neutral stage, there was a doubt that AI alone could help Apinya improve her thesis performance. In addition, in accordance with AI action planning in Destiny phase (section 5.2.5), the researcher recommended further action or integration with some other effective approach to help address some urgent critical issues experienced by Apinya. However, only positive questions were employed during the coaching session I.

5.4.1.2: Coaching II: December 2009

Meeting agenda:

- (1) Apinya updated the research questionnaire #22 (the degree of difficulties on each performance issue) and the "Highs and Lows": Feelings about her Master's thesis.
- (2) The researcher discussed with Apinya the current major issues she had experienced and applied AI to the issues found.
- (3) Applying additional AI positive questions to help improve Apinya's thesis performance.

Figure 5.3: Coaching II agenda with Apinya (December 2009)

Step 1: Updating the latest thesis status

At the beginning of Coaching session II (December 2009), Apinya updated the Highs and Lows feelings about her Master's thesis (Figure 5.4), and the performance issues according to questionnaire #22 (Appendix A) see table 5.6.

Figure 5.4: Apinya's Highs and Lows as of 2nd Coaching, December 2009

Figure 5.4 demonstrates Apinya's current feelings about her thesis, while she was doing data analysis. The feelings she indicated, shown by a flat line at the bottom of Neutral stage, remained at the same level as the first coaching session in November 2009. Another indication that supported the unchanged feelings were several performance issues rated by Apinya as having high and very high degrees of difficulty, according to Table 5.6, next.

Based on Apinya's latest performance issues presented in Table 5.6, there were three issues with very high and 11 issues with high degrees of difficulty. The three issues with very high degree of difficulty were: Keeping the deadlines/timeline (A8), Scoring/coding data (A28), and Interpreting data (A30). In addition, there were three new issues with high degree of difficulty,

Meeting social demands (A4), Keeping healthy/fit (A7), and Procrastination and Distractions (A40). Some of the same performance issues with high degree of difficulty carried forward from November related to writing, organising literature, designing the study, and feeling supported/motivated. The researcher discussed these major issues and applied AI positive questions, in order to facilitate Apinya's positive core to help improve the performance, next.

Degree of difficulty	Very low	Low	Med	High	Very high	N/A*
Problems encountered in completing theses
A1.Staying motivated for my thesis				XYZ		
A4.Meeting social demands		X	Y	Z		
A7.Keeping healthy/fit			X Y	Z		
A8.Keeping my deadlines/timeline				X	YZ	
A10.Feeling my study is valuable or worthwhile			YZ	X		
A13.Feeling supported/motivated			X	YZ		
A16.Designing my study				YZ	X	
A18.Organising the literature found				XZ	Y	
A19.Knowing when to stop reading literature			X	Z	Y	
A23.Writing the literature review				XZ	Y	
A24. Writing the method section				XZ	Y	
A28.Scoring/coding data				X	YZ	
A30. Analysing & interpreting data					X YZ	
A31.Reporting data				Z	X Y	
A34. Writing the results section			Z		X	Y
A40.Procrastination			Y	Z		X

N/A* = Not Applicable

Table 5.6: Apinya's questionnaire, degrees of difficulty June 2009 (X = data collection stage), November 2009 (Y = writing stage), December 2009 (Z = writing stage)

Step 2: The researcher discussed with Apinya the current major issues experienced by her, and applied AI to the issues found.

Keeping the deadlines/timeline was an on-going performance issue experienced by Apinya. To re-visit this issue with Apinya within an AI context, the researcher had to reframe this problematic issue into a positive context and/or employ positive questions during the discussion. The main purpose of using positive questions was to facilitate Apinya's positive cores, so that she could continue working on the positive or strengths base to improve her thesis performance. For the time being, according to Apinya, her supervisors seemed to worry that she had not written anything solid yet.

To overcome the deadlines issue and start writing her thesis' chapters, Apinya could utilise some of her preferred working style: working well after seeing the big picture. When the researcher reminded Apinya regarding her working style, she said, *You are right. I want to see the flow from the bigger picture before I can write.* Unfortunately, after the first coaching session (November 2009), Apinya had to conduct the last phase of her research: an interview with NZ public sector (related to her Master's' major) managers. Prior to the interview, she had to do a lot of things. Apinya told, *As I said, there are too many distractions: the interviews, the official information request to the entities that I want to conduct the interview, the follow up and several telephone calls to the entity. I cannot write without full concentration.* Apinya had to complete the transcribing and send them back to her interviewees as soon as possible to get consent, before she could do the analysis and start writing a chapter.

Once again, in relation to Apinya's research transcribing, there was another moment that the researcher had to neutralise the interview's environment from the negatives. According to the researcher's own experience, many other young researchers could type and transcribe fast from the interviews. This might help Apinya to complete transcribing sooner and able speed up her thesis tasks. Apinya said, *Yes, I type quite fast. I guess because I am used to the NZ accent as well. For the most part, I can actually get what they said the transcription, it is quite easy. But the hard part is becoming comfortable with myself. I feel uncomfortable listening to my own voice. This slows down the transcribing.* At this point, in keeping with AI methods, the researcher chose to share his own experience of the similar negative side of the transcribing: feeling uncomfortable when listening to your own voice. In addition, the researcher took the opportunity to tell Apinya the truth that, "To be honest, I found that among many interviewees I conduct the interview with, your voice is very clear and very easy to transcribe". By sharing some negative effects from the research fieldwork and telling Apinya about her clear voice, the researcher was able to neutralise the interview's environment with her from the negatives and

able to continue discussing on the deadlines issue smoother. Apinya said, *Yes, I must remind myself to focus on the interviews and to complete the transcribing as soon as possible so that I can start writing the analysis.* After completing the transcribing, Apinya should be able to see the overall outcomes of her research interviews.

Besides the ability to work well after seeing the big picture of the whole case (according to AI, these are strengths), Apinya could also utilise her ability of working well under pressure (Referring to first interview with Apinya in June 2009) to overcome the deadlines issue. The researcher reminded Apinya to use both of her working styles at this stage. Apinya agreed and conveyed her wishes: *Yes, once I can complete my transcribing, I just look forward to confining myself in my own room and having all the papers around me and start reading the relevant things and start analysing and writing, and get rid of the whole distractions around me. I am looking forward to 100% just working on my thesis.* According to Apinya, the remaining distraction was Boxing Day (going shopping and enjoying the big discounts and sales). The researcher also took the opportunity to motivate her, “You should reward yourself after completing your last phase of data collection (the interviews) and the interview transcribing”.

There were two performance issues with very high degree of difficulty, Scoring/coding data and Analysing and interpreting data, to be addressed. According to AI, under certain circumstances, AI experts will allow their clients talk about the problematic issues before bringing the issues into positive contexts. Apinya explained that she did not use a qualitative software program to help coding or interpreting data, but did it manually or used an Excel (spreadsheet) program to help with grouping the data. She said, *There is a lot of data so I have to keep in mind the bigger picture in terms of what I am trying to find. Rather than getting lost within the large amount of data, this is very challenging task. I have to make the data into themes. With a large amount of data, it's easy to lose focus on what I am trying to find.* However, by having a positive and supportive environment, including her own strengths according to Apinya's Discovery phase, she found it helpful, *I applied my supervisor's advice on research interviews, he reminded me I can go into technical questions or detail, but I must keep focusing on the big picture of what I am looking for.* So Apinya employed a strategy she learned from her supervisor to work on coding the data and data analysis. At this point, the researcher took the opportunity to also remind Apinya that she had utilised her strengths and past achievements from her available resources: using the Excel computer programme that she knew well, combined with manual work for coding data, and getting good advice from the

same supervisor that she had enjoyed working with since her Honours study. Apinya agreed and added, *My supervisor and I agreed not to use the NVivo programme, as it might take time for me to learn. If you use certain software programmes in your data analysis, you can tend to let the software programmes do the thinking, not you. But when you are doing it manually, you think as you read; you are doing the thinking yourself.* Again, the researcher employed AI one-on-one shared interviews by sharing the advantages of reading the transcription and listening to the interview tape several times to help enhance the researcher's understanding and the analysis. This should help convince Apinya to continue working well on her scoring and coding the way she had been doing.

In relation to staying focused and/or to concentrate on her thesis work at this stage, Apinya needed to minimise distractions: the newest issue with a high degree of difficulty. Once again the researcher employed AI's technique of allowing Apinya to talk about the issues before reframing them into positive contexts. She told her story, *At the moment, there are too many distractions. I had to attend two of my good friends' graduation ceremonies. Their parents and family members came from overseas, and they invited me to join parties and dinner.* She explained that, *Because my friends have already completed their degrees and they are leaving for good. That is the main reason I had to join them.* After listening to Apinya's story, the researcher reframed her distraction issue into a positive context. Fortunately, the researcher also attended the same ceremony as a guest of a PhD friend who was graduating, "I find it is very inspiring to hear my PhD friend standing near the University's Chancellor and hearing another university executive read her thesis abstract (short version): "I hope to be there soon." Apinya commented, *Yes, I guess with the graduation ceremony, seeing PhD students, and Master's, it was quite motivating. I saw Master's graduates in the front row and they were the first few on the stage. It was quite motivating.* By reframing the distraction into an AI positive context, Apinya could see it as one of the motivating factors for her to continue working on her thesis for that achievement.

Similar to Tarn (T1), during the coaching sessions, distraction was one of the issues experienced by Apinya. Tarn needed to find and address the root cause of the distractions in order to get rid of them. For Apinya, the AI approach used positive questions to reframe distractions to a positive experience and this might have helped at a certain level. However, the need remained for Apinya to find a better way to enhance her concentration on her thesis, by getting rid of distractions or minimising disturbances.

Step 3: Applying additional AI positive questions to help improve Apinya's thesis performance.

In the final step of coaching session II, the researcher employed positive questions to facilitate Apinya's appreciation of her Master's thesis, in order to enhance her performance.

The researcher inquired, "Being a Master's thesis student, you have been doing an independent study by selecting your own research topic, reviewing the relevant literature, designing your own research, and conducting your own fieldwork. As of today, what are the positive changes you have learned so far? How do you feel?"

Apinya said, *There are a lot of things to learn from the NZ public sector. My interviewees provided me a lot of insights and clear information. From the new researcher's point of view, I can develop something that cannot be learned just from textbooks. I gained good experience from my research. And experiences teach us different things from what you can find in a book. Furthermore, it increases my communication skills as well; it's really good to go out and actually meet with professionals and interact with them. I have really learned a lot, especially from all of my interviewees, who are very cooperative and professional.*

At this point, the researcher tried to facilitate the appreciative environment by saying, "You made the right decision designing your research and interviewing NZ public sector managers, and collecting data in NZ. Now you have gained a lot of things to take back to your home country". Then Apinya continued her appreciation by saying:

It was quite fascinating and amazing, the time and effort they put into my research. I hope to take back to my home country. I want to practice first and come back to the university (as a practitioner, to contribute what I have learned and do my PhD). Now the world or everything is fast pace, researchers and practitioners need to keep up with each other.

Lastly, the researcher asked Apinya what were her three wishes at this thesis stage. Apinya said:

I guess for me to work harder and to have excellent ideas to write up my research. I wish I could write very good research, especially the analysis part. That will help me

get a distinction. I wish I could focus well and can concentrate well, so that I can write very good research.

Apinya's three wishes at this stage were something that could enhance her thesis quality. These three wishes should have been transformed into an action plan, according to AI Destiny. However, due to the limited time during the coaching session, the researcher could only remind Apinya that she must utilise her best skills in studying and writing to write her quality thesis and to learn from her supervisors' feedback.

To sum up the coaching sessions (Table 5.7): the two Appreciative Inquiry (AI) coaching sessions with Master's thesis student Apinya, during her data collection and analysis session, achieved their objectives to some degree. The researcher has learned that AI not only helps amplify and recognise the interviewee's positive cores, but provides a positive and friendly environment during the coaching sessions. By helping Apinya realise her own strengths, past achievements, and ability to pursue a Master's thesis, these AI coaching sessions take the role of motivating Apinya to make the most out of her strengths: good study skills perseverance, determination, and self-motivation. Furthermore, with AI positive inquiry, Apinya was able to take this opportunity to appreciate what she has learned from her independent study, a Master's thesis. Apinya realised that, with the flexibility of the Master's thesis, she needed to improve her self-discipline, self-motivation, and self-initiative, as well as to utilise the best of her strengths to move on achieving the Master's thesis, and her future career. In addition, the researcher was able to learn from the two AI coaching sessions with Apinya that at each stage of the Master's thesis, there were a number of new tasks that the students needed to learn and perform over a period of time. To perform and learn new tasks independently over the period under dynamic environments, Master's thesis students must not only have high self-discipline, but to obtain effective tools to help enhance their performance and success. Importantly, to employ AI as a tool, a positive and friendly environment must be obtained. On top of this, within the Master's thesis context, the student's supervisor or buddy must be able to neutralise any negatives, and/or reframe problematic issues to positives, as the researcher did during the coaching sessions. Lastly, to help enhance AI success in improving Master's thesis students' performance issues, AI needs to integrate with some other relevant disciplines, especially in the Destiny phase, suitable for each student's capability and potential for improving their skills.

Apinya's thesis enrolment: March 2009 – February 2010		
1 st Interview (June 2009) Thesis stage: Data collection	1 st Coaching (November 2009) Thesis stage: Data analysis	2 nd Coaching (December 2009) Thesis stage: Data analysis
Major performance issues	Major performance issues	Major performance issues
A1: Staying motivated (High)	A1: Staying motivated (High)	
		A4: Meeting social demand (High)
		A7: Keeping healthy (High)
A8: Keeping the deadlines/timeline (high)	A8: Keeping the deadlines/timeline (Very high)	A8: Keeping the deadlines or timeline (Very high)
A10: Feeling my study valuable or worthwhile (high)		A10: Feeling my study valuable or worthwhile (High)
	A13: Feeling motivated/supported (High)	A13: Feeling motivated/supported (High)
A15: Not knowing how to get started (high)		
A16:Designing my study (Very high)	A16:Designing my study (High)	A16:Designing my study (High)
	A17: Gathering info for the lit. review (High)	
A18: Organising literature found (High)	A18: Organising literature found (Very high)	A18: Organising literature found (High)
	A19: Knowing when to stop reading literature (Very high)	A19: Knowing when to stop reading literature (High)
A23: Writing the literature review (High)	A23: Writing the literature review (Very high)	A23: Writing the literature review (High)
A24: Writing the methodology section (High)	A24: Writing the methodology section (Very high)	A24: Writing the methodology section (High)
A28: Scoring/coding data (Very high)	A28: Scoring/coding data (Very high)	A28: Scoring/coding data (Very high)
	A34: Writing the results (High)	
		A40: Procrastination/distractions (High)

Apinya's thesis enrolment: March 2009 – February 2010		
1st Interview (June 2009) Thesis stage: Data collection	1st Coaching (November 2009) Thesis stage: Data analysis	2nd Coaching (December 2009) Thesis stage: Data analysis
Major performance issues	Major performance issues	Major performance issues
	Apinya's strengths & high point experiences: Being able to work under pressure, to view big picture before writing, to enjoy the flexibility of Master's study, to improve self-discipline, self-motivation, self-study, and self-initiative to maintain good rapport and trust with the supervisors.	Apinya's strengths & high point experiences: Appreciation of supportive interviewees and learning a lot of things from the interviews with NZ public sectors, good learning from the field besides the textbooks, being able to improve communication skills through the interviews, being able to utilise own strengths and the available resources, to learn and see big picture before writing, good advice from the supervisors, looking forward to writing a thesis.
		Apinya's negative feelings: Inexperience researcher, lack of self-confidence to conduct the interview with high experience managers.
		3 wishes: working harder, having excellent ideas and write good thesis.
AI tools employed : 4-D Cycle & positive questions	AI tools employed: Positive questions	AI tools employed: Positive questions

Table 5.7: Summary of coaching sessions with Apinya

5.5 Chapter summary

Appreciative Inquiry (AI) offered an opportunity for Master's thesis students to focus on their positive cores, in order to enhance their thesis performance improvements. AI processes motivate the students to acknowledge and appreciate their strengths and past achievements, as a strong platform for their current mission's development and improvement. The appreciation of their positive cores and past successes could enhance their dreams of better performance. The researcher discovered that there were some notable limitations when applying AI to a unique individual context: Master's thesis students. A Master's thesis is a higher level study, which most students are pursuing for the first time. Some of each student's positive cores, strengths and past success, were therefore not relevant or applicable to be counted on as a strong base for this higher degree study. In addition, a Master's thesis is an independent, non-class structured study, with various new things to be learned. Furthermore, there are some weaknesses within each student's capability and skills that can have a high impact on his/her performance, during Master's study. Most importantly, AI does not focus on weaknesses, but

strengths. To apply AI to only the student's strengths could help motivate the student to use the relevant strength to improve his/her thesis performance, including coping with mental issues to some degree. A lack of certain skills might therefore remain an issue, especially technical issues (i.e. Academic English writing suitable for Master's standard or Analytical skills). To employ AI to the individual Master's thesis student's context, AI users or practitioners need to integrate AI with some other methods, especially those that address weaknesses, in order to maximise the thesis student's performance. In particular, supervisors must be able to neutralise negative factors for the AI approach to be successful.

Chapter Six: Addressing the Highs and the Lows: Applying a Hybrid model (TOC+AI) to Master's thesis students' performance issues (Research findings, and Analysis)

The Theory of Constraints (TOC) improves performance by identifying and addressing the root cause of a problem/the Lows (Chapter Four), while Appreciative Inquiry (AI) seeks to focus on the root cause of success/the Highs, as presented in Chapter Five. Chapter Six presents the findings and analysis of the four selected Master's thesis students from VUW, who took part in the Hybrid (TOC+AI) individual interviews. The Hybrid model attempts to utilise a combination of TOC and AI to address both the Highs and the Lows, in order to improve Master's thesis students' performance. This chapter is divided into five main sections: (1) Hybrid individual interviewees; (2) Applying Hybrid model to the four interviewees (Hybrid analysis); (3) Conclusion; (4) Coaching sessions, and (5) Summary.

6.1 Hybrid individual interviewees

The Hybrid interviewees were all full-time students: Hong (H1), Helen (H2), Harn (H3), and Henry (H4) (not their real names). The four students were recruited for this research's comparative and study purpose, as stated in Chapters Four and Five. According to their characteristics in Table 6.1, there were various differences in terms of age, thesis stage, financial support, supervisors' selection, primary reason for undertaking a thesis, and thesis goals.

Helen and Henry were local students, while Hong and Harn were international students with English as their second or third language. The two females were under 30 years old, while Harn and Henry were much older than the others. In terms of financial support, the two international students were on scholarships, Helen had a student loan, and Henry used his own funds. The two females selected their own supervisors, while the two males had supervisors recommended by their schools. Hong and Henry had the same primary reason of career enhancement for undertaking a thesis. Helen wanted personal satisfaction, while Harn identified three main reasons: career enhancement, personal satisfaction, and to pursue a PhD later. Quality and on-time thesis completion was the common goal for Hong, Helen, and Harn, but Henry's goal was an understanding of the issues involved. In terms of thesis stages, the four interviewees were in different stages: data collection (Hong), data analysis (Helen), writing (Henry), and finishing

(Harn). Regarding the major performance issues experienced by the four hybrid interviewees, Table 6.1 presents details.

Interviewees' name (not their real names) and their code	Hong (H1)	Helen (H2)	Harn (H3)	Henry (H4)
Gender	Female	Female	Male	Male
Age	30&<30	30&<30	41-50	50+
Local/International (Int'l)	Int'l	Local	Int'l	Local
Thesis stage	Data collection	Data analysis	Finishing	Writing
Full-time/Part-time study	Full-time	Full-time	Full-time	Full-time
Financing	Scholarship	Student's loan	Scholarship	Personal funds
Supervisor selection	Self	Self	By schools	By schools
Primary reason for undertaking a thesis	Career enhancement	Personal satisfaction	Career Enhancement, personal satisfaction, and pursue PhD later	Career enhancement
Thesis goal	Quality and on-time	Quality and on-time	Quality and on-time	An understanding of issues involved
Major performance issues Refer to Appendix A	A1,A5*,A6,A8,A10*,A11,A19,A22*,A23,A25,A27*,A28,A30,A31,A34,A35*,A36*	A4,A5,A8*,A13,A15,A16,A17*,A19,A25*,A27,A33	A8*,A18*,A19*,A23*	A8*,A9,A13*,A15,A16,A18,A19,A22*,A30,A31,A34*,A35

Table 6.1: Characteristics of 4 Hybrid interviewees

Remarks:

1. Red colour highlights the major performance issues representing the top ten major issues.
2. The performance issue numbers (A1, A2, A3,...) with * (Asterisk) symbol on top represent a “very high degree of difficulty”, but those issue numbers without * (Asterisk) symbol mean “high degree of difficulty”.

Hong (H1) identified various performance issues related to her data collection stage, from finding subjects, collecting data, scoring data, including some emotional issues (Feeling her study valuable or worthwhile, and Staying motivated), and other issues (Keeping the deadlines/timelines, Financing her thesis, and finding time for her thesis).

Helen (H2), in the data analysis stage, also experienced various types of issues: technical (Not knowing how to get started, Designing her study, Gathering the literature, Not knowing when to stop reading the literature, Finding subjects, Collecting data, and Using computer for database organising), mental (Staying motivated, and Feeling supported/motivated, and other issues (Financing her thesis, Keeping the deadlines/timelines).

Harn (H3) struggled with the technical issues (Organising the literature found, Not knowing when to stop reading the literature) related to the literature review of his thesis, and one other issue: Keeping the deadline/timelines.

Henry (H4), in the writing stage, encountered the issue of Keeping the deadline/timelines and several technical issues related to his writing stage, Organising the literature found, Not knowing when to stop reading the literature, Analysing and interpreting data, reporting data, writing the results section, proofreading, and writing acceptable English, and other technical issues: Selecting topic, Not knowing how to get started, and Designing his study.

According to the analysis in Chapters Four and Five, TOC addressing the root causes of each student's problem, could offer solutions to help improve the situation. AI, focusing on the root causes of each student's success, could help improve the students' issues. The next section of this chapter presents how the integration of TOC and AI might help improve the four Master's thesis students in a Hybrid model group.

6.2 Applying the Hybrid model to the four interviewees (Hybrid analysis)

Figure 6.1: Seven steps of the Hybrid model (combining TOC and AI)

According to Figure 6.1 and the explanation in Chapter Three (Research methodology), the first two steps of this Hybrid model were from TOC (Phase I), and Steps III – V were from AI (Phase II). The Last phase, Steps VI and VII were an integration of TOC implementation plan, and AI Design and Destiny; the results from Steps II - V were merged into Design, and action plan respectively. By applying a Hybrid model to improve Master's thesis students' performance, the researcher aimed to make the most out of the two contrasting approaches: addressing the root cause of a problem, and focusing on the root cause of success.

As stated earlier, the seven steps of Hybrid model were from TOC and AI. Therefore, the researcher would not repeat explanations of the two approaches' technical terms, as they were already explained in the previous two analysis chapters. The seven steps' Hybrid model analysis is from sections 6.2.1 – 6.2.7, next.

6.2.1 Hybrid Step I: What is your goal?

The first step of the Hybrid model used the Theory of Constraints (TOC)'s first critical questions: what is your goal? An IO map can be applied to both individuals and organisations. The IO map provides an opportunity for a system's owner to set up a clear goal including identifying the main milestones and supporting activities, in order to reach the goal. By knowing the achievement's criteria and required activities, a system's owner can perform, strive, and utilise his/her strengths to reach the goal.

The four Hybrid model interviewees (Hong, Helen, Harn, and Henry) were asked to identify their IO Maps, according to the same procedure applied to TOC interviewees in Chapter Four. Each student's IO Map is presented next (Figures 6.2 – 6.5).

Hong (H1) was in the data collection stage when taking part in his individual interview. The simple and well defined structure of the IO Map helped Hong clarify her goal, Critical Success Factors (CSF), and Necessary Conditions (NC) (Figure 6.2). Hong's research involved experimentation. Therefore, her goal, CSF, and NC relied on the completion of her experiment, the synthesis, and the availability, of information and reference material respectively. Hong's success factors included supportive supervision, which was the same criterion for many others, including Apinya (AI1, Chapter Five). Later in Step V (Dream), Hong's goal and her CSF1 became her two wishes as part of the Appreciative Inquiry (AI) analysis.

Helen (H2) was doing her data analysis when taking part in the Hybrid individual interview. Helen's goal extended beyond the completion of her Master's thesis, and one of her terminal outcomes (Dettmer, 2007, 72) was to complete her Master's thesis (CSF1, Figure 6.3). Helen's CSF1 was similar to Hong's (H1), but Helen's goal focused on a bigger picture. According to Dettmer (2007), Helen's IO Map could be a system level goal, whereas Hong's was a process level goal.

Harn (H3) had just submitted his thesis on the same day he took part in this Hybrid interview. His IO Map's goal (Figure 6.4) reflected the common goal of the majority (78%) of this research's survey participants. In addition, time management (Harn's CSF1) was the common milestone for Harn, Tarn (T1) Ton (T3) and Tim (T4) (Section 4.2.1, Chapter Four). Harn's CSF1 and CSF2 influenced much of his current reality in terms of the TOC analysis (Step II, next section), and became his main two wishes (Step V).

Henry (H4) was writing the last few chapters when he took part in the individual Hybrid interview. Henry determined his goal as getting a Master's degree in something relevant to his current career, and his community work. According to TOC, there are normally 3-5 Critical Success Factors (CSFs) supporting the goal of a system (Dettmer (2007, p. 72). Henry took the opportunity to clarify his three main CSFs (Figure 6.5) in line with his storylines. Based on the storylines, supervision became one of his critical root causes on his current reality analysis (next section).

Using the TOC IO Map in Step I enabled the four Hybrid interviewees to establish their goals, CSFs, and NCs and navigated them to the identified direction. Some students set up his/her IO Map at a process level, close to his/her current situation, but some identified with a system's level IO Map, a higher level than a process one. The next process is to analyse each student's current reality by using TOC's Current Reality Tree (CRT) and Evaporating Cloud (EC).

6.2.2 Hybrid Step II: What is your current reality?

After constructing the TOC IO Map in Step I, in Step II, the Hybrid model analysed each student's current situation using TOC's Current Reality Tree (CRT), based on the same procedure demonstrated in section 4.2.2 of Chapter four: TOC analysis. The only difference was that the researcher decided to focus on only 1-2 major problematic (performance) issues of each interviewee instead of 3 for the Hybrid interview to accommodate a one hour interview timeframe. The Hybrid model Step II comprised: CRT analysis (Section 6.2.2.1), Root causes analysis (Section 6.2.2.2), Evaporating Cloud/EC with Negative Branch Reservation (NBR) testing method, and Future Reality Branch (FRB) (Section 6.2.2.3).

6.2.2.1 Current Reality Tree (CRT)

Hong (H1)'s CRT (Figure 6.6) revealed the effect-cause-effect linkages of her two major problematic issues: (1) Feeling her study was valuable or worthwhile, and (2) Keeping the deadline/timelines. Hong's research involved experiments on certain material that meant she had to spend longer working on her research project (entity 104/201). The entity 104/201 then caused entity 202 (I am always behind my research timeline). In addition, the entity 104/201 together with entity 105 (I have not found the right solution for my research project) caused entity 106 (I feel it is a waste of time and money working on this project). Hong's CRT disclosed the negative linkages, until the stage that she could not focus well on her thesis (entity 109/211). Then entity 109/211 connected with other entities within the two major problems

yielding the critical impact on her goal, my goal of completion of the research project and satisfactory thesis is jeopardised (entity 214). At the bottom of Hong's CRT, there were three root causes: entity 101 (I can hardly find the right information about my research project), entity 102 (I am doing something so that it does not go well), and entity 103 (I am new to a Master's thesis). These three root causes, analysed using TOC span of control and sphere of influence including other criteria, are presented in section 6.2.2.2.

Helen (H2)'s CRT based on the two major problems, Not knowing how to get started and Designing her study, disclosed the negative linkages from the root causes of a problem to Undesirable Effect (UDE) that jeopardised her goal (Figure 6.7). Compared with Hong (H1) who had to re-work her experiments again and again, which slowed down her research project, Helen's Not knowing how to get started and lack of research skills as a new researcher also caused a delay from one to another of her research's stages. The four root causes of Helen's problems, entities 202, 101/201, 203, and 204, needed to be analysed by using TOC span of control and sphere of influence including other criteria is presented in section 6.2.2.2.

Harn (H3)'s CRT (Figure 6.8) was constructed from his two major problematic issues: Not knowing when to stop the literature search, and Writing the literature review. Being a new researcher (entity 101), Harn designed complicated research and compounded the time constraints (entity 102), had no experience with research interviews (entity 103), and lacked experience in thesis writing (entity 201). The CRT's process revealed the logical linkages of these three entities (102, 103, and 201) which seriously affected Harn's well-being physically and emotionally. He felt stressed (entity 120/215), was not able to sleep (entity 121/216), and was panicky (entity 124). In his down moments, Harn felt so bad he thought about giving up his thesis (entity 125). Harn's situation, according to his CRT, could seriously prevent him from achieving his goal (IO Map). The analysis of Harn's CRT critical root cause (entity 101) by TOC's span of control and sphere of influence, including other criteria, is presented in section 6.2.2.2.

Henry (H4)'s CRT (Figure 6.9) presented his current reality of Keeping the deadline/timelines issue. Based on his answers to the TOC questions, Henry's CRT demonstrated the three root causes, entity 101 (My supervisor does not push me to create the deadline), entity 102 (I misunderstand the imperative of keeping the deadline, and entity 103 (I have other

commitments with the community outside the university), that caused several undesirable effects. The analysis of Henry's CRT critical root causes is presented in section 6.2.2.2.

Figure 6.6: Hong's Current Reality Tree (CRT)

Figure 6.7: Helen's Current Reality Tree (CRT)

Figure 6.8: Harn's Combined Current Reality Tree (CRT)

Figure 6.9: Henry's Current Reality Tree (CRT)

6.2.2.2 The critical root cause analysis

The CRT analysis revealed several root causes for each student's current situation. TOC provides the process to analyse the root causes and select the most critical of these by comparing the root cause's impact on the system's IO Map, and checking if it is within the system owner's authority: within his/her span of control and sphere of influence. Following the same analysis method as the TOC analysis (Chapter Four), the main criteria used to select which root cause is a critical root cause within the Master's thesis student's context are: (1) an impact on the IO Map; (2) within the span of control; (3) within the sphere of influence, and (4) Master's student's thesis stage.

Figure 6.10 Root causes of Hong's problem vs her IO Map

Figures 6.10 – 6.13 present the root causes of problems experienced by each Hybrid model interviewee from the CRT analysis versus his/her IO Map. According to Dettmer's TOC gap analysis (2008), the Undesirable Effect (UDE) may block a system owner from achieving his/her Goal and/or Critical Success Factor (CSF). The root causes found for Hong, Helen and Harn's problems, had a negative impact on both their CSFs and goals. For Henry, most of his root causes affected his goal directly. For example, entity 101 (Hong can hardly find the right information about her research project) blocked CSF1 from completion the synthesis of required material (Figure 6.10). If Hong failed to complete CSF1 she could not achieve her goal: completion of research project and satisfactory thesis. Henry's example (Figure 6.13) entity 103 (Henry had other commitments with community outside the university) blocked him from achieving his goal to get a Master's.

After evaluating the impact of the root causes to the system's IO Map, the next important criteria are his/her span of control, sphere of influence, and the student's thesis stage.

Figure 6.11 Root causes of Helen's problem vs her IO Map

Figure 6.12 Root causes of Harn's problem vs his IO Map

Figure 6.13 Root causes of Henry's problem vs his IO Map

Table 6.2, next, presents root causes of each student's problems and whether each root cause was within the student's boundaries: span of control (SOC) and sphere of influence (SOI). According to this analysis, almost all of the root causes were not in SOC, except Henry's entity 102 (see the explanation under each entity in Table 6.2). This result could explain why the students had identified these problems as a high or very high degree of difficulty, as the root causes were beyond the students' control. Fortunately, some entities (root causes) were within the student's sphere of influence. This means that the system's owner or each student can influence the root causes to some degree. Therefore, from analysing SOC and SOI in the Hybrid model analysis, it is recommended that the system's owner should address the root cause(s) that he/she has authority to change. According to Table 6.2, any entity with "Yes" in any SOC or SOI's column should be addressed. However, in the context of a Master's thesis, the thesis stage (literature review, analysis etc.) is an important criterion to consider when determining which root cause is critical for the system's owner (the student). This is considered next.

At each stage of a Master's, thesis students may experience different types of issues. Based on the SOC and SOI analysis, the proposed root causes to be addressed were: entity 101, 102 for Hong (in data collection stage), entity 101/201, 202, 203 for Helen (in data analysis stage), entity 101/102, 101/103, 101/104 for Harn (in finishing stage), and entity 102, 103 for Henry (in writing stage).

For Hong, in the data collection stage, CRT (Figure 6.6) entities 101 and 102 were similar; they caused the same effects. Hong could have chosen to address either of them. However, taking her thesis stage into consideration, if Hong addressed the root cause entity 101 at this stage, it could have a greater improvement on her performance. During data collection (in the experiment process), Hong could always talk with her supervisors about finding alternative sources of information for her research project. Regular discussion with her supervisors about her research should increase the level of Hong's confidence in her project. Therefore, the root cause entity 102 would become invalid.

For Helen, in the data analysis stage, there were 3 root causes, entity 101/201, 202, and 203, within her sphere of influence (SOI), that could be addressed. However, the root cause entity 203 was more critical when taking into consideration that Helen was doing data analysis. At this stage, it was imperative that Helen receive clear guidelines and other information needed for the analysis stage and for the remainder of her thesis. Addressing the 'unclear guideline'

was critical for her IO Map/success. In contrast, the entity 101/201 (My research topic is new and nobody had done this topic), and entity 202 (My research topic's literature has such a wide range to search) were not crucial and thus were irrelevant at this stage: data analysis. If Helen was in the process of selecting the topic or doing a literature review, the entity 101/201 or 202 might be the critical root cause for that thesis stage, but not the analysis stage.

Hybrid interviewee	Root cause (entity number and description)	Span of control (SOC)	Sphere of influence (SOI)
Hong (H1) Thesis stage: data collection	Entity 101: I can hardly find the right information about my research project. SOC = No, because I cannot control the external information. SOI = Yes, I can find alternative sources for the external information.	No	Yes
	Entity 102: I am doing something so that it does not go well SOC= No, because my topic is new and I cannot control the results of my research's experiments. SOI= Yes, I can consult with my supervisor/experts to limit a scope or boundary of my research's experiments.	No	Yes
	Entity 103: I am new to a Master's thesis SOC=No, because a Master's thesis is set up by the university and I have to follow its rules and instruction. SOI=No (same reason with SOC)	No	No
Helen (H2) Thesis stage: data analysis	Entity 101/201: My research topic is new and nobody had done this topic SOC= No, because I cannot control external information. SOI=Yes, I can design my own research under supervision of my supervisor(s).	No	Yes
	Entity 202: My research topic's literature has such a wide range to search. SOC=No, because I cannot control external information. SOI=Yes, I can consult with my supervisor/experts to limit a scope or boundary of my research's literature.	No	Yes
	Entity 203: I do not receive a clear guideline of how to do research. SOC= No, because the authority of controlling research guideline belongs to my school/university. SOI=Yes, I can inquire or ask for a research guideline from my school/university.	No	Yes
	Entity 204: I am a new researcher (To a Master's thesis). SOC=No, because a Master's Degree thesis is set up by the university. I need to enrol into the program and complete a minimum of one year thesis base and follow the university's system in order to gain experience as a Master's researcher. SOI=No (same as SOC)	No	No
Harn (H3) Thesis stage: finishing	Entity 101/102: I am a new researcher who designed complicated research that compounded the time constraints. SOC=No, because a Master's Degree thesis is set up by the university. I need to enrol into the program and complete a minimum of one year thesis base and follow the university's system in order to gain experience as a Master's researcher. SOI=I can design feasible research under close supervision.	No	Yes
	Entity 101/103: I am a new researcher with no experience in research interviews SOC=No, because a Master's Degree thesis is set up by the university. I need to enrol into the program and complete a minimum of one year	No	yes

Hybrid interviewee	Root cause (entity number and description)	Span of control (SOC)	Sphere of influence (SOI)
	thesis base and follow the university's system in order to gain experience as a Master's researcher. SOI= I can conduct a pilot test and learn to conduct a better interview from research method literature.		
	Entity 101/103: I am a new researcher who lacks experience in thesis writing. SOC=No, because a Master's Degree thesis is set up by the university. I need to enrol into the program and complete a minimum of one year thesis base and follow the university's system in order to gain experience as a Master's researcher. SOI= I can improve my thesis writing by attending writing courses provided by the university (or Student Learning Support Service)	No	Yes
Henry (H4) Thesis stage: writing	Entity 101: My supervisor does not push me to create the deadline SOC/SOI=No, I have no control on my supervisor's authority.	No	No
	Entity 102: I misunderstand the imperative of keeping the deadline. SOC/SOI=Yes, I have full authority for my own system.	Yes	Yes
	Entity 103: I have other commitments with community outside the university. SOC= No, I have no authority to control over the community's activities. SOI= Yes, I can choose to participate in some activities.	No	Yes

Table 6.2: Hybrid interviewees' root causes analysis by TOC span of control & sphere of influence

For Harn, in the finishing stage, there were three root causes of his problems, entity 101/102 (I am a new researcher who designed complicated research that compounded the time constraints), 101/103 (I am a new researcher with no experience in research interviews), and 101/104 (I am a new researcher who lacks experience in thesis writing). Harn had just submitted his thesis when he took part in the Hybrid model individual interviews. According to his storylines and his CRT (Figure 6.8), the writing issue was critical to his finishing. The other two root causes, entity 101/102 and 101/103, were not relevant at his finishing stage. If he was in an earlier stage, for example, the literature review or data collection stage, the entities 101/102 or 101/103 might have been critical and, thus, in need of addressing.

For Henry, in the writing stage, there were two root causes of his problems, entity 102 (I misunderstanding the imperative of keeping the deadline) and 103 (I have other commitments with community outside the university). At this stage, the root cause entity 103 was critical, because Henry should concentrate on his writing and minimise the other activities that might cause distraction or block him from achieving his goal. Another root cause, entity 102, became less important, as he was already aware of keeping the deadline. Therefore, Henry needed to address the critical root cause: entity 103.

After finalising which root cause of the problem needs to be addressed, the next step in the Hybrid model is to manage the root cause using TOC, by employing the Evaporating Cloud (EC).

6.2.2.3 Using the TOC Evaporating Cloud (EC) to evaporate the conflicts.

In this section, the researcher employed the TOC EC to frame the critical root cause for each interviewee (within this Hybrid model) into a two-sided conflict ‘evaporating cloud’ and using the same procedure as the TOC analysis in Chapter Four (section 4.2.3).

Entity 101(I can hardly find the right information about my research project) was Hong’s critical root cause of her performance issues. According to Hong’s Current Reality Tree/CRT (Figure 6.6), she had to spend time working on the experimental element of her research project, again and again. She felt that she got to nowhere (entity 206). Based on her CRT and her storylines, Hong’s critical root cause could be reframed into an EC’s conflict (Figure 6.14). Entity D (I must spend enough time learning and working on my own to find the right solution for my research project) is in conflict with entity D’ (I must spend enough time discussing and learning from my supervisors and/or experts to improve my research project).

Figure 6.14 presents the two-sided conflicts of Hong, ABD, and ACD’, with the common objective: to complete a quality on-time thesis. There were assumptions supported each of the links between parts of the two entities: AB, BD, AC, CD’, and DD’. For example, the main assumption underlying Hong’s conflicts was that she had time constraints, and could not perform both D and D’. According to the TOC EC procedure, in order to terminate an existing conflict, at least one of the underlying assumptions of the conflict must be eliminated, thus creating a vigorous solution that can cause great improvements to the system. For Hong’s case, the solution (Injection BD) that could invalidate the assumption BD1 and BD2 would be to allocate time to discussion with her supervisors and getting good advice from them on her research project. By doing this, Hong could minimise the time lost when she had to work on her experiment again and again. In addition, injection AB2 (Supervisors’ advice provides a better plan for new researchers) could terminate the assumption AB2: Master’s thesis is an independent study in which the students must plan their own programme.

Figure 6.15 presents the EC of Helen (ABD and ACD’), with the common objective: to complete a quality on-time thesis, along with the main underlying assumptions: AB, BD, AC,

CD' and DD'. For example, the main assumption underlying Helen's conflict, was that she had time constraints, and could not perform both.

Similar to Hong, the solution (Injection DD') that could invalidate the assumption DD' is to allocate time for discussion with her supervisors and getting clear guidelines for the remaining thesis process. By doing this, Helen could save a lot of time or minimise the time lost when she had to try to work on her own. In addition, injection AB1 (Supervisors' advice enhances a better performance for new researchers) could terminate the assumption AB1 and AB2: to complete a quality on-time thesis I must be able to work independently, and being able to work independently is one of the key success factors for Master's thesis students.

Figure 6.16 presents the EC of Harn (ABD, and ACD'). The main assumption underlining Harn's conflict was that he had time constraints, and could not perform both D and D'. Similar to Hong and Helen, in terms of time management, the solution (Injection DD') that could invalidate the assumption DD' is to allocate time to learn how to improve writing a good thesis from various sources: attending writing courses offered by the school/university, my supervisors' feedback, and thesis writing guidebooks. By doing this, Harn could save a lot of time or minimise the time lost when he had to try working on his own. In addition, injection BD (Supervisors' advice enhances a better performance for new researchers) could break the assumption BD1 and BD2: By spending time learning and improving thesis writing by myself enhances good thesis writing, and writing a thesis is an independent study, therefore, I must learn and improve how to write a good thesis by myself.

Figure 6.17 presents the EC of Henry (ABD, and ACD') with the common objective: to get a Master's Degree in something relevant and helpful to my community work. Henry's conflict was that he had time constraints, and could not perform both. Similar to Hong, Helen, and Harn, in terms of time management, the solution (Injection DD') that could invalidate the assumption DD' would be to give priority to the thesis and spend less time on community work. By doing this, Henry could focus well on his thesis writing and achieve his objective. In addition, injection CD' (I must let my community network know that I have to focus on writing a thesis and cannot attend many of the community's activities for a period of time, and I will be more useful to them when my thesis is complete) could break the assumption CD': by spending enough time joining in community work and my networking outside the university enhances the support from my community networks.

The Evaporating Cloud (EC) helped reframe the students' critical root causes of conflicts to find solutions to terminate the conflicts and the related assumptions. The next step in the Hybrid model, following the EC analysis, is to test the solution using the Negative Branch Reservation (NBR) process (see Figures 6.18 – 6.21).

	Hong (H1)	Helen (H2)	Harn (H3)	Henry (H4)
Thesis stage	Data collection	Data analysis	Finishing	Writing
IO Map (Figures 6.2 -6.5)	Goal: Completion of research project and satisfactory thesis CSF1: Complete the synthesis of required material CSF2: Good written thesis	Goal: To see if I could CSF1: Completion of thesis CSF2: Attaining a good result	Goal: To complete a quality on-time thesis CSF1: Time management CSF2: To follows research methods step by step	Goal: To get a Master's Degree in something relevant and helpful for both my teaching and community work CSF1: Determining a topic CSF2: The willingness of interviewees CSF3: Good supervision
Problems (Table 6.2)	Feeling my study valuable/worthwhile, Keeping the deadline/timelines	Not knowing how to get started, Designing my study	Not knowing when to stop reading the literature, Writing the literature review	Keeping the deadline/timelines
Critical root cause (Table 6.3)	I can hardly find the right information about my research project	I do not receive a clear guideline of how to do research	I am a new researcher with lack experience in writing thesis	I have other commitments with community outside the university
Conflicts from EC (Figures 6.14 - 6.17)	D: I must spend enough time learning and working on my own to find the right solution for my research VS D': I must spend enough time learning from my supervisors and experts to improve my research project	D: I must spend enough time working on my own VS D': I must get clear guidelines of how to do research from my supervisor and/or my school postgraduate coordinator.	D: I must spend time learning and improving a thesis' writing by myself VS D': I must improve how to write a good thesis from various sources: attending writing courses offered by the school/university, my supervisors' feedback, and thesis writing guidebooks.	I must spend enough time working on my thesis VS D': I must spend enough time joining community works and my networks outside the university.
Solution from EC (Figures 6.14 - 6.17)	I must allocate my time to discuss with my supervisors and get good advice from them in order to improve my research project.	I must get a clear guideline of how to do research	I must spare some time to improving my thesis writing from various sources: attending writing courses offered by the school/university, my supervisors' feedback, and thesis writing guidebooks.	I must give priority to my thesis and spend less time on my community works.

Table 6.3 Summary of results of TOC analysis of each Hybrid model interviewee

Figure 6.14: Hong's Evaporating Cloud (EC)

Figure 6.15: Helen's Evaporating Cloud (EC)

Figure 6.16: Harn's Evaporating Cloud (EC)

Figure 6.17: Henry's Evaporating Cloud (EC)

Figure 6.18: Negative Branch Reservation (NBR) and Future Reality Branch (FRB) for Hong

Figure 6.19: Negative Branch Reservation (NBR) and Future Reality Branch (FRB) for Helen

Figure 6.20: Negative Branch Reservation (NBR) and Future Reality Branch (FRB) for Harn

Figure 6.21: Negative Branch Reservation (NBR) and Future Reality Branch (FRB) for Henry

Figure 6.22: Hong's Future Reality Tree (FRT)

Figure 6.23: Helen's Future Reality Tree (FRT)

Figure 6.24: Harn's Future Reality Tree (FRT)

Figure 6.25: Henry's Future Reality Tree (FRT)

From Step I and Step II of the Hybrid model, using part of TOC, the problematic issues of each interviewee were addressed, and yielded solutions for further actions in order to improve their performance. The solutions found were tested by NBR methods, and presented in a format of FRT before an actual implementation. The first phase analysis of the Hybrid model, using TOC, was at an end. The researcher would merge the results of the first phase later with AI's results. The second phase of Hybrid model, employing AI, is from sections 6.2.3 -6.2.6, next.

6.2.3 Hybrid Step III: What is your affirmative topic?

After addressing the constraints by using TOC in the first phase (Steps I and II), the second phase focuses on the strengths by employing AI (Steps III – V). Step III of the Hybrid is to identify the affirmative topic of each student's Master's thesis study. This process is the first step in Appreciative Inquiry (AI) to select the focus area for improvements. In organisations, according to AI literature, the topic can be preselected by the organisation's assigned working group or among the staff members who take part in the organisation's improvements. However, within the context of this research, the affirmative topic for each student was composed by the researcher, based on the same procedure in Chapter Five: AI analysis, see Table 6.5 below.

	Hong (H1)	Helen (H2)	Harn (H3)	Henry (H4)
Thesis stage	Data collection	Data analysis	Finishing	Writing
Reason for undertaking a thesis	Career enhancement	Personal satisfaction	Career enhancement, Personal satisfaction, and to pursue PhD later	Career enhancement
Thesis goal	Quality and on-time	Quality and on-time	Quality and on-time	An understanding of issues involved
Strengths/desire	Hard working person, self-determination, financial constraint free study, support from family, postgraduate student in the same school, and supervisors	To work on a research topic that can help people and being able to make a difference.	Being optimistic To help improve for a better life and better society for the people in my home country. Environmental, and conservations concern.	To conduct research that I can meet and talk to people including to help develop and enhance Maori society.
Affirmative Topic	<i>Quality on-time thesis with good and hands-on supervision under supportive environments for career enhancement</i>	<i>Quality on-time thesis with the topic of my interest with clear guidelines of how to do research that I can learn and make a difference to the target group of my research</i>	<i>Quality on-time, and good written thesis with environments and conservation based research for social developments and my future career and PhD enhancement</i>	<i>Quality on-time, and good written thesis that enhances my personal learning on the involved issues for my future career and community works.</i>

Table 6.4 Each interviewee's affirmative topic and the sources of affirmative topic's components.

The AI affirmative topic composed in this step for each Hybrid interviewee is similar to the goal in TOC's IO Map. One of the differences is that the goal in the IO Map has two important

components, Critical Success Factor (CSF), and Necessary Condition (NC). The details that enhance the AI affirmative topic will be revealed after applying the AI 4-D Cycle, next.

6.2.4 Hybrid Step IV: Discovery: Appreciating what is

The first AI 4-D is Discovery, appreciating past achievements and a system's strengths. With the same AI procedure as Chapter 5 (section 5.2.2.2), the researcher employed AI positive questions to allow each Hybrid model interviewee to recognise and appreciate his/her past achievements. The answers from each interviewee are summarised below:

Hong: *I am a hard working person: I actually rework, try, and give as much as I can for the project and I do not give up easily, I try again with **determination**. My strengths of hard working type can cope well with failure. Besides, **the support from** my friends, my family, and **people around are very important**. They motivate me well and keep telling me not to give up. Actually most of my friends are doing similar projects, so they normally understand what I am doing, so it's good because they can help me. **They can give support, help and suggestions for what to do. I found it's very helpful. I found that having a good supervisor is very helpful, too** because they can give a lot of insight, they know what I am doing. I chose my own supervisors. At the beginning of my project, I had a bit of a financial problem. I had to work part time and studied at the same time, but it did not work out. They (my supervisors) actually helped me with financial issues and provided me a scholarship. They helped me with my writing and when I have something to discuss with the project. **They can give a lot of insight**, they know a lot. Furthermore, **I can always meet them** because some supervisors are very busy and very hard to find, but mine are pretty good and it's easy to find them. **Whenever I need to, I can just find them.** I can meet my supervisors easily. They also reply to my e-mail very fast.*

AI positive questions helped Hong reveal her strengths and her past impressive moments. Her hard working personality combined with determination became a strong base and fitted well with the independent study of Master's research, especially as the research she was dealing with involved a lot of uncertainties. The completion of her research was one of the Critical Success Factors (CSF) that she identified in her IO Map (Figure 6.3). However, Hong's strengths might not be enough to push her through the future predicament in the next stage of her thesis (see Coaching session, section 6.5). Hong's past outstanding moment was the support

she received from former classmates, her family, and supervisors. She was lucky that some of her classmates were doing similar research, and Hong had the same supervisors who were very supportive. Hong also took part in the last phase of this research: coaching sessions (action research). During the coaching session, according to the TOC analysis (part of this Hybrid model), it was her supervisors and Hong's decision that were critical to her success.

Helen: *My research allows me to combine things that I have a passion for, with study and research, so I can make positive differences. By doing this research, I am involved in a form of activism in a way – activism that makes a difference in the lives of people I am working with. My research emerges from the work I have done with X (name of a group of people). I have the background required to look at this area and it's a way of being able to challenge something that really interests me, something that has never been researched before.*

Helping people and being able to make a difference has always been so important to me. So, to feel like I can combine that desire to help people with what I do in my Degree, makes the degree all the more useful. That was really important to me. Spirituality and generosity are important to me. I love what I am doing. I will put the work in and do very well. I have got more time to put into the analysis and because I love what I am doing, I am willing to spend more time on it. Listening to the interview tapes while I was transcribing, I could hear passion in my interviewees' voices when they talked about things. I am very happy to have the opportunity to do this research and my topic is very interesting: it is close to what I really love.

I think I am quite good at working under pressure. I am good at writing. The way I process everything is to think about it and do it. I know that I can get it all done. I also have the ability to work to deadlines. Being able to plan, does help me to stick to my timeline. I know how to break down tasks into steps that seem to be the most productive. Furthermore, I have a very good supervisor. She is brilliant. She is busy, but she is really good. She knows how to supervise.

For my high point experience, my undergraduate study was brilliant. It was something that I have always been interested in and wanted to study. The school where I did my undergraduate study was very small and all lecturers knew me very well. I can go back and have a coffee with them, whenever I visit the university. I made good friends of them.

AI positive questions offered Helen an opportunity to talk about her Master's research that she could combine her passion with her study. Helen chose a research topic that could serve her sense of spirituality and generosity. She wanted to help people, especially those in the study group that she had earlier been working with. The positive questions of AI were able to disclose some of Helen's root causes of success so that she could utilise her strengths, which were relevant to Master's thesis students' required capability of being a good writer, able to work under pressure to the deadlines, and planning ability to work on the interesting research topic that she had been passionate about. According to supervisor "A" (Pongsart, 2005, pp. 139,141), "students should do a project that they enjoy doing, and good supervision is one of the key success factors (for research students)." Helen was happy with the supervision. Unfortunately, at this stage, Helen encountered the 'unclear guidelines' of a Master's thesis. The final step, the Hybrid model, offered an opportunity to merge the critical root cause of Helen's problem and some of her root causes of success for further action.

Harn: *I am not a selfish person. All my life, my motivation has been thinking about being able to contribute to the development of my country. I try to improve the quality of poor people's lives, to help them to have a better life and to build a better society. I always want to get involved with conservation and improving the livelihoods of the people. I am always working on environmental problems.*

I have never made a decision by thinking about material things. I wanted to do the right thing by improving my skills. I guess that is why I got a scholarship. My plan has always been to go back and continue doing good things. I never thought of leaving my country. I like knowledge, I like learning. I am not young and I have been working since I left school, but I always felt that I did not have time to read things. By coming back to school (higher education), I have opportunity to read, so I enjoy that. I want to go back and help a local community living around a protected area.

For the factors that give life to my life and study, I guess life itself. I really enjoy being alive and I enjoy having contact with all kinds of living beings, animals and plants. I am very connected with nature. I guess "hope" because we have a very difficult situation, not only in my country, but around the world. I am always optimistic, I am a positive person. I am always "looking at the good side of things".

A high point experienced...that was quite a long time ago...I like study, I like knowledge, I like reading, I like information, I like sciences, and I am interested in

*things. I guess that **interest is one of the things that help my study**. Furthermore, there is one thing that helps me a lot and that is that **I like to meet with people**. I also enjoy learning with good teachers/tutors. That is rewarding. **The interviews or my fieldwork was one of the best parts of my research**. It was good to be able to go out and talk to people, and learn from them.*

Similar to Hong and Helen, AI positive questions worked well with Harn. He seemed to enjoy telling his impressive stories in the past. Harn loved studying, reading, meeting with people, conservation and environment care, and doing things for his country and improving people's lives in his country. Being optimistic, he enjoyed life and having contact with living things.

In contrast with the TOC questions in section 6.3.2.1 (see Harn's CRT, Figure 6.8), AI positive questions enabled the researcher to understand Harn from a different angle: his strengths and past achievements. AI's philosophy of approaching the issue from the positive end allowed Harn and the other Hybrid model's interviewees to recognise their strengths and past successes. Answering AI positive questions and talking about the positives might have lifted up the interviewees' confidence and motivation at that moment. The issue of concern in Harn's case is whether AI could sustain this appreciative moment of each student, so that he could overcome any obstacles that may block him from his success. How can the students convert their appreciative moment, strengths, and past achievements into their root cause of success?

By revisiting Harn's CRT (Figure 6.8), Harn's critical root cause was: Being a new researcher who lacks thesis writing experience. Coincidentally, Being good at reading (one of his strengths), but Not knowing when to stop reading the literature, combined with his critical root cause and Availability of information in this information age, could yield various Undesirable Effects: entity 205 (I am overwhelmed with so much information), entity 207 (I keep going back, filling in this, and working on that), entity 115 (I keep finding things that were more important), entity 116/209 (I usually ended up with having too much information, entity 211 (I am very tired and exhausted), and many more (see Harn's CRT, Figure 6.8). the TOC CRT tool revealed Harn's current reality that he was struggling during his writing stage. From this point, the researcher had learned that it might be difficult to employ positive questions to intervene and cause positive change at this stage. Therefore, the Hybrid model might be one of the alternative choices to help improve the students' performance. More analysis by the Hybrid process is presented later in Steps VI and VII.

Henry: I am a good talker. I enjoy talking to people. I so enjoy interviewing people and I enjoy listening to people's stories. Probably, these two are my key things that help me on my (Master's thesis) journey. My high point experience was the presentation (after my data collection) in terms of just the Master's, because I think what they did was brought together very interesting interviews, a lot of interesting people and brought together a case, an argument. I had interesting engagement with interesting people. I got very positive feedback that was encouraging and my supervisors were very happy. That was quite a turning point for me, it was tangible and it was very important to have this confidence and motivation. Furthermore, things that energised me during my Master's were the interview itself because people were quite enthusiastic about the issue I was dealing with. Furthermore, the discovery of a relevant piece of literature, a book I got during my research. Finding the book is a similar type of event that certainly helps me see the relevance of what I am doing. It also shows a different approach that the organisation I investigate could have taken to achieve the positive. So one book makes things significantly relevant and that was good and the enthusiasm of the people I have been working with energises me a lot. In addition, my faith does and it is important to me and God is important to me and so these things are significant and give me a lot of relevance. Also, support from my family and friends who are also very interested in what I am doing.

Henry's answers to the AI positive questions revealed his high point experience during his Master's thesis, as well as a personality that seemed well-suited to researching his topic. His enjoyment of talking and listening to people's stories enhanced his research interviews and presentation. However, similar to Harn and the other Hybrid interviewees, Henry also experienced constraints (see Henry's CRT, Figure 6.17). His friendly personality, enjoying talking and listening to others, combined with his activities with his community outside the university, were in conflict with his last thesis stage: writing (see Henry's Evaporating Cloud/EC, Figure 6.17). Similar to Harn, Henry's strengths and his high point experience alone might not be sufficient to cope with his current constraints, without integrating AI with some useful tools from the other disciplines.

The Hybrid model Step IV borrowed from AI Discovery presented the interviewees' positive side of their strengths and past achievements. According to AI, after the Discovery phase where it creates appreciative moments, AI takes advantage of a high level of positive feelings (of AI

participants) to dream of improving their current reality beyond any boundaries, Dream phase. Therefore, the researcher designed Step V, Dream, to follow Discovery: Step IV. The Current reality from Step II will be merged with the positives in Step VI onwards, after Step V, Dream, next.

6.2.5 Hybrid Step V: Dream: What might be?

The Hybrid model Step V, Dream, aims to make the most out of the Hybrid model interviewees' high level of appreciation by asking them to make 3 wishes (one of the AI positive questions) that could enhance the vitality of their Master's thesis performance. The answers would be combined with the Discovery phase's results in the next Step VI.

Hong: My two wishes are: that my research is achieved, and I can complete my thesis on time.

Hong's wishes were almost the same as those she identified in her Intermediate Objective (IO) Map (Figure 6.2). In the data collection stage, she was struggling with finding the synthesis of required material from her experiment (CSF1 – IO Map). According to Hong's Current Reality Tree/CRT (Figure 6.6), she spent a lot of time working on her experiment. Hong faced uncertainties in her research and was not sure if she could complete her thesis on time. It seemed that her current reality of facing difficulties influenced her wishes. In contrast, AI Dream is supposed to make the most out of what has been discovered from Step IV: Discovery. However, it might be Hong's strength in being hard a working person with determination, *I don't give up easily*, combined with her supportive friends, family, and her supervisors, that kept her in the game.

The Hybrid model could compensate for what AI Dream could not perform well, while constraints exist, as in Hong's situation. While focusing on positives, the Hybrid model employed TOC (Steps I and II) to address Hong's constraints and come up with a solution to enhance her success. Table 6.4 presents the solutions yielded from addressing Hong and three other interviewees' critical root cause(s). The solutions from both sides, strengths and constraints, offered a system's owner more options to improve the system's performance, instead of looking at only one side. The past achievements and strengths are useful information for the researcher and the system's owner. Thus, action plans to enhance the solutions were

yielded from both, the root cause of a problem, and the root cause of success, see section 6.2.7., Hybrid model Step VII.

Helen: *My two wishes are: I wish to have more time to do my research, and I wish to have more chance to talk with people who are taking a similar approach.*

There were commonalities and differences in Hong's and Helen's wishes. The commonalities were that both interviewees could only provide two wishes, and the wishes were related to their IO Maps (see Helen's IO Map, Figure 6.3). Helen seemed to enjoy working on her topic and would like to have more time working on her research project. Furthermore, in her data analysis stage, Helen did not seem to have any serious constraints. According to Helen's Current Reality Tree/CRT (Figure 6.7), most of the entities were related to her beginning thesis stage of topic selection. In the analysis stage, entity 203 (I do not receive a clear guideline of how to do research) was the only relevant root cause. This also indicated that Helen encountered fewer issues, compared to Hong. By experiencing fewer constraining issues, Helen's wishes represented the main objective of AI Dream: dreaming beyond boundaries. If there was no time limitation, Helen must have spent more time researching and learning from, and/or sharing experience with people who were doing similar approach. More analysis based on Helen's Dream and Discovery is presented in Step VI onwards.

Harn: *My two wishes are:*

I wish to have more time, more time, and more time! – So that I can be able to deal with several issues. Perhaps, my decision to do a two phase research project was not a smart idea. I did not realise that. It was not good for me because one year for a thesis is very short time. Consequently, time was very much always my main constraint. I always wished to have more time.

My second wish *is to do a one phase research project. I am not going to continue with a two phase project. I will do only one phase instead. Actually, when I came to NZ, I wanted to do a PhD. One year to do a thesis or similar research is too short.*

If my wishes come true, I would feel relief for the first time in my life. I am still having emotional problems even now, towards the end of my Master's thesis. Yet normally, I am a very stable and secure person.

Compared with Hong and Helen, Harn also had two wishes, but aimed to correct what went wrong in his research, similar to the AI interviewees in Chapter Five. Harn's two wishes were related to the constraints he was facing, as shown in his Current Reality Tree/CRT (Figure 6.8). From the analysis in previous steps using TOC, Harn's critical root cause was his lack of experience in writing (section 6.3.2.2). His critical root cause yielded several Undesirable Effects (UDEs), as previously mentioned in Discovery's analysis (Step IV). Therefore, "more time" (Harn's wish) had a different purpose from Helen, who wished to have more time so that she could enjoy learning and improving her research project. In contrast, Harn would use his extra time to deal with several constraining issues. This was further evidence to support the claim that AI Dream may not be able to perform well with students who are experiencing particular constraints, or that the system's constraints must be eliminated before AI's Dream phase takes place. In addition, Harn's second wish was also to correct what went wrong; he wished to 'go back in time' to simplify his research design.

***Henry:** My three wishes to enhance the vitality of my research are:*

*Firstly, I would like **to be a crisper writer**. I would like to be able to write in a sharp way so the reader is not getting bogged down. Secondly, I wish **I could keep to the deadline**. I would like to be finished now in terms of being able to make the deadline. The third wish, the work will have relevance so it would be able to speak meaningfully to the organisation that I am writing about.*

*Lastly, I know that my work (research) will help me whether I stay at XYZ (Henry's current job) or my community. **The research will give me the new sensitivity to Maori aspirations and Maori desires**. I see an absolutely apparent need in a school context for the schools to be able to create strong connections with the community as well as affirming Maori culture within the school. This is to give a new sense of dignity and self-respect to young Maori students and also a sense of accountability to young Maori students and a connection with Maori parents. In this respect, schools become a place where Maori people feel welcome and also where young people feel accountable, knowing that two strings of influence in their lives, which include both their parents and the institution itself are working together to ensure they make progress. So that is really important.*

Compared with Hong, Helen, and Harn, Henry was the only one who could identify the complete three wishes; covering similar topics to those conveyed by the first 3 Hybrid

interviewees. Henry's first two wishes were to correct what went wrong, and to improve the current reality, similar to Hong and Harn. His third wish aimed to expand his strengths and past successes into his research's contribution, similar to Helen. According to his Current Reality Tree/CRT (Figure 6.9), during his writing stage, Henry encountered the deadline issue. His current reality had an impact on his first two wishes: to be a crisper writer, and to be able to keep the deadline. Among the 4 Hybrid interviewees, in terms of experiencing constraints, Helen and Henry seemed to have less serious problems than Hong and Harn, according to the CRT analysis, section 6.3.2.1. Henry and Helen were able to wish for something beyond boundaries. Thus, the researcher learned from Henry and Helen that AI Dream may perform better within less constrained environments.

	Hong (H1)	Helen (H2)	Harn (H3)	Henry (H4)
Thesis stage	Data collection	Data analysis	Finishing	Writing
Reason for undertaking a thesis	Career enhancement	Personal satisfaction	Career enhancement, Personal satisfaction, and to pursue PhD later	Career enhancement
Thesis goal	Quality and on-time	Quality and on-time	Quality and on-time	An understanding of issues involved
IO Map (Figures 6.2 – 6.5)	Goal: Completion of research project and satisfactory thesis CSF1: Complete the synthesis of required material CSF2: Good written thesis	Goal: To see if I could CSF1: Completion of thesis CSF2: Attaining a good result	Goal: To complete a quality on-time thesis CSF1: Time management CSF2: To follows research methods step by step	Goal: To get a Master's Degree in something relevant and helpful for both my teaching and community work CSF1: Determining a topic CSF2: The willingness of interviewees CSF3: Good supervision
Problems (Table 6.2)	Feeling my study valuable/worthwhile, Keeping the deadline/timelines	Not knowing how to get started, Designing my study	Not knowing when to stop reading the literature, Writing the literature review	Keeping the deadline/timelines
Critical root cause (Table 6.3)	I can hardly find the right information about my research project	I do not receive a clear guideline of how to do research	I am a new researcher with a lack of experience in writing a thesis	I have other commitments with community outside the university
Conflicts from EC (Figure 6.14 -6.17)	D: I must spend enough time learning and working on my own to find the right solution for my research VS D': I must spend enough time learning from my	D: I must spend enough time working on my own VS D': I must get clear guidelines of how to do research from my supervisor and/or my school postgraduate coordinator.	D: I must spend time learning and improving my thesis writing by myself VS D': I must learn how to write a good thesis from various sources: attending writing courses	I must spend enough time working on my thesis VS D': I must spend enough time joining community works and my networks outside the university.

	Hong (H1)	Helen (H2)	Harn (H3)	Henry (H4)
Thesis stage	Data collection	Data analysis	Finishing	Writing
	supervisors and experts to improve my research project		offered by the school/university, my supervisors' feedback, and thesis writing guidebooks.	
Solution from EC (Figure 6.14 -6.17)	I must allocate my time to discuss with my supervisors and get good advice from them in order to improve my research project.	I must get a clear guideline of how to do research	I must spare some time improving my thesis writing from various sources: attending writing courses offered by the school/university, my supervisors' feedback, and thesis writing guidebooks.	I must give priority to my thesis and spend less time on my community works.
Affirmative Topic	<i>Quality on-time thesis with good and hands-on supervision under supportive environments for career enhancement</i>	<i>Quality on-time thesis with the topic of my interest with clear guidelines of how to do research that I can learn and make a difference to the target group of my research</i>	<i>Quality on-time, and good written thesis with environment and conservation based research for social development and my future career and PhD enhancement</i>	<i>Quality on-time, and good written thesis that enhances my personal learning on the issues involved for my future career and community works</i>
“Discovery”: the best of “What is”	Hard working person, self-determination, financial constraint free study, support from family, postgraduate student in the same school, and supervisors	To work on a research topic that can help people and being able to make a difference.	Being optimistic To help improve for a better life and better society for the people in my home country. Environmental and conservation concern.	To conduct research that I can meet and talk to people including to help develop and enhance my community, especially Maori society.
“Dream”	My research is achieved, and I can complete my thesis on time.	<i>To have more time to do my research, and to have more chance to talk with people who are taking a similar approach.</i>	More time to cope with several issues, and to simplify my research design	To be a crisper writer, could keep my deadlines, and contribute/add value to my community

Table 6.5 Summary of the results yielded from TOC and AI analysis of each Hybrid model interviewee

The results of the first five steps of the Hybrid process of addressing the root cause of a problem (TOC) combined with a focus on the root cause of success (AI) are summarised in Table 6.6. Next is Step VI: Design.

6.2.6 Hybrid Step VI: Design:

For Steps I and II of the Hybrid model, the researcher employed the TOC IO Map and current reality analysis to find what is a critical root cause of the problems encountered by Master's thesis students. Then, in Steps III, IV, and V, the researcher applied AI to identify the

affirmative topic or the promising theme, to reveal the positive cores, and to expand the positive cores' possibilities to enhance future's success.

At Step VI, the Hybrid model merged the results yielded from addressing the root cause of a problem (TOC) and the root cause of success (AI), into a hybrid provocative proposition, a challenging and convincing statement composed from both sides: constraints and strengths.

The three steps of AI in the Hybrid model (Steps II, IV, and V) revealed that Hong was a hard working person with self-determination. She did not give up easily while having problems during her studies. In addition, she was happy with the supervision and enjoyed working under supportive environments; her postgraduate friends in the same school were friendly and supportive. These results from AI would be stated in the provocative statement combined with Hong's dream. Unfortunately, Hong, while experiencing the constraints, was not able to expand her positive cores/strengths in terms of wishes, as mentioned in Step V: Dream. However, her wishes were in line with the IO Map and her thesis goal (Table 6.6). Therefore, the researcher could draw from whatever was relevant to improve Hong's performance yielded from the analysis in Steps I to V. Below is the resulting hybrid provocative proposition for Hong:

I am embarking on a Master's Degree thesis to enhance my future career. My goal is to produce a quality on-time thesis under supportive environments from the postgraduate friends within the same school, from my family members and my supervisors. The research project I conduct requires the completion of a synthesis of required material and that I must conduct an experiment suitable for the Master's Degree's standard of Victoria University of Wellington. By conducting the experiment, I must input all my best effort with determination to the work in order to achieve what was required. As a new researcher, I must consult with my supervisors every now and then with an ambitious aim to learn the most out of my Master's journey. I must keep a record of what has been done and try my best to analyse according to the knowledge I have learned. At the same time, I must keep my supervisors informed on my progress or failure from the experiments. Most importantly, to make the most out of independent study, a Master's thesis, I must try to plan my own study, learn and consult with my supervisors, the experts in my school, and any other available sources online and within

the university's available resources. I must try my best and step forward firmly to achieve my goal. Turning back or giving up is not me!

Helen, in the data analysis stage, was having a problem with designing her study, and not knowing how to get started. The solution for Helen yielded from the TOC analysis in Steps I and II, was to get a clear guideline of how to do research from her supervisor and/or from her school's postgraduate coordinator. By having a clear guideline of how to do research, Helen could continue the rest of her thesis effectively. On the other hand, with AI positive questions and analysis from Steps II, IV, and V, the researcher discovered that Helen was a good writer which is one of the most important success factors for thesis students. Furthermore, she was very interested in the topic she was researching. Helen hoped to learn much from her thesis and contribute to making a difference for the people she was working with. The aim of her research matched well with what mattered most in her life: spirituality and generosity. In addition, AI positive questions, within less constrained thesis environments like Helen's, brought her to a level that she could make a wish (AI Dream) to expand her positive cores; Helen would like to have more time to pursue her interesting topic, and to talk with people who were taking a similar approach. The findings from TOC and AI analysis of the Hybrid model were composed according to AI into a hybrid provocative proposition below:

I chose the topic that I love to conduct my Master's research with an aim to make a positive difference to my target group. This research aim serves what matters most to me: spirituality and generosity. In order to achieve my research aim, I must get a clear guideline of how to do research from my supervisor whom I trust and whose supervision I enjoy, or from my school's postgraduate coordinator. From the guideline, I can plan my study well and make the most out of the rest of my remaining thesis stages. To make the most out of my study, I must utilise my strengths, being a good writer, the ability to work under pressure and to meet the deadlines, to produce a quality thesis under good supervision from my supervisor. By working at my best and making the most out of my strengths (good at writing, work well under pressure, ability to plan and work to deadlines), I can learn much from the process and have more time to share my learning experience with those who are or had been working on a similar research project. From the knowledge I gain, I must find a contribution that has a positive impact on my research participants/target group.

Harn, in the finishing stage, was experiencing the problem of Not knowing when to stop reading the literature, and Writing the literature review before finishing his thesis. The TOC analysis in Steps I and II of this Hybrid model proposed that Harn must allocate some time improving his thesis writing from various sources, , instead of writing by himself: attending writing courses offered by the school/university, getting his supervisors' feedback, and reading thesis writing guidebooks. From the strengths base of AI analysis (Steps III, IV, and V), the researcher learned that Harn was positive and optimistic. Furthermore, he enjoyed life, learning and studying. Harn always wanted to do a higher degree where he could enjoy reading, learning new things, and gaining knowledge. Furthermore, he enjoyed having contact with all living things. He wanted to work for his country, to make a better society, and to help improve people's lives. However, the constraints (revealed by TOC) of a negative experience in writing the literature review before finishing, tended to weaken AI's Dream in Harn, the same as in Hong's case. His wishes were to correct what went wrong in the past, instead of amplifying his positive cores. The researcher combined the results from both TOC and AI analysis into Harn's hybrid provocative proposition below:

I am embarking on a Master's Degree thesis to serve my future career, personal satisfaction and to prepare for my PhD study. Master's studies offer me a chance to enjoy reading, learning something new, gaining knowledge, interviewing interesting people, improving and conserving the environments that I always wanted to promote. I am positive that I can input all my strengths and best efforts to my study with an aim to produce a quality on-time thesis. I must also allocate my time to improve my thesis writing from various sources: attending writing courses offered by the school/university, my supervisors' feedback, and thesis writing guidebooks. Optimistically, I can use the experience and knowledge I gained to work for my home country, to help create a better society, and improve people's lives.

Henry, in the thesis writing stage, was encountering the deadline issue, as he had other commitments outside the university, besides pursuing a Master's thesis. The proposed solution from the TOC analysis was that Henry must give priority to his thesis and spend less time on his other commitments outside the university, especially his community works. From AI analysis, Henry disclosed that he was a good talker; he enjoyed talking and listening to people's stories. His high point experience was the presentation of his Master's research findings, when he received good feedback from his audience. AI positive questions were able to motivate

Henry to expand his strengths and past success to seek his contribution from his research to the community that he always took part in. However, his other two wishes were to improve his writing ability, and his ability to keep to the deadlines. The researcher combined these results into Henry's hybrid provocative proposition, below:

I pursue a Master's thesis with an aim to understand the issues involved for my future career enhancement. Master's research offers me a good opportunity to conduct research with the community of my interest that I have been talking part in. With this good opportunity, I must utilise the best of my strengths, being a good talker, and enjoying talking and listening to people stories to produce a quality thesis. I am working on my best to conduct good research and find my contribution to help develop my beloved community. In addition, at the stage of writing, I must definitely give priority to my thesis and spend less time on the other commitments, including community work. By focusing on my thesis, I can produce a quality thesis to meet my goal of contributing good value to my beloved community.

The provocative propositions composed for each Hybrid interviewee tended to include what was found from applying TOC, rather than AI, especially for Hong, Harn, and Henry. After composing the hybrid provocative proposition, the next step of the Hybrid model is to convert the hybrid provocative proposition into an implementation plan by employing TOC Prerequisite Tree (PRT) and AI Destiny, next.

6.2.7 Hybrid Step VII: What will be your prerequisite tree and implementation plan?

The mission in Step VII, the last step of the Hybrid model, was to construct a proposed implementation plan based on the solutions from previous Step II and Step VI. The researcher employed the TOC Prerequisite Tree (PRT) to assist with preparing the list of activities, according to the solution yielded from TOC analysis Step II. In addition, the researcher also composed the implementation plan and classified it into major themes, according to the Hybrid provocative proposition (Step VI). Each student would get two plans: TOC PRT and AI Destiny. TOC PRT provided action plans to strengthen the weakest links/constraints, while AI Destiny offered action plans to students to perform based on their strengths to enhance their thesis performance. The two actions, from PRT and Destiny, should help in maximising the students' success. The lists of activities provided by the PRT, and AI Destiny's implementation plan for each Hybrid model interviewee, are presented within this section, beginning with Hong

(H1). Hong's solution for her critical root cause was to allocate her time properly to meet and discuss with her supervisors in order to get good advice and find ways to finalise her experiments. TOC provided Hong the PRT's list of activities that was constructed based on the same procedure used for TOC interviewees (Chapter Four), see Table 6.7. In addition, the solutions from Hong's strengths based analysis (same procedure as in Chapter Five), AI, combined with TOC in Step VI, were composed into Destiny's action plans, see Hong's Destiny after PRT (Table 6.7).

Hong's Prerequisite Tree (PRT)

Objective: To allocate my time properly meeting and discussing with my supervisors to learn from them and from the experts in order to improve my research project.	
Obstacle (Obs)	Intermediate Objective (IO)
Obs1: I am busy with my experiments.	IO11: I must remind myself that I am a new researcher, and I need close supervision.
	IO12: My supervisors are the experts in my research area, I must consult them.
	IO13: Good advice can save me a lot of time.
Obs2: My supervisors are busy	IO21: I contact my supervisors earlier.
	IO22: I tell the truth to my supervisor: I have limit budget to stay in NZ; I have to go back to my country as soon as possible; I worry that my experiment might be failed, and I want to complete a quality thesis on time.
	IO23: I ask for extra time to meet and discuss with my supervisors on the weekly progress of my experiment.
Obs3: I do not know what type of issues to bring to the meeting.	IO31: I present what I have done in the last experiment step by step.
	IO32: I ask my supervisors what part of my experiment that needs to be improved.
	IO33: I learn from my supervisors' advice/suggestion.
Obs4: I feel down	IO41: I make friends with other postgraduate students in my school.
	IO42: I share my research experience with other postgraduate students in my school.
	IO43: I call home and get support from my family members.
	IO44: I talk to my supervisors when I face any difficulties on my research project.

Table 6.6 Hong's Prerequisite Tree (PRT) – presented in a table for brevity

Hong's Destiny:

- ***Hands-on supervision:*** *My supervisors are nice and available for me to discuss any issues related to my research project. I must take this opportunity to learn as much as from them. Most importantly, I need close and hands-on supervision because I am a new researcher and my research project does not go well. To enhance a quality on-time thesis, I must discuss with my supervisors: (1) to provide me extra time on weekly basis during the tough period of my data collection to discuss on the progress of my*

experiment; (2) to improve my data collection worksheets and reports from the experiment; (3) to get advice from my supervisors in order to improve my learning, research findings, and analysis.

- **My learning experiences and ambitious goal:** *I must input my best efforts to my research project in order to enhance my learning and the project's success. In addition, I must learn how to plan my own study under close and hands-on supervision of my supervisors. My main purposes of planning are: (1) to spend my time daily to learn as much as I can from my research project and my supervisors; (2) to complete my quality thesis on time and ensure that I do not spend too much on something that may block me from achieving my goal; (3) to spare time learning to gain knowledge and improve my research project from other sources; (4) to balance my time well between studying, leisure, socialise, and good rest.*
- **Friendly and supportive environments:** *Master's thesis is an independent study that I have to conduct my own research and experiment alone. However, at my school, I have friends who have done an Honours study together and now they are working on their own research project in the same laboratory room. We must support each other and share our research experience. By supporting each other and sharing the research experience, we will not only be motivated by friends but also learn from each other's project. I must spend some time, at least once a week, to have lunch or a coffee break with them. At home, I must make a long distant call to my parents and family members to keep in touch with them because my family supports and motivates me well.*
- **My learning sources:** *I must take the opportunity of being an independent study student to learn from other sources, besides learning from my research project and my supervisors. The other learning sources are: (1) the school and university library where I can read research methods textbooks, how to write a thesis textbooks, previous year theses, and other publications; (2) online sources (related research and articles); (3) attending my school/university's workshops and seminars; (3) talking to experts in my research areas at school or from the other university via the internet; (4) Student Learning Service Support (SLSS) tutorials.*

The last step of the Hybrid model offered Hong an implementation plan to improve her thesis performance, from both problem-solving methods, and strengths, base. From the problematic issue, TOC provided the list of activities (PRT, Table 6.7) for Hong to perform in order to achieve the objective. TOC offered a simple solution for Hong: allocate time to meet with supervisors regularly. In fact, the simple solution, once implemented, could help enhance Hong's research a great deal, because the two supervisors were experts in Hong's area of research, and their advice would contribute to Hong's success. On the other hand, from the strength base, AI Destiny offered Hong the list of activities yielded from the hybrid provocative proposition with themes to make the most out of Hong's strengths and past success. Importantly, the Hybrid's Destiny action plan, covering both TOC (Step II) and AI, offered Hong 'a two-sided coin' to work on; one enhances the other.

With the same procedure as applied to Hong, Helen was also offered the two sets of activities to take action in order to improve her thesis performance. The additional benefit added to Helen's AI Destiny was her two wishes of having extra time to learn the thesis process and improve her thesis. The hybrid model enabled Helen to gain extra time from having a clear guideline how to do research (see Helen's PRT, Figure 6.8), and from working better with her strengths (Helen's AI's Destiny).

Helen's Prerequisite Tree (PRT)

Objective: To get a clear guideline of how to do research from my supervisor	
Obstacle (Obs)	Intermediate Objective (IO)
Obs1: The information received is still unclear	IO11: I get advice from my supervisor where to seek for further information.
	IO12: I seek for a clear guideline of how to do research from various sources: research methods handbooks, previous year theses, and talking to experts (PGSA, SLSS, and my school lecturers).
	IO13: I submit my draft analysis and learn from my supervisor's feedback.
	IO14: I attend relevant workshops provided by the school/university.

Table 6.7 Helen's Prerequisite Tree (PRT)

Helen's Destiny:

- **Promising and convincing topic:** *to conduct research with the topic that I love, I must enjoy spending time working on the project and utilise my strengths (being good at writing, being able to work under pressure, being able to plan well and work to deadlines) to produce a quality thesis that serves my personal satisfaction.*
 - *I must plan my thesis works and activities well in order to learn from the thesis processes and produce a quality thesis.*
 - *In writing stage, I must use my best writing skills to interpret and write a good thesis.*
 - *I must stick to my timelines and add enough buffer (amount of time as a provision) at the end of my thesis stage, so that I review and revise my draft chapter to make a better thesis. I will use the ability to work under pressure and work to the deadlines if needed.*
- **Making a difference to my research participants/target group:** *One important research aim is to help make a difference to my research participants /my target group. This aim serves my passion of helping people and my generosity. To make a difference, I must work at my best and spend enough time learning from the thesis processes, from my supervisors, and from those who are or had been working on similar research project. By seeking channels to meet with experts in this field, I must do the following:*
 - *To make contacts through my supervisor's networking*
 - *To attend/present my works at VUWPGSA, interactive postgrad sessions, where I can meet and share my research experience with other postgraduate students and researchers.*

- *To contact some of my research participants' networks.*
- **Advantages of having clear guidelines of how to do research:** *I understand the remaining thesis processes, and work on my research's analysis with better understanding. Then I can work faster on my analysis and writing thesis chapters as I am good at writing. By working faster with clear guidelines, I can spare some time learning from other sources and sharing my research experience with others who are or had been doing the similar project. With knowledge I gained learning from various sources as previously mentioned, I must be able to improve my analysis and find a contribution that help make a difference to my research participants/target group.*

The Hybrid model offered Helen benefits from both TOC and AI. From TOC, having a clear guideline could provide Helen with extra time savings so that she could utilise her strengths, i.e. good writing skills, to enhance her quality thesis. In addition, similar to Hong, AI's hybrid provocative proposition could support Helen's PRT well. Harn (H3) experienced the deadline issue during the finishing stage. The solutions from the Hybrid model offered Harn action plans from the TOC PRT (Table 6.9) and AI Destiny (from hybrid provocative proposition).

Harn's Prerequisite Tree (PRT)

Objective: To spare time learning and improving my thesis writing skills from various sources: my supervisor's feedback, and other sources.	
Obstacle (Obs)	Intermediate Objective (IO)
Obs1: I experience the deadline issue.	IO11: I revisit my IO Map and set up a second level IO Map at the finishing stage.
	IO12: I set up my own timetable to serve the IO Map, and prioritise tasks according to importance and urgency.
	IO13: I stick to the plan and work at my best.
	IO14: I discuss with my supervisor to simplify my thesis chapter while maintaining the quality.
	IO15: I use the prime time of the day to work on my thesis.
	IO16: I reward myself when I achieve the main thesis task.

Table 6.8 Harn's Prerequisite Tree (PRT)

Harn's Destiny:

- **Making the most out of what I have always wanted to pursue:** *Embarking on a higher degree of study provides me a good opportunity to enjoy reading, enjoy learning new things, and to conduct research and interview the experts in my interest area of environment care and conservation. Therefore, in my finishing stage I must:*
 - *devote my time to write a good thesis with an aim to input all that I have learned into a quality thesis, which should provide a strong platform for me to pursue a PhD later;*

- *allocate my time properly to improve my writing from various sources: my supervisor's feedback, relevant writing workshop organised by PGSA/SLSS/the university, SLSS tutorials, previous years' theses, and thesis writing guidebooks;*
- *submit my draft chapters to my supervisor earlier, so that I can learn from my supervisor's constructive and timely feedback.*
- ***Aiming to do something for my country:*** *I am a person who loves my home country. I always want to work for my country and to help improve people's lives. I must use this objective to motivate myself whenever I feel down, so that I can continue my mission of pursuing a Master's thesis to serve my objective.*

The PRT (Table 6.9) and AI's Destiny from the Hybrid model's last step offered Harn a list of activities to perform to improve his writing in the last thesis stage, in order to improve his performance. In addition, the action plans from Destiny could support the TOC PRT well, because it was constructed from Steps II – V (both TOC and AI). Destiny's action plans could motivate Harn well, as part of that was from his past achievements and strengths.

Henry (H4) was at the stage of writing his thesis, and experiencing various commitments of both thesis and non-thesis activities. The Hybrid model presented Henry action plans: PRT, Table 6.10, and AI Destiny (see below).

Henry's Prerequisite Tree (PRT)

Objective: To give priority to my thesis and spend less time joining the community works outside the university	
Obstacle (Obs)	Intermediate Objective (IO)
Obs1: I feel unmotivated when not joining in community work	IO11: I talk to my family members to gain support from them.
	IO12: I call my good friends from the community to explain them my situation.
	IO13: I ask my family members to take part in the community activities on my behalf for the time being.
	IO14: I attend the writing workshops organised by my school/the university.
	IO15: I present my latest research findings and analysis at the monthly presentation organised by the VUW PGSA to get feedback.
	IO16: I invite my community networks to my presentation.
	IO17: I submit my draft analysis and/or thesis chapters to my supervisors for feedback.
	IO18: I learn and improve my thesis writing from the supervisors' feedback and various sources: previous years' theses, relevant workshops, my community's feedback, and feedback from my presentation.

Table 6.9 Henry's Prerequisite Tree (PRT)

Henry's Destiny:

My research's contribution and my beloved community: *One of my dreams or the main aim of my Master's research is to help develop my beloved community. To*

help develop my community, the research I have conducted must yield significant findings that can contribute values to the community I work with. The presentation of my research findings few months ago went well and impressed a lot of my audience, as well as my supervisor. Therefore, the strategies to write a quality thesis are: (1) to give priority to my thesis writing and spend enough time on it; (2) to spare some time improving my thesis writing by learning from various sources (attending relevant writing workshops organised by PGSA/SLSS/the University, in order to improve my writing, reading previous years' theses, SLSS tutorials, and reading thesis writing guidebooks); (2) to submit my thesis draft chapters to my supervisor earlier, so that I can learn and improve my writing from my supervisor's timely feedback; and (3) to invite my community members to attend a presentation of my research findings, in order to gain support and get constructive feedback before finalising my thesis writing.

Interestingly, Henry's PRT (Table 6.9) included his strengths of being a good talker and presentation skills from AI analysis. Henry's relevant strengths could support the PRT's activities well, in order to achieve the identified objective. Applying the Hybrid model obtained good information from both the lows and the highs.

For Henry's (AI) Destiny, the third of Henry's wishes was to find his contribution; similar to Helen, in terms of the benefits offered by AI Dream. This was included in Henry's AI implementation plan. This inclusion should help motivate Henry to work at his best to produce a quality thesis that contributes value to his community.

The last step of the Hybrid model, Step VII, offered two main action plans: the TOC PRT, and AI Destiny. The TOC PRT presented action plans addressing the root cause of the problem, based on the solution from Step II. AI Destiny, in the Hybrid model offered the four interviewees the same as conventional AI, focusing on the root cause of success, while also covering parts that could help in addressing the participants' constraints. The hybrid provocative proposition formulated in Step VI added value to Hybrid AI Destiny, as presented earlier. The two action plans, enhancing each other, should contribute much to improve Master's thesis students' performance.

6.4 Conclusion

Applying the Hybrid model, a combination of Theory of Constraints (TOC) and Appreciative Inquiry (AI), to Master's thesis students' performance issues offers the opportunity to a system's owner, or to those who want to improve the system, to examine both sides: the constraints (root cause of a problem) and the positive cores (root cause of success). TOC addressed the root cause of Master's thesis students' performance issues. It offered a solution that could make a huge positive impact on their thesis performance, once implemented. On the other hand, AI addressed the root cause of each student's success. AI could disclose the student's positive cores (or strengths) and past achievements. For each student, their relevant positive cores could be identified and used to improve his/her thesis performance. By addressing both root causes, the solutions from each cause could be shared. Each helped to enhance the other. The shared solutions could compensate for any gaps that may have been apparent, if only TOC or only AI, were used. Thus, the combined, or Hybrid model, could be more effective in helping improve the student's Master's thesis performance, than each model applied on its own.

According to the research design (Chapter Three), after the individual interviews, the researcher designed the last phase of this research for action research or coaching sessions, using the same procedure as conducted in Chapters Four (TOC) and Five (AI). The coaching sessions with one participant, Hong (H1) offered an opportunity for the researcher to discuss the individual interview's analysis (section 6.5) with the participant, and to apply the Hybrid model to any major issue encountered by the participant. The coaching sessions also offered an opportunity to evaluate the effectiveness of the Hybrid model, as outlined next.

6.5 Coaching session (Action research)

Similar to section 4.3 (Chapter Four) and section 5.4 (Chapter Five), the last phase of this research is the coaching session or action research. The two coaching sessions were conducted (Figures 6.26 and 6.28). The researcher recruited Hong (HI 1), who had already taken part in the Hybrid individual interview, based on the criteria stated in Chapter Three: the research methodology. The action research with Hong was conducted twice: in November and December 2009. The results of the action research with Hong are reported and analysed next.

6.5.1 Coaching session I with Hong (November 2009)

Meeting agenda:

- (1) The researcher presented the results from the individual interview with Hong in June 2009, after applying the Hybrid model.
- (2) The researcher talked with Hong about the issues and proposed solutions presented in Step1.
- (3) Hong updated the researcher questionnaire #22 (the degree of difficulties for each performance issue) and the “Highs and Lows”: Feelings about her Master’s thesis.
- (4) The researcher discussed the new performance issues based on (3) with Hong.
- (5) The researcher applied the Hybrid model to help Hong to improve her performance.

Figure 6.26: Coaching I agenda with Hong (November 2009)

Step 1: The individual interview’s results applied with the Hybrid model presentation

The researcher explained to Hong the main principles of the Hybrid model in addressing both a system’s strength/positives and system’s constraints, in order to improve the performance of the system. After that, the researcher presented the results of Hong’s individual interview since June 2009, after applying the Hybrid model and its tools step by step from Step I to Step VII, as in section 6.3, Figures 6.2, 6.6, 6.14, 6.18, 6.22, Table 6.7, and Hong’s Destiny. The late feedback was one of this research’s limitations, discussed in Chapter Eight.

Step 2: The researcher talked with Hong about the issues and proposed solutions presented in Step1. After reviewing the researcher’s presentation and propositions (Step 1), Hong agreed with them. The Hybrid model, AI part (an affirmative topic and provocative proposition), reflected Hong’s success factor in relation to hands-on supervision (Table 6.6). According to Hong, many activities she was performing and attending were similar to those proposed by the

Hybrid model's solutions. Hong's supervisors were very active and they made themselves available for students. Hong said, *If I do not go to my supervisors they will come to see me; they are very hands-on and supportive.* They also joined the informal gatherings in the lab with me and other postgraduate researchers twice a week. Hong seemed to be happy and made the most out of the gatherings among research students within her school. She explained that: *When I told the group that I have not found anything interesting from my experiments they (other postgraduate researchers in her school) often suggested me to try this or that. They are very supportive and I don't feel isolated.* Hong was happy with her supervision and the supportive environments in her school.

Figure 6.27 Hong's feelings about her Master's thesis: Highs and Lows

Step 3: Hong updated the researcher questionnaire #22 (the degree of difficulties on each performance issue) and the “Highs and Lows” Feelings about her Master’s thesis.

Despite being happy with her supervision and supportive environment, Hong’s feelings towards her thesis were negative. She was encountering various problematic issues related to her research project. With reference to Figure 6.27, Hong’s feelings about her Master’s thesis (Highs and Lows), she indicated her negative feelings at this point of time, and her feelings were not improving. By the time the individual interview took place in June 2009, her feelings were in an upper part of neutral stage, but on the first coaching day in November 2009, her feelings were at the middle of the negative stage. According to Hong, she had been facing uncertainties arising from her laboratory research because she had not found any significant results yet. The researcher told her that many research students were experiencing highs and lows syndrome, not just Hong. However, more evidence supporting Hong’s down feelings is explained next.

Degree of difficulty	Very low	Low	Med	High	Very high	N/A*
Problems encountered in completing theses
A1: Staying motivated for my thesis				X	Y	
A5: Financing my thesis				Y	X	
A6: Finding time for thesis				XY		
A8: Keeping my deadlines/timeline				X	Y	
A13: Feeling supported/motivated			X	Y		
A14: Getting supervisor's timely feedback		X		Y		
A16: Designing my study		X			Y	
A27: Collecting data	X				Y	
A28: Scoring/coding data				XY		
A31: Reporting data				XY		
A34: Writing the result section				XY		
A35: Proofreading				Y	X	

N/A* = Not Applicable

Table 6.10: Hong's questionnaire: degrees of difficulty June 2009 (X = data collection stage) and November 2009 (Y = data analysis stage)

Consistent with Hong's down feelings, in Table 6.10, there were 4 issues with "Very high" degree of difficulty (Staying motivated for my thesis, Keeping the deadlines/timeline, Designing my study, and Collecting data), and 8 issues with "High" degree of difficulty (Financial my thesis, Finding time for my thesis, Feeling supported/motivated, Getting supervisor timely feedback, Scoring data, Reporting data, Writing the result section, and Proofreading).

Step 4: The researcher discussed the new performance issues based on (3) with Hong. It was up to Hong, as the system's owner, to decide what the main issue was that she wanted to address.

When the researcher asked Hong what her main issue was, she replied:

The laboratory experiment is the main issue, as it creates a lot of uncertainties. I have to spend more time on it, hoping that I can find the right solution. If it does not work, I usually bring it

to the group meeting with other postgraduate students. Then some people in the meeting suggest something new for me to try and I go back and try.

Discussing her laboratory results in the group meeting was one strategy Hong used since applying AI positive questions to discover her strengths and past success since June 2009. However, Hong had got used to repeating her experiments, so far, without success. Other success factors found using AI questions, were Hong's strength of self-determination and her motivation. She also had the supportive environments that helped her a lot during this tough period of her research. The researcher told Hong that these strengths could help her overcome many obstacles, including the experimental one.

Step 5: The researcher applied the Hybrid model to help Hong improve her performance.

At this stage of Hong's thesis, data collection and analysis, she was still facing uncertainties finding the right solution (Collecting data) from her research's experiments. Hong initially rated "Data collection" as a low degree of difficulty, because that was in the beginning of her experiments and she hoped to find the desired solutions soon. However, after almost five months, she had still not found a good solution. Therefore, the researcher reminded Hong to use her strength of self-determination and persistence (not giving up) as well as the proposal from the TOC PRT (Figure 6.7) and AI Destiny (section 6.2.7). Hong agreed with the researcher's proposal that she would utilise her best efforts and went back to her supervisors and the group meeting.

To sum up the coaching session I, the researcher presented Hong with the relevant tables and figures, after applying the Hybrid model to help improve Hong's performance from the thesis issues she had experienced. Hong agreed with the proposed action plans, and had been putting the plans into practice. Hong also confirmed that her critical root cause was: Not finding the solution/right information about her research project (Tables 6.3 and 6.4). This critical root cause caused her negative feelings. At the end, Hong agreed to use the proposed the action plans from the Hybrid model to help improve her performance.

6.5.2 Coaching session II with Hong (December 2009)

Meeting agenda:

- (5) The researcher followed up with Hong on the implementation of the solution discussed in "Coaching session I".

- (6) Hong updated the researcher questionnaire #22 (the degree of difficulty for each performance issue) and the “Highs and Lows”: Feelings about her Master’s thesis.
- (7) The researcher and Hong discussed the new critical issues based on (2)
- (8) The researcher recommended some Hybrid model tools to help Hong improve her performance.

Figure 6.28: Coaching II agenda with Hong (December 2009)

Step 1: The researcher followed up with Hong on the implementation of the solution discussed in “Coaching session I”.

Hong discussed what she had been doing lately: *I am meeting with my supervisors twice a week to discuss my research experiments. They also joined the informal gatherings with me and other postgraduate students in my school. I got some ideas to improve my experiments from the others during the informal gatherings. It was useful.*

Hong implemented and took action as per the proposed action plans from the coaching session I. She met with her supervisors more often (twice a week rather than weekly meetings). In addition, Hong also met with the group of postgraduate students at her school to share her laboratory experience, and she got feedback from them to improve her experiments. A “good written thesis” was one of her IO Map’s Critical Success Factors (Figure 6.2) besides completion of the synthesis of required material (her laboratory experiments). However, when the researcher inquired of Hong when she could stop the experiment and start writing her thesis chapters, Hong explained that, *I will try again a couple times and see if it works before giving up and working on something else* (related to her current experiments).

Step 2: Hong updated the researcher questionnaire #22 (the degree of difficulty on each performance issue) and the “Highs and Lows”: Feelings about her Master’s thesis. Firstly, Hong identified her feelings about the latest thesis stage as of December 2009. Compared with November 2009, the graphic of her feelings was still in a negative mode with an unfavourable trend. Hong said, *I hope it’s going up by the time I complete my research*. According to Kearns et al. (2009) feeling up and down is one of the commonalities of postgraduate students, while pursuing their theses.

Figure 6.29 Hong’s feelings about her Master’s (Highs and Lows) as of December 2009

Degree of difficulty	Very low	Low	Med	High	Very high	N/A*
Problems encountered in completing theses
A1: Staying motivated for my thesis				XZ	Y	
A5: Financing my thesis				YZ	X	
A6: Finding time for thesis				XYZ		
A8: Keeping my deadlines/timeline			Z	X	Y	
A12: Meeting with my supervisor				Z		
A13: Feeling supported/motivated			XZ	Y		
A14: Getting supervisor's timely feedback		X		YZ		
A16: Designing my study	Z	X			Y	
A27: Collecting data	X		Z		Y	
A28: Scoring/coding data		Z		XY		
A31: Reporting data			Z	XY		
A34: Writing the result section				XYZ		
A35: Proofreading			Z	Y	X	

N/A* = Not Applicable

Table 6.11: Hong's questionnaire: degrees of difficulty June 2009 (X = data collection stage), November 2009 (Y = data analysis stage) and December 2009 (Z = writing stage)

Despite the unfavourable trend of Hong's feelings about her thesis, Table 6.11, compared with Hong's coaching session I in November 2009, there were fewer performance issues with "Very high" and "High" degree of difficulty identified by Hong during coaching session II in December 2009. There were only six issues with "High" degree of difficulty and no issue with "Very high" degree of difficulty found during the coaching session II. The six issues with "High" degree of difficulty were: Staying motivated for my thesis, Financing my thesis, Finding time for my thesis, Meeting with my supervisor, Getting supervisor's timely feedback, and Writing the result section. In addition, some improvements on key issues, a decrease in the degree of difficulties to medium or below was found: Keeping the deadline, Feeling supported/motivated, Designing her study, Collecting data, Scoring/Coding, and Reporting data. According to Hong, the twice-weekly meetings with her supervisors were very helpful, as were the relevant discussions at group meetings with other postgraduate students at her school. These two main activities, despite her down feelings, were proposed by the Hybrid model (TOC PRT, Table 6.7), besides her strengths based on the Hybrid analysis (AI part).

Step 3: The researcher and Hong discussed the new critical issues, based on Step 2

Hong reviewed the performance issues (Table 6.12) with “High” degree of difficulty and concluded that her research experiment remained the main issue that affected the other issues with “High” degree of difficulty.

Hong: The main thing is my laboratory experiment, nothing else. The problem of not finding the right solution (yet) has impacted on the other issues, especially financing my thesis, and finding time for my thesis. I may have to re-enrol or extend my thesis, which means I have to pay extra school fees and my living expenses in NZ. I have been spending a lot of time working on my research from 8am to 8pm. I sometimes write my thesis over the weekend. Furthermore, I rated high degree of difficulty on meeting with my supervisor, and getting timely feedback, because these two issues are also crucial to my completion at this stage. I need my supervisors’ constructive feedback and advice on my experiments.

Hong must have split the issue of Collecting data into two: normal data collecting process in laboratory experiment, and the solutions from the experiments. The normal collecting data process was rate as medium (issue A27, Table 6.12), but not finding solutions was not included on the survey list.

The researcher asked about the advice from Hong’s supervisors on how to finalise her experiments. Could not Hong have written her Master’s thesis on what she has learned from conducting her experiment repeatedly? According to Kearns et al. (2009) some research students could also write a thesis on failures, instead of success (of their research). Hong explained:

I talked to my supervisors about whether I could stop the laboratory experiment and start writing, but they were not very keen about that. They expected me to find something. It will be nice if I can write a thesis on something that works.

Hong’s answer reflected that her supervisors’ expectation (according to TOC) was beyond her span of control (SOC), and sphere of influence (SOI). This had a critical impact on her thesis

completion. This should be one of her IO Map's CSFs, and she finally added it as a third milestone to achieve her goal (see Figure 6.30).

The researcher asked Hong about the other postgraduate students' current research and progress in her school currently, to see if there was any better practice that she could learn from. According to AI experts, a system's owner can also choose the best available methods that match well with the system/organisation.

Hong: The other research students, both Master's and PhD, in my school are experiencing the same things; they have not come up with a good solution yet. We are more like in the same situation; we are a couple of months behind the timelines. I think it's just the way the school operates the research teams, and it is the nature of this research subject.

Hong's story raised a concern that a clear Master's thesis guideline on research standards suitable for a one year thesis completion should be decided by the university, and conveyed to all concerned, especially to research students and their supervisors. However, at this stage, the researcher had to focus on the Hybrid model tools to help Hong to improve her performance and overcome the laboratory experiments' uncertainty, next.

Step 4: The researcher recommended some Hybrid model tools to help Hong improve her performance

After discussing the major issues in Step 3, the main issue that Hong was experiencing was the same as that found in coaching session I: She had not yet found a solution to her laboratory experiments. Hong tried to follow the action plans recommended by the researcher, as per the Hybrid model's analysis and solutions. At this stage crucial to Hong's completion, she might need a more aggressive action plan to cope with the fact that her supervisors preferred Hong to find solutions (see Hong's statement in Step 3). Therefore, the researcher and Hong revisited the two Hybrid model tools: Prerequisite Tree (PRT), and Intermediate Objective (IO) Map. The two tools are simple, user-friendly, useful, and can be used as a stand-alone tool. Importantly, using the tools, the researcher and Hong could construct the diagrams within a short period of time (during the coaching session), so that Hong could have it with her for further action.

The benefit of the IO Map, which was re-introduced to Hong at this stage, was to show that Hong needed to set up a clear process level goal of achieving the laboratory experiments (her new short-term goal, Figure 6.7). The IO Map is a frame of reference (Dettmer, 2008, p. 68) and without a frame of reference, the determination of what should be changed within the system is merely a matter of opinion and speculation. By having a clear goal, Hong could be motivated and decide what to perform accordingly. The three milestones to achieve her new IO Map goal, as identified by Hong were: (1) persistence and determination (her strengths according to AI), (2) competent skills and understanding of what she is doing, and (3) good supervision. Hong also added Necessary conditions (NCs) under each milestone (see Figure 6.30). In addition, the NCs added under good supervision (CSF3) could be amplified, creating a positive link to her new PRT, next.

Objective: To finalise my research project as per a quality on-time thesis requirement	
Obstacle (Obs)	Intermediate Objective (IO)
Obs1: Lack of negotiating ability	IO11: I set up my clear goal to complete my thesis on time
	IO12: I set up my thesis work timetable in accordance with my goal of completing on time.
	IO13: I bring my thesis work timetable to discuss with my supervisors.
	IO14: I explain my supervisors that I do not have enough funding if I have to conduct a longer research/thesis beyond my official deadline.
	IO15: I summarise my laboratory findings and propose some interesting findings in order to finalise my research.
	IO16: I ask my supervisor for a clear research guideline that provides standard requirements for my research project.
	IO17: I ask for my supervisors' advice on how to achieve the required standard
	IO18: I revise my thesis work timetable to suit the thesis deadline and perform my research according to the required standard.

Table 6.12 Hong's Prerequisite Tree (PRT)

Hong's new PRT (Table 6.12)'s objective was linked to her IO Map's goal: to finalise her research project as per a quality on-time requirement. After discussion, Hong admitted that her lack of negotiation ability was the main obstacle in her new PRT. In order to overcome the obstacle, Hong identified various ambitious intermediate objectives, i.e., to create a thesis work timetable and discuss with her supervisors, to explain her financial constraints should the project take longer than envisaged (Table 6.12). After constructing the new IO Map and PRT, Hong repeated, *I won't give up*, and agreed that she needed to negotiate with her supervisors, according to the PRT's intermediate objectives.

To sum up, the coaching sessions provided the researcher a good opportunity to assess the Hybrid model's effectiveness, by applying it to the research participant (Hong). Within Hong's situation of experiencing uncertainties on her laboratory experiments under supportive environments, the Hybrid model could intervene in both her constraints and her positive core.

Prior to the coaching sessions, analysis based on the previous individual interview using the Hybrid model, provided solutions yielded from both addressing the root cause of a problem (the lows) and the root cause of success (the Highs). The critical root cause (I can hardly find the right information about my research project) revealed from addressing the lows remained because of two main reasons: the critical root cause was not in Hong's span of control, and Hong had not been informed about the solution on how to manage the critical root cause properly. During the coaching session I (November 2009), after finding that Hong was experiencing the same critical root cause, the researcher asked Hong to consider taking action on the proposed activities provided by the Prerequisite Tree (PRT), Figure 6.7. However, after taking some action from the proposed solution, in the coaching session II the researcher found out that Hong was still encountering the same situation, as she was not able to control the laboratory test and the policy of when to stop testing. It was her supervisors who could make decisions, according to the school's policy. According to TOC, the supervisors' decisions were seen to be beyond Hong's span of control and sphere of influence. Therefore, the researcher decided to utilise the Hybrid model and offer Hong an action plan, as well as motivating Hong within the short period of her coaching session, by revisiting the IO Map and PRT. With cooperation from Hong, the IO Map and PRT were composed. The IO Map employed was at the process level (Figure 6.30), as it was a closer to Hong's current mission to manage her laboratory experiments, before reaching her system level IO Map. By monitoring something closer, it should enhance Hong's thinking and help her to manage her related activities, in order to achieve her goal. Hong could also add her strengths of persistence and determination to her IO Map. Given the research design and limitations, evaluation beyond coaching session II could not be done with Hong. However, with Hong's participation and contribution to construct her own new IO Map and ambitious PRT in coaching session II, it implied that she gained confidence and should take initiatives to perform what she had stated in order to complete the goal of her IO Map and the objective of her PRT.

6.7 Chapter summary

The Hybrid model (TOC+AI) took advantage of monitoring the Master's thesis students' highs and lows and offered the students, or all concerned, positive outcomes/solutions to improve Master's thesis students' performance. By addressing both the root cause of a problem, and the root cause (or positive core) of success, the Hybrid model could gain access to both sides of the issues. The information gained from using the Hybrid model could compensate for the

deficiencies apparent when each approach is performed alone, especially in the Design phase. The hybrid provocative proposition composed from the TOC analysis plus AI Discovery and Dream could compensate for AI Dream's apparent deficiencies in some cases where constraints existed. From this case, the researcher also learned that, within the same context, the constraints can weaken AI performance, especially in Dream phase. Due to the research design limitations, the researcher was not able to discuss the solutions yielded from applying the Hybrid model with the four interviewees in the first phase of this research. However, the coaching sessions with Hong (H1), one out of the four interviewees, proved a useful part of the research design.

Despite conducting the first coaching session almost 5 months after the first individual interview with Hong, there were some commonalities in the two action plans: Hong's and the researcher's solutions from the Hybrid model. The similarity of Hong's current action plans, set up by her supervisors and school, which she was implementing, compared with the proposed solutions yielded from the Hybrid analysis for Hong, could enhance the validity and reliability of the Hybrid model analysis. Unfortunately, the authority to address Hong's major problem of not finding good solutions, as identified during the coaching sessions, was beyond her span of control and sphere of influence. According to Hong, it was her supervisors' preference to find good solutions from her experiments and they would make the decision about when to stop her experiments. However, by focusing on both strengths and constraints with various supporting tools, the coaching sessions could motivate Hong to construct her own IO Map and ambitious PRT by realising and utilising some of strengths. Thus, Hong could take further action by herself to negotiate with her supervisors, in order to finalise her research project. Although the last coaching session was conducted in December 2009, and the researcher could not follow up on Hong's progress from there, the Hybrid model must have helped Hong realise her strengths and showed her how to set up both short-term and long-term goals with Critical Success Factors, Necessary conditions (IO Map), and action plans (PRT). Hong also added her strengths to CSF1 (Figure 6.30), which would be useful for her to utilise her best strengths. Hong's learning from the Hybrid's useful tools was a good start. Next, it would be up to her. If Hong could apply what she had learned to help enhance her performance, it would be a reward she deserved. The positive comments received from Hong after her thesis completion are presented and discussed in Chapter Eight: Discussion

Chapter Seven:

Comparing the Theory of Constraints (TOC), Appreciative Inquiry (AI), and Hybrid model, on their effectiveness for understanding and improving Master's thesis students' performance

The previous three chapters (Four, Five and Six) presented the analysis of the Theory of Constraints (TOC), Appreciative Inquiry (AI) and Hybrid models (TOC+AI), applied separately to Master's thesis students' performance issues. Chapter Seven compares the effectiveness of each approach. The comparison chapter comprises (1) the effectiveness of each approach, when applied to individual interviews, (2) the effectiveness of each approach, as evaluated from coaching sessions with the selected student, and (3) a Chapter Summary.

7.1 Comparing the effectiveness of TOC, AI, and Hybrid model in the individual interviews

This section compares the effectiveness of the three approaches, TOC, AI, and Hybrid, in five common categories. The five categories are (1) Research interview questions; (2) *IO Map versus Provocative propositions*; (3) *Current reality versus appreciating what is*; (4) *Future Reality versus Design*, and (5) Action plans.

7.1.1 Research interview questions

TOC questions	AI questions
<ol style="list-style-type: none"> 1. What is the problem or UDE (Undesirable effect) in your perspective? 2. How is the problem/UDE undesirable or bad? 3. In what way is it undesirable? 4. Why do you put up with this problem/UDE? 5. What objective is being jeopardised by this problem/UDE? 6. Is there a specific action resulting from the problem/UDE? 7. Is there a specific action causing the problem/UDE? 8. Does this problem/UDE create any conflict? What is the problem/UDE in conflict with? Describe the conflict. <p style="text-align: right;">(Cox et al, 2003)</p>	<ol style="list-style-type: none"> 1. Without being modest, what do you value most about yourself and your study? 2. What are the core factors that give life to your life and your study? 3. What do you want more of (when doing a Master's thesis)? 4. What would you describe as being a high-point experience in your university days when you were most alive and engaged? What happened? How was it? What are the key success factors that enabled your achievements? 5. What energises you during your Master's thesis journey? 6. What are the 3-5 core strengths that can enhance your performance in doing a Master's thesis? Please describe those strengths? 7. What have you incorporated into your current study (doing a Master's thesis) from your past achievements? 8. What three wishes do you have to enhance the vitality of your Master's Degree thesis? <p style="text-align: right;">(Adapted from Cooperrider et al, 2008)</p>

Table 7.1 TOC and AI interview questions

The questions in Table 7.1 were used to interview Master's thesis students. The first column of TOC questions (*Eight questions* by Cox et al., 2003) was employed in the TOC interviews (Chapter Four: TOC analysis). The second column, AI questions, was applied to the AI interviewees (Chapter Five: AI analysis). For the Hybrid model, the researcher employed the set of TOC questions first, followed by AI questions (Chapter Six: Hybrid model analysis).

The TOC *Eight questions* (Cox et al. 2003, see Figure 3.3) allowed the interviewees to talk about their problematic issues and undesirable effects, as well as related causes, which provided good information, in the one hour available. The high quality information from the interviews enabled the researcher to compose informative storylines that enhanced the subsequent analysis. The *eight questions* provided rich information for constructing the TOC Current Reality Tree (CRT) to analyse each student's current situation. In the case of a TOC analysis using the further tools, i.e. Evaporating Cloud (EC), and Prerequisite Tree (PRT), it appears the process would be enhanced if both the discussion and analysis were conducted simultaneously, during the TOC interview. The participation of the system's owner (interviewee) in the analysis could enhance the effectiveness of TOC. For example, more underlying assumptions could be added by the system's owner to better validate the conflicts (EC). In addition, relevant activities suitable for the system owner's capability could be identified and verified.

Before employing the questions provided by Cox et al., the researcher asked the TOC/Hybrid interviewees Dettmer's 6 questions, with the answers being used by the interviewees to complete the IO Map form (see section 7.1.2).

Despite the absence of discussion with the interviewees while constructing the EC, FRT, and PRT, TOC provided the necessary criteria to help the researcher choose which critical root cause needed to be addressed (using span of control and sphere of influence criteria) as well as Negative Branch Reservation (NBR) methods to test solutions that formed the targeted PRT. By contrast, the (eight) AI interview questions adapted from Cooperrider et al. (2008), helped AI interviewees appreciate their strengths by talking about their past achievements and related success factors. The key words, *high point experience*, *energise*, and *key success factors* appeared to motivate the interviewees to disclose their success stories, and achieve the main AI objective: a focus on positives and strengths.

According to the AI literature, AI enhances positive changes in organisations or societies by sharing the positive stories and strengths of the team members (see Cooperrider et al., 2008). This provides a point of difference, and a possible limitation, between this and typical AI studies, as this AI study focused on individuals, rather than being team-focused. AI positive questions were applied in individual interviews, not in a group. Thus, each interviewee did not get a chance to hear from other students. Information was therefore from one source: the interviewee. This may have limited the effectiveness of applying AI, when compared to the team-sharing approach.

A further limitation of this research was identified when employing AI questions in the Dream phase. The *three wishes* question could not function to best effect under time constraints. Nor did it function well where pre-existing critical problems were disclosed by interviewees. The critical problems students encountered could weaken the effective performance of some AI positive questions. As discussed in the AI analysis (Chapter Five), two interviewees, Adisorn (AI3), and Alex (AI4), were having some serious problems, before taking part in this study. Their answers to the *three wishes* were aimed at correcting the mistakes that occurred in their past thesis stages, while the aim of Dream should be to look beyond any boundaries, by using the past successes to enhance the achievement of their dreams. The *three wishes* question did not perform at its best with Adisorn and Alex, as their focus was on ‘fixing’ the past.

For the Hybrid model, the researcher employed both TOC and AI questions, in one interview, with each Hybrid interviewee. The advantages and disadvantages were much the same as those identified when using TOC or AI questions separately. However, there were additional benefits. Building a fuller ‘picture’ with the information gained from both sides (strengths and constraints) was one advantage. Flexibility was another, as both the TOC or AI questions could be used, depending on context. TOC-related questions could be employed when problematic issues were the topic of conversation. For example, while AI was appropriate when discussing the interviewee’s strengths and desires, time constraints were the main obstacle in terms of the Hybrid model. With the combination of AI and TOC questions, there were more questions than a one hour interview could comfortably accommodate. This limitation affected the quality of the interview results to some degree. Chapter Eight, Discussion elaborates on the limitations of the various approaches.

7.1.2 IO Map versus AI affirmative topic and provocative proposition

The goal oriented approach, TOC, provided the Intermediate Objective (IO) Map for interviewees to set up their goal and identify the two important IO Map's components: Critical Success Factors (CSFs) and Necessary Conditions (NCs). As a strengths based methodology, AI offered a provocative proposition based on the affirmative topic, past achievements (Discovery), and Dream. To utilise both TOC and AI, the Hybrid model included TOC's IO Map and the AI provocative proposition in the process.

The IO Map helped its users to clarify their goal and supporting necessary activities, in undertaking their Master's thesis, raising awareness and prompting re-thinking, in respect of what to perform in order to achieve the set goal. The IO Map with CSFs and NCs acted as a roadmap to success, producing positive changes in the students' performance. According to the TOC analysis (in Chapter Four), three out four interviewees constructed their IO Map with a minimum of two CSFs and two NCs (Figures 4.1-4.4). The IO Map played an important role in helping Tarn (T1), and Hong (H1) during their coaching sessions, as outlined in section 7.2.

For AI, an affirmative topic (focused area) and a provocative proposition (also known as possibility statements or design principles by Cooperrider et al., 2008, p. 45) were the two AI elements that could be compared to the TOC IO Map. These two elements were composed from each interviewee's aim in pursuing a Master's thesis, combined with their strengths, past success, and dreams. In respect of the composition processes, the AI affirmative topic and provocative proposition were markedly more complicated than the TOC IO Map. In terms of usefulness, both TOC and AI intended to provide their users with something that enhanced positive change. An important role of the IO Map, apart from being a navigator and roadmap, was to be one of judging the major criteria in selecting which constraints to address (which constraint has a high impact on your goal/IO Map). Despite the benefits accrued in the first phase of this research, by having individual interviewees participate in the interview analysis, the researcher did not interact with all four of the interviewees again, due to time constraints. As an alternative, one interviewee from each approach took part in the coaching session, as discussed in section 7.2.

An interesting outcome of employing the Hybrid model was that the information gained from combining TOC and AI questioning could be merged and constructed into an informative

(hybrid) provocative proposition. This was shown in section 6.2.6: Hong, Harn, and Henry's provocative propositions.

7.1.3 Current reality versus past achievements

To cause positive changes or improvements, TOC and AI begin with different methods. After identifying the IO Map, TOC employs a Current Reality Tree (CRT) to help analyse a system's current situation and address the root cause of a problem that tended to have a high impact on the system's goal. By contrast, AI addresses a system's strengths: first identifying the system's affirmative topic, then applying the actions in AI Discovery to discover and appreciate past achievements and success factors.

The data gleaned from the TOC individual interviews enabled the researcher to construct a comprehensive CRT that presented a clear picture of each interviewee's current reality. This rich interpretation of their current situation aided subsequent analysis, while also helping to advance buy-in from the TOC interviewee, the system's owner. Despite its usefulness for rich analysis, the researcher's experience corresponds with that of some other TOC practitioners (Dettmer, 2007) that constructing CRTs can be a time-consuming process. The time constraint was one reason the researcher did not employ the CRT within the one hour coaching sessions with Tarn (T1) or Hong (H1) (discussed in section 7.2).

By contrast, composing what was found during the AI Discovery interviews took little time. On the other hand, the one hour interviews were not generally long enough for the interviewee to appreciate his/her past success and strengths, revealing a potential weakness of AI that should be considered. With enough time to discuss and appreciate the interviewees' high point experiences and positives, AI provided good results, and was effective preparation for the next 4-D Cycle, Dream. In general, the four AI interviewees enjoyed telling their positive stories in the individual interviews, with two limitations: the sharing of information was confined to the researcher (where a group discussion approach is more generally the norm in AI) and, talking in an entirely positive mode was challenging or impossible while constraints existed for the interviewee (as discussed in 7.1.1).

The Hybrid model that combined both the CRT and AI Discovery was found to reflect the advantages and disadvantages of the two contrasting approaches: TOC and AI. The

effectiveness of the Hybrid model, as compared to the use of TOC or AI alone, is discussed in Chapter Eight, Discussions.

7.1.4 EC and FRT versus Dream and Design

After identifying solutions from the previous step (section 7.1.3), both methods share a common aim: to define a desirable future for the interviewee.

In respect of TOC, the solution from the CRT and EC was tested by the Negative Branch Resolution (NBR) and yielded a desirable future represented by the Future Reality Tree (FRT). In this research, the FRT helped students see what would be their situation, once the action plan was implemented. Through visualising their positive future within the FRT, the students were motivated to implement the action plan and follow it strictly.

To design their positive future, AI in Design phase combines the solutions from Discovery and Dream into a provocative proposition, as presented in Chapter Five. Thus, AI Design relies on what is yielded from the first two phases: Discovery and Dream. In this research, two (Adisorn and Alex) of the four AI interviewees did not respond well to the positive questions in Dream phase. As discussed in the analysis in Chapter Five, the two students were struggling with some critical problematic issues. The researcher found that was an obstacle when applying AI Dream as stated in 7.1.1.

On the other hand, applying AI Dream in the Hybrid model and encountering the aforementioned problem with Adisorn and Alex, the researcher was able to compensate for what was not working well in Dream, by adding relevant information from the TOC analysis, to compose a Hybrid provocative proposition in Design phase, as shown in 6.2.6.

7.1.5 Prerequisite Tree (PRT) and Destiny

After defining their desirable futures and then identifying the solutions to be implemented (TOC) and the AI provocative proposition, the next step in the process of positive change is to implement the action plans using the TOC PRT and AI Destiny accordingly.

The researcher constructed a PRT for each TOC interviewee, based on the outcomes yielded from the previous TOC analysis step and tool (EC). The PRT offered an action plan: a list of activities and actions to take, in order to overcome identified obstacles, and to achieve the

objective. The action plans provided by the PRT for each student were based on solutions found using the previous steps, and other related elements, according to TOC procedures (Dettmer, 2007). By having a proper plan with identified objectives and obstacles, students should be motivated to act accordingly. The PRT constructed was a pared down version of the prescribed (Dettmer, 2007) construct, focusing on the particular part of the system that required necessary changes to meet the goal.

The last step of AI, Destiny, helped articulate each student's provocative proposition into an action plan, in a similar way to TOC, but without a supportive tool. AI Destiny's action plan offered an opportunity for each student to construct the best available plan that suited him/her. Moreover, AI Destiny's action plan could be borrowed from the best available sources that enhance the system owner's success. An AI action plan was constructed for each student, based on his/her strengths, combined with what was found from the literature search on thesis students (see Chapter Two, Part one).

Once again, the Hybrid model could benefit the students with gains made by addressing both the constrained side, and strengths based side. Being offered the two action plans from each approach, TOC and AI, the Hybrid interviewees could combine and implement both plans to enhance their thesis performance and their success accordingly.

7.1.6 Summary

TOC offered various tools to help improve students' performance by addressing the root cause of their problems. The tools employed were not only useful in terms of demonstrating the logical effect-cause-effect relationships for students to realise what to do or what not to do, but also to motivate and guide them to perform, in order to achieve the set goal/objectives.

A disadvantage was that the current reality analysis was time consuming, so the researcher was not able to construct it with direct input from the students. By contrast, AI methods were quick to focus on students' strengths and positive cores to help improve their performance, where the students had no serious problematic issues. By employing AI positive questions, it could increase the students' awareness to utilise their best strengths and success factors from the past to improve their thesis performance and enhance success. However, there were two factors that might limit AI performance, constrained time in AI Discovery and the existence of critical issues while applying AI Dream.

To compensate for AI's potential deficiencies, the Hybrid model might play a good role to help enhance the students' performance, especially by composing a hybrid provocative proposition and by offering both TOC PRT and AI Destiny's action plans. The limitations found when applying the Hybrid model were: a one-hour interview was not long enough for combining both TOC and AI questions, or for the time-consuming Hybrid analysis process.

7.2 Comparing the effectiveness of TOC, AI, and Hybrid model in coaching sessions

Comparing the individual interviews, the researcher was able to see the some degree of effectiveness in applying each approach (TOC/AI/Hybrid) to Master's thesis students' issues, as discussed in the summary in 7.1.6. In this section, the effectiveness of each approach yielded from the coaching sessions is analysed and compared, beginning with the TOC coaching sessions.

7.2.1 TOC coaching sessions' effectiveness

The effectiveness of applying TOC to Tarn's performance issues during the two coaching sessions could be summarised as follows:

- Goal driven.
The researcher chose the TOC IO Map (Goal, its milestones/CSFs, and supporting activities/NCs) to help improve Tarn's thesis performance. The main reasons for choosing the IO Map were: to use one of the main TOC principles, goal oriented, to help Tarn navigate her thinking, to utilise simplicity and usefulness of IO Map within the constrained time of the coaching sessions, and to introduce a process level IO Map to Tarn, because she claimed that her goal was not clear.

Comparing Tarn's IO Maps from the coaching sessions I (Figure 4.23) and II (Figure 4.26), Tarn was able to improve her IO Map with reasonable, practical CSFs and NCs. In addition, Tarn was able to add a good number of CSFs (from 2 to 4 entities) and NCs (from 2 to 8 entities). The increased numbers of CSFs and NCs could indicate her clearer thinking, determination, and confidence gained from using the IO Map to help guide her towards completing the remaining thesis. Tarn confirmed that the IO mapping process helped her to get things done. She managed her time well and could focus well her thesis; she avoided distractions and took a break on some weekdays, but worked on

Sunday when she could concentrate well, as her office at the university was quiet (see Step 3 of coaching session II, Chapter Four).

- Strategic plans to overcome obstacles that blocked Tarn from achieving her goal. “Distractions” were one of the major issues that disturbed Tarn and she wanted to eliminate these. During the coaching session I, Tarn added a daily timesheet and IO Map as part of the intermediate objectives (activities) to help focus on her thesis (Table 4.12, Chapter Four) to overcome the two main distractions: distractions by friends, and by other things. Tarn was able eliminate the main distraction ‘from unexpected visitors’, one of her friends who visited and stayed at her flat. Tarn asked her visitor to move out once she found that the visitor distracted her. Therefore, in the coaching session II, Tarn added a new activity to her revised PRT: Prioritising whom to spend time with to minimise distractions. From this action, the PRT offered a means for Tarn to verbalise and write down things to do to overcome her obstacles. By taking actions that worked, Tarn seemed to gain confidence and concentration to step up and continue focusing on her thesis in order to archive her IO Map goal.

There are several ways, within the TOC methods, to manage constraints. Among TOC’s various tools, the researcher chose the TOC IO Map and PRT to help Tarn improve her performance, based on her critical issues, and to cope with a limit of time during the coaching sessions. The two tools enhanced Tarn’s concentration on her thesis, as well as to motivate her. In addition, Tarn gained confidence in dealing with eliminating distractions. Tarn wrote the following comment to the researcher after completing her thesis: *Identifying the critical issues also helped me focus on the solutions that I needed to apply to get out of the current situation.* What TOC offered Tarn during the coaching sessions would not only help Tarn in the short term, completing her thesis on time, but also support her in her future endeavours. Tarn added: *I felt that I got much from the coaching; it helped me very much, and was instrumental in my success.* Tarn successfully completed her thesis on time and got a research job overseas, as she had identified in her first IO Map.

7.2.2 AI coaching sessions’ effectiveness

The effectiveness of applying AI to Apinya’s performance issues during the two coaching sessions could be summarised as follows:

- Improving performance from appreciating and utilising her best strengths through positive questions.
Despite experiencing various performance issues, i.e. Keeping the deadlines, Scoring, analysing and reporting data, Apinya was able to appreciate her strengths and past success when answering positive questions. Furthermore, the researcher reminded Apinya about her relevant strengths that she could use to enhance success. For example, ability to work well under pressure to overcome the deadline issue, or to continue working till seeing the big picture, and using the big picture view technique to add quality to that piece of work. From these points, Apinya should be able to utilise her best relevant strengths/good learning techniques that she had successfully implemented during her Honours studies, to improve her thesis performance.
- Improving performance by creating positive contexts from negative feelings with positive questions, and reframing to positive environments.

There were a number of non-positive issues raised by Apinya during the coaching sessions, including distractions or the slow process of Apinya's data transcribing. After listening to Apinya's stories, the researcher reframed those issues into positive contexts and recommended things she could 'take away' (see Table 7.2).

Non-positive issues	Reframing	What to take away
Distractions: Attending her good friends' graduation ceremony and dinner	Finishing line of a student's life (cheerful and joyful occasion)	Motivating factor (I will be there soon).
Boring tasks: interview tape transcribing	Important and interesting tasks: an opportunity to learn from your interesting professionals' experience and point of views as well as to utilise your good typing skills (you type fast).	The more you listen to the interview tape or work on transcribing by yourself the better you can remember which would enhance the quality of your data analysis.

Table 7.2 AI reframing Apinya's non-positive issues

Apinya felt better and agreed with how the researcher reframed her issues and with the recommendations; seeing her good friends receive their degrees at their graduation ceremony was motivating, transcribing her research interview's tape by herself enhanced memorising her interviewees' stories and the upcoming data analysis. By seeing positive contexts and things that benefited her, Apinya could confidently continue working well on her thesis.

Appreciative Inquiry (AI) was effective in helping improve Apinya's performance during the coaching sessions, as it helped her identify her strengths so she could make the most out of them, to enhance her thesis success. In addition, AI positive context reframing could turn her critical situation into an opportunity (Table 7.1). AI reframing helped Apinya see a wider perspective so that she could enjoy positives and continue utilising her strengths to improve her thesis performance. Apinya wrote from her home country that: *It was a great opportunity to be able to share my insights and experience...I have achieved most, if not all goals that I shared during the coaching sessions.* She completed her Master's thesis on time and successfully got a good job in her country, as she had wished.

7.2.3 Hybrid model coaching sessions' effectiveness

The effectiveness of applying the Hybrid model to Hong's performance issues during the two coaching sessions could be summarised as follows:

- The power of two (Hybrid: TOC + AI) helped improve Hong's performance. The effectiveness of the Hybrid model was due to the two methods' collaboration and contribution. The Hybrid model borrowed a variety of tools from TOC that can be used as a stand-alone or in concert with others (Dettmer, 2007), including integration with AI. As the AI 4-D Cycle provides a space for other approaches to join, especially in Design and Destiny phase, the Hybrid model bridged this gap and enjoyed TOC and AI's merging from AI Design phase onwards (Figure 6.1, Chapter Six).

In the Hybrid coaching sessions with Hong, applying both TOC and AI helped improve her performance. TOC provided various tools to help find the root causes of her problems and show how to overcome them, while AI helped Hong to realise and use her strengths to continue working on her thesis. In the first session (November 2009), Hong agreed with the solutions yielded from applying the Hybrid model to her performance issues. Hong implemented much of the proposed action plan agreed with the researcher during Hybrid model analysis: She met with her supervisors more than one time a week, she joined the weekly gatherings (friendly environments according to AI) to discuss her laboratory experiments and results with colleagues and other postgraduate students. She found these actions useful. Unfortunately, the type of project Hong and many other postgraduate students in her school were doing seemed

complicated and it was difficult to find the ‘right’ solution from her experiments (Step 3, coaching session II, Chapter Six).

It emerged during Hong’s coaching sessions that the authorisation to decide when to stop her experiment and to write the thesis was up to her supervisors. Thus, according to TOC, Hong was facing something beyond her span of control (SOC) and sphere of influence (SOI). She could not fully decide on when to stop her research project. Instead, her supervisors had authority to approve her project. This raised an issue that perhaps Hong could negotiate. Negotiation is one of the required skills (Hart, 2006, 446) for Master’s thesis students. In discussion with Hong, it appeared that lack of negotiating skills was her main obstacle at this stage. The TOC Prerequisite Tree (PRT) was one of the appropriate tools that could help Hong find an action plan to overcome this obstacle. However, prior to employing the PRT, the researcher needed to identify what were the Critical Success Factors (CSFs) and Necessary Conditions (NCs) for her to perform if she wanted to be successful in her laboratory experiments (IO Map’s goal – a process level). Hong completed constructing both the IO Map (Figure 6.30) and PRT (Table 6.13) successfully. Her process level IO Map had included her strengths as one of CSFs, and all were reasonable, practical, and ambitious.

The Hybrid model demonstrated its effectiveness by motivating Hong to step forward firmly, with supportive tools to take appropriate action, to help complete her thesis by negotiating with her supervisors. This process motivated Hong to improve her negotiating skills by utilising her strengths of determination and persistence, while also improving her thesis, an independent study. Hong wrote to the researcher after submitting her completed thesis three months after the coaching session II: *I actually found the questions were helpful. They helped me identify my strengths and weaknesses in my study that I might otherwise never really have considered. Furthermore, the researcher also helped me with the advice of using those strengths and weaknesses to better advantage in my study.*

7.2.4 Summary

Despite the relatively short period of time during the two coaching sessions, with one interviewee from each of the TOC/AI/Hybrid approaches, each approach helped motivate the students and offered ways to improve their performance, based on their principles and practices. TOC helped Tarn improved her performance by offering goal setting (IO Map) and

the list of activities to overcome the obstacles, and achieve the set goal/objective. AI with positive questions helped Apinya recognise her own strengths, and provided her a positive lens, reframing into positive contexts, to promote opportunities, not crises, to help enhance her performance. Lastly, the Hybrid model, a combination of both TOC and AI, helped Hong identify critical issues and obstacles, as well as recognising her strengths to make the best out of her study.

7.3 Chapter summary

The two contrasting approaches, Theory of Constraints (TOC) and Appreciative Inquiry (AI), have the same aim of improving a system's performance. Both have their own principles and styles in addressing issues. The two phases of this research, individual interviews and coaching sessions, enabled the researcher to evaluate the effectiveness of TOC, AI, and the combination, Hybrid, model.

The TOC tools enabled the interviewees to set their goals, helped them to recognise their current reality, and to identify the root cause(s) of their problems, as well as how to improve their current situation. Despite time constraints during the coaching sessions, the researcher employed the IO Map and PRT from the range of TOC tools, to help Tarn identify her goal in completing her thesis and enhance her focus by making her own ambitious plan to take further action, in order to achieve the set goal.

Though not addressing problems *per se*, AI was found to help Master's thesis students improve their performance by offering them opportunities to realise their own strengths and past achievements, and motivate them to make the most out of the positives, in order to improve their thesis performance. During the coaching sessions with Apinya, AI reframing helped her view things in a wider perspective: looking for opportunities, not crises.

The Hybrid model, a combination of TOC and AI, took advantage of gaining access to both constraints and positives. The hybrid provocative proposition in Design phase revealed useful information from both TOC and AI, and accordingly, more options for the Hybrid interviewees to choose from and perform. The hybrid coaching sessions helped motivate Hong to utilise her best strengths in performing what she identified in her TOC PRT and IO Map. A disadvantage in employing the Hybrid was the time-consuming analysis and related processes. Constrained

time was also a disadvantage in the TOC current reality analysis, and in AI Dream. AI Dream also suffered from the existence of critical issues, which tended to lessen its effectiveness. The advantages, disadvantages, and the overall effectiveness of the three approaches, TOC, AI, and Hybrid model are discussed next, in the final chapter.

Chapter Eight: Research Discussion and Conclusion

This final chapter of this thesis, Chapter Eight, is divided into two parts: Discussion and Conclusion. The first part discusses the two methods, the Theory of Constraints (TOC), and Appreciative Inquiry (AI), in respect to applying them separately and in concert (Hybrid), at both a macro level and at micro level. The discussions outline applications for each approach and the particular application employed in this research, that of the individual context, Master's thesis students (the focused area of this research), and the guidelines developed for graduate school committees, researchers, and their supervisors from the outcomes of addressing this research participants' root causes of problems, and root causes of success. The second part, conclusion, comprises research achievements, contribution, research revisited and its outcomes, research limitations, future research, and the researcher's reflections.

Part I: Discussion

In Part I, the researcher discusses and compares how applying TOC and AI in an individual context, with Master's thesis students, differed from applications at a macro level (organisations). The researcher then discusses the significant findings and analysis of this research's focused area: Master's thesis students. The findings' relationship to the literature is also emphasised. Finally, the researcher proposes essential guidelines yielded from the research findings and analysis (chapters 4-7) to help improve researcher students' performance.

8.1 The Approaches: Theory of Constraints (TOC) and Appreciative Inquiry (AI)

Each method, the Theory of Constraints (TOC) and Appreciative Inquiry (AI), has its own processes and tools for causing positive change drastically. The discussion in this section considers the similarities and differences in applying TOC or AI at both a macro (organisational) and a micro (individual) level, and looks at how each method being employed might differ from other TOC or AI applications in practice.

8.1.1 Theory of Constraints (TOC) and Appreciative Inquiry (AI) at macro and micro levels

Over two decades, the research focus in respect of TOC and AI has been on applying these approaches in organisations at a macro level, more than in individual contexts. There is

evidence that TOC can be usefully applied both at a macro and a micro level. Kim et al (2008) documented by industry and type of application but did not separate out individual from organisational use, though the vast majority of cases appear to be organisational. TOC techniques have been applied at a macro level by a number of Fortune 500 companies, not-for-profit organisations and government agencies (Mabin & Balderstone, 2003; Watson, Blackstone, & Gardiner, 2007). At the micro level, some TOC scholars employed TOC with individuals and demonstrate the application of Thinking Processes, i.e. Scheinkopf (1999), Cox et al. (2003), and Cox and Schleier (2010). In addition, Khaw Choon Ean (2005), a Malaysian trainer in education and sport, applied TOC TPs to her own children and wrote a book called *Thinking Smart: You Are How You Think*. Her target groups are children, teachers, parents and anyone interested in thinking skills. The main principles of focussing on goal and constraints can apply well in various contexts. TOC's consistent performance in addressing the weakest links and surfacing break-through change to continuous improvement (Cox et al., 2003, p.75) has convinced practitioners and users to employ its processes, techniques, and tools.

Despite its usefulness, some practitioners claim that TOC's Full Thinking Process Analysis (FTPA) and tools are not user-friendly (Watson et al., 2007). They assert that TOC, properly applied, can take a fair amount of time to work through, especially constructing the trees (Davies & Mabin, 2009). Watson et al. (2007) also observe that the extent of training required to use the TOC tools and FTPA can be an obstacle to gaining support from top management. Kim et al.'s (2008) study of 1994-2006 research publications on TOC TPs reveals that just 13% use the full set of TPs, FTPA, whereas 87% use single tools or a subset.

TOC, as applied to this study of individuals, confirmed what has been found at the macro level. To apply FTPA to each participant (four in TOC interviews and four in Hybrids) was time consuming. A time consuming process may not be worthwhile to employ and invest in individuals. This is perhaps especially so for critical issues, requiring timely feedback or results. However, in the coaching sessions carried out for this study, the researcher appreciated the variety of options offered by particular TOC TP tools. These can be selected for relevance and applied independently, as suitable for the action research coaching sessions. TOC tools, applied singly, can be simple, useful, and easy for new users to understand, within a short period of time. These include the IO Map, EC, and PRT.

There are some commonalities and differences between TOC and AI in terms of their applications, and full or partial analysis.

Like TOC, AI has been applied by companies and institutions in countries including USA, U.K., Canada, Brazil, Australia, Africa, Mexico, and Netherlands (Yaeger, Sorensen & Bengtsson, 2005). Yaeger et al. (2005) reveal that, from 468 publications (1986 – 2003), 42% were for-profit organisations, and 54% were made up of community and service organisations, including laboratories, education, government and healthcare, as well as other not-for-profit organisations. The involvement of a facilitator, external to the organisation, and familiar with the format of AI, is significant when applying AI in organisations (Willoughby & Tosey, 2007). AI facilitators help organisational members work through the whole process of the AI 4-D Cycle (Full AI analysis) during AI summits (Ludema, Whitney, Mohr, & Griffin, 2003).

Willoughby and Tosey (2007) argue that (like TOC) full AI analysis is an extremely time consuming process. The researcher suggests this is also the case when AI is applied in an individual context, as in this research. In *Discovery* phase, the researcher had to allow each AI interviewee sufficient time to appreciate his/her past success and strengths to enhance the next phase's performance, *Dream*. In addition, *AI Design* phase relies on a combination of *Discovery*, and *Dream* phases. *AI Destiny* cannot function without *AI Design*.

Another commonality between TOC and AI is that some of each method's tools can be employed separately. The *Discovery* stage of the appreciative framework can be isolated from the other 3Ds (Michael, 2005). Questions offered by AI for *Discovery* phase can be used dependently. The researcher found this consistent with his study, where using AI positive questions from the *Discovery* phase was useful in the coaching sessions with the AI interviewee.

Aside from AI's limitation as a time consuming process, the researcher also discovered that AI might work best in problem-free environments. AI participants did not respond well to AI positive questions if they were also having critical problems, as discussed in Chapter Seven. In addition, applying AI to a single individual appeared to result in some past achievements not being utilised, despite being recognised. For example, a student with a strong quantitative research background, but lacking qualitative analysis skills, had difficulty utilising his quantitative skills and applying these to his current qualitative research. These two issues,

namely, past success appearing irrelevant in the AI context, and the existence of critical problematic issues, have also been cited in the organisational context by Golembiewski (1998). More AI research on these issues is required to provide clear answers, and to develop understanding and methods that would deliver improvements.

8.1.2 Theory of Constraints (TOC) and Appreciative Inquiry (AI) in this research versus their other versions

The two main approaches in this research, TOC and AI, were founded in the 1970s and 80s. TOC is known as change management theory, particularly in operations management, while AI is well known in organisational development theory. Over twenty years, both approaches have evolved. The discussion in this section is to emphasise how each method, as applied in this research, differed from the other, in the main aspects.

8.1.2.1 Theory of Constraints (TOC) and its other versions

The TOC TPs and tools employed in this research were drawn largely from the *Logical Thinking Process* (Dettmer, 2007), and *Managing Operations: a Focus on Excellence* (Cox et al., 2003). TOC by Dettmer (2007) provides the *Intermediate Objective (IO) Map* as a means to answer the critical question, *what is your goal?* This is the foundation for the step by step process that includes the (more) traditional three TOC critical questions: *what to change?* *what to change to?* and *how to cause the change?*

The idea of the IO map is to establish a system's goal prior to an analysis or further steps, strengthening the typical TOC Thinking Processes (TPs). Further, the *TOC IO Map* proposed by Dettmer is of particular use to individuals. Thus, it fits nicely into this research's individual context, as a way for Master's Students to articulate their goal in an individual interview, where they also state the conditions they need to fulfil in order to achieve the goal. A goal and supporting *Critical Success Factors (CSFs)* (or milestones), set with *Necessary Conditions (NCs)* (or the required activities to achieve the *CSFs*), provides a clearer picture and direction for postgraduate research students to help navigate their thinking and ultimately enhance their performance. Dettmer entitled his version of the series of TOC thinking processes *The Logical Thinking Process* (2007).

Apart from different versions of the TOC TPs, TOC experts, including academics and practitioners, also publish a TOC dictionary, the latest version of which was compiled by Cox,

Boyd, Sullivan, Reid, and Cartier (2012). The dictionary provides researchers with up-to-date definitions on a full spectrum of TOC terms. While most definitions used in this thesis are consistent with the latest *TOCICO Dictionary* (Cox, Boyd, Sullivan, Reid, & Cartier, 2012), the IO map is the exception. The researcher has used Dettmer's definition above, and would recommend his version because placing the goal/objectives clearly as the first step in the Thinking Process helps not only to measure achievements (Goldratt, 1990) or analyse the gap (Dettmer, 2007), but also to navigate one's thoughts and performance in order to achieve success.

Despite the usefulness of Dettmer's *Logical Thinking Process*, the TOC TPs appear to be designed more to apply to macro or organisational level issues, than to individuals, with facilitators expected to conduct the learning sessions or to help improve users' performance. There would appear to be a lack of specific questions in the researcher's view, apart from the typical *three TOC critical questions*, to help researchers or facilitators while conducting independent research or sessions. Accordingly the 6 questions included at the start of the interviews were adapted for the individual context, see figure 3.3.

On the other hand, TOC by Cox et al. (2003) offers *eight interview questions* (last 8 questions, Figure 3.3 Chapter Three) suitable for research interviews. These questions can enhance the interview results. The *eight questions* worked well in the interview sessions. The researcher was impressed by the performance of these questions when applying them to his own Master's research on a similar topic (to this PhD research). Furthermore, a pilot using the *eight questions* prior to conducting fieldwork, confirmed the interview results as satisfactory. Thus, the researcher was encouraged to use the eight questions in both the TOC and the Hybrid interviews.

As recommended by Cox et al. (2003), the researcher employed the *eight questions* to invoke three sets of problematic issues from each interviewee. To apply TOC in organisations, Cox et al. (2003) advise users to select three diverse *Undesirable Effects (UDEs)* from different functional areas, in order to cover the major *UDEs* that have the highest impact on the main system. The researcher followed this same procedure, with an aim to address the core problematic issues of the system under scrutiny.

Cox et al. (2003) introduced the *Generic Evaporating Cloud (GEC)*, composed from three separate *Evaporating Clouds (EC)* of the same system in TOC Thinking Processes (TPs), *TOC's roadmap to ongoing improvement* (2003, p. 115). Cox et al. include an analysis of each system's business model to describe the business and its environment. From this analysis, it reveals the business's goal. The latest comprehensive review of the Thinking Processes (TPs), (Mabin & Davies, 2010), published in the authoritative TOC Handbook (2010), presents the conventional set of 5 TP tools (CRT, EC, FRT, PRT, and TT) to answer the three TOC critical questions: what to change?, what to change to?, and how to cause the change? In addition, the developments of TOC TPs and tools were reviewed, including Dettmer's (2007) IO Map, Cox et al.'s (2003) TPs version of the Business System model and the contributions from other TOC experts, Barnard (2010), and Scheinkopf (2010), as reviewed in Chapter Two. The new TOC handbook presents analysis to clarify the potential supplementary/complementary roles of TOC TP tools, in relation to traditional OR/MS methodologies and methods. According to Mabin and Davies (2010, p. 663), TOC and the TOC TPs can be recognised as a meta-methodology that *offers a set of methods for use alongside traditional [Operations Research/Management Science (OR/MS)] methods and other [problem structuring methods]*. From this analysis, it provides an opportunity for OR/MS experts to appreciate what TOC and the TOC TPs can offer and share with their community.

8.1.2.2 Appreciative Inquiry and its other versions

Apart from changing the name Delivery to Destiny in the last D of AI 4-D Cycle, as reviewed in Chapter Two (AI Literature Review), there was a claim from Bushe (2007) about the core of AI, which was not discussed in the latest AI handbook. Instead, the AI handbook (2008) presents *generative factors* of AI 4-D Cycle (Figure 8.1).

The key term in AI claimed by Bushe (2007) was *Generativity*, rather than Appreciation. He argues that to focus on the positive is not the main purpose of AI, but it is to generate a new and better future. According to Bushe, a focus on the positive can support *generativity*; the *Discovery*, and *Dream* phases of AI that can lead people to replace cynicism with hope. When this happens, impressive *generativity* results. He explains that AI generates spontaneous, unsupervised, individual, group and organisational action toward a better future. Bushe recommends “*Generative Inquiry*” as the new name of AI. He comments that *generativity* is the core of AI, according to an early article by Cooperrider and Srivasta (1987).

Appreciative Inquiry in Organizational Life by Cooperrider and Srivasta (1987) introduced AI through action research. The two authors, AI's founder (first author) and his PhD supervisor, also refer to the *generative theory* in their article. They claim that one main aspect of action research is its generative capacity. Action research aims to generate creativity, or something worthwhile to the research economy, and society. Cooperrider and Srivasta (1987, p. 354) argue that: *the generative incapacity of contemporary action-research derives from the discipline's unquestioned commitment to a secularized problem-oriented view of the world and thus to the subsequent loss of our capacity as researchers and participants to marvel, and in marveling, to embrace the miracle and mystery of social organization.* Therefore, the role of AI and its strengths are well suited to action research contexts.

Figure 8.1: AI Managing Change, the three generative factors: Continuity, Novelty, and Transition (Adapted from Cooperrider et al. 2008, p.26)

Notwithstanding their early opinion (1987), in their latest (2008) AI handbook, Cooperrider et al do not discuss *generativity* in the same vein, although they use the term as *a factor* that gives life to healthy organisations. The three *generative* factors are: *continuity* (honouring the past), *novelty* (search for the newness), and *transition* (embracing movement toward the new future) (Figure 8.1).

Usefully, the AI 2008 Handbook provides interview questions and the traditional 4-D Cycle that the researcher employed in this research. The positive questions were employed for

Discovery and Dream in the individual interviews. However, the researcher decided to use the *three wishes* question for *Dream* phase, instead of the *imagination questions*. The imagination questions in Dream Phase proposed in the AI 2008 Handbook may have worked well in organisations, where one-on-one interviews were shared, after spending enough time appreciating collective past successes. The example of *Dream* question is: *Imagine you've awakened from a long, deep sleep. You get up to realised that everything is as you always dreamed it would be. Your ideal state has become the reality. What do you see? What is going on? How have things changed?* However, the imagination questions did not work well when applying to individuals during the pilot test of this research. This might be due to the time constraint of one hour to share the participant's experience in an interview. Thus, the researcher decided to employ the three wishes question instead. The three wishes questions in *Dream* phase have been applied successfully in other research and practice: the study of AI in school improvements by Willoughby and Tosey (2007), using AI to create classrooms of preference by Conklin (2009), and by Roadway Express (Cooperrider et al., 2008).

Apart from the 4-D Cycle in the Appreciative Inquiry handbook 2008 employed in this research, the researcher also applied two related variants of AI: *Appreciative Coaching* (Orem et al, 2007), and *Appreciative Intelligence* (Thatchenkery & Metzker, 2006). *AI Coaching* was written by practitioners, and applied to consulting businesses, while *Appreciative Intelligence* was written by two AI academics. The two books contained relevant information and techniques that appeared useful for this research. Thus, the researcher adapted some of the questions and employed reframing techniques for the coaching sessions from *AI Coaching* and *Appreciative Intelligence*, respectively. Notably the AI coaching questions allow more flexibility when dealing with negative aspects and problems.

8.2 The individual context: Master's thesis students and their performance issues

This research to improve Master's thesis students' performance by applying TOC, AI, and the Hybrid model (TOC+AI) yielded two significant results: the root cause of a problem, and/or the root cause of success, were revealed. The significant outcomes of the study are discussed in this section, including categorising the students' performance and issues.

8.2.1 Root causes of problems

The TOC analysis in Chapter Four, and Chapter Six (Hybrid), revealed the interviewees' root causes of their problems. Those root causes can be summarised into five categories:

1. research guidelines,
2. knowledge and skills to do research,
3. unmanageable research project,
4. deadlines and
5. motivation

Each category is discussed below:

Research Guidelines:

Postgraduate research is known as an independent study with no specific guidelines, especially at Master's level (Hart, 2006). VUW Master's students typically take coursework for two semesters in the first year, and conduct a one year research project in the second year. In the first year, the students have a detailed course syllabus and course outlines describing the requirements and expectations regarding each subject/paper taken. However, when doing their one-year thesis in the second year, there are not such clear guidelines.

Lack of clear guidelines on how to pursue independent study can cause new researchers serious concerns. Despite a paucity of research on the Master's' research experience, as confirmed by Demb and Funk (1999), lack of information (guidelines) was one of the main concerns for their research participants, Master's thesis students. This finding is borne out by this study. The TOC analysis in this research revealed unclear research guidelines as one of the critical root causes for three out of four research participants. This root cause may yield multiple negative impacts (or undesirable effects), as presented in TOC Current Reality Tree (CRT) analysis, Chapter Four. To help improve the performance of Master's students, it is strongly recommended that clear(er) research guidelines be provided on the university website and enrolled Master's thesis candidates be directed to the site and its content. With accessible and clear research guidelines, the students will be better prepared to embark on their higher studies. Their chance of success will no doubt be improved, as a consequence.

Knowledge and skills to do research:

The second major root cause of the participant interviewees' problems was lack of knowledge and skills to do their research. This root cause was discovered from all survey thesis stages

(data collection to finishing). In each thesis stage, there are various research activities for the new researchers to perform. For example, in data collection, research students have to conduct their own survey, to contact organisations or individual research participants, to recruit research interviewees, and interview their participants. According to Demb and Funk (1999), in their study of Master's students' thesis experiences, one third of the participants claimed *frustration* as the key emotion associated with the data collection stage. With most independent research activities new to the students interviewed for this study, many activities were challenging for them, with some more difficult than others.

New Master's thesis students face high expectations in respect of the knowledge and skills required for their independent study, whether it is their own expectations, and that of family and friends, or the expectations of their supervisors. According to Hart (2006), and as demonstrated in Chapter Two (Table 2.1 and Figure 2.2), the expected skills are complex and demanding. They include effective thinking and decision-making skills, analytical ability, and the capacity to synthesise ideas and results. In the context of this research, new students have to develop the required complex and demanding skills, within the constrained time of a one year research project.

Clear guidelines are crucial, as is effective support from the school and university to help students learn independently, if Master's thesis students' performance is to develop and improve in the relatively brief period allowable for this kind of independent study. New researchers show a high tendency towards non-completion of their study programme (almost 40% according to Scott, 2004). This low completion rate jeopardises current research students' confidence and their opportunities for successful employment. Low completion statistics may impact negatively on new enrolments, and also may reduce the university's funding. Ultimately, low completion rates threaten the sustainability of economic benefits that New Zealand receives from higher education, including those derived from international students choosing to study here.

Unmanageable research project:

The unmanageable research project can be the most undesirable of all research projects, for all concerned, not only for the research student owning the project, but for family and friends of the student, and for the supervisors. Some research participants experienced this root cause,

unmanageable research. One student was forced to change their research topic, after several months of study. Another had to repeatedly conduct their experiments, month after month.

This root cause of the problem can seriously constrain related research investments, as well as causing a chronic sense of loss for the student and all concerned. This might include the sense of loss felt when family, friends and employers find out about the student's issue with managing their research, and the more tangible loss of time and quality, as students are generally constrained to one year full-time, or a limited to a certain part-time period. Finally, the completion rate will be affected, as previously discussed. Avoiding the *unmanageable research project* as a critical root cause involves developing strong communication between the student and their supervisors at the earliest opportunity. Research students must be given an early signal as to the appropriateness of their topics, or their experiments, for example. The merits and potential issues of the research project need to be assessed and addressed early on, well prior to the further undesirable effects the unmanageable project may cause.

Deadlines:

The deadline issue is of vital importance for Master's thesis full-time students, who only have one year to conduct their research and write a thesis. Although the thesis is examined in its entirety once it has been finished, each thesis stage tends to have its own deadline. For the timeframe involved in producing a Master's thesis, as provided by Hart (2006, p.21), see Figure 2.2, Chapter Two. The thesis stages are conducted and presented in sequence, one after another. For example, you cannot design your research unless you have undertaken a literature review, and you must design your research prior to data collection.

The deadline issues follow research students like a dark shadow. The shadow grows bigger and darker to the point that the student feels they may not be able to find their way through. Each stage of a thesis requires careful and considered time management. Once too much time has been spent on one stage, it triggers a delay in another. On the other hand, if students rush from one stage to the next, without the required focus on quality study and research techniques, they may experience difficulties, particularly towards the end of the thesis. This may result in a requirement to re-work and possibly apply (and pay) for a thesis extension, in order to meet the expected quality thesis.

A common concern for students in this research was that they had spent too much time on reading the literature throughout their thesis journey. Towards the end of the limited time they

had to submit their thesis, the students found that they had left too short a period for producing the desired quality of writing. Thus, the deadline issue must be included in research students' early understanding of thesis expectations. Supervisors must address the topic of deadlines, from day one, to the last day of thesis students' candidature. They must assist their candidates with understanding the root causes of problems in respect of producing a quality thesis on time.

Motivation:

Motivation might be considered as a non-thesis task, but it has a high impact on research students' performance; without motivation, performance suffers (Green, 2000, p.4). Students who are well-motivated, either by themselves or others, tend to perform better than those with lack of motivation. Research students have to spend a lot of time on new thesis tasks, working independently. Thus, they need to be motivated, by their own progress, and/or by people around them, family members, friends and supervisors. Arguably, though self-motivation is important, a high level of self-motivation may not be sufficient for some students to produce a non-class structured thesis in a one year timeframe, with motivation also needed from other sources.

The five categories of the root cause of the problems were derived from a small group of participants who took part in this research. Despite the small sample, the literature lends support to the findings (Green, 2008; Hart, 2006; Scott, 2004) and it is imperative that new research students learn not to fall into the same traps. To improve Master's thesis students' performance in the research world, these root causes of problems should be acknowledged and addressed by all concerned, not just the research students themselves. Section 8.4 presents a set of essential guidelines for Graduate school committees, research students and their supervisors, developed and proposed by the researcher, as a result of this research.

8.2.2 Root causes of success

In a similar process to section 8.2.1, based on the findings of this research (Chapter Five/AI analysis, and Chapter Six/Hybrid analysis), the researcher classified the root causes of success of the Master's thesis students into three categories:

1. Study skills,
2. Technical skills and
3. Inner skills.

The three skills are discussed next.

Study skills:

Study skills are a root cause of success, and can be considered as a priority requirement for research students in higher education. Besides basic research communication skills, such as researching, reading, and writing, Master's thesis students must be skilled in analysis, argument, and other study skills, as presented in Table 2.1, Chapter Two: Standard expectations of the Master's (Hart, 2006). Competent study skills can enhance students' success in embarking on their higher research studies. Thus, educational institutions and management must pay close attention to student's skills and deal with gaps in their understanding, to enhance the success of students, and improve the wider research economy.

Attention should be paid to the level prior to Master's thesis enrolment. Further, the schools and universities can promote improved performance during the researcher's candidature by offering short courses and seminars in relation to study skills' improvement.

Technical skills:

Along with the competency in study skills required, technical skills are one other important root cause of success for the students interviewed in this research. Technical skills in the context of this study means the skills of a student, excluding study and *inner* (see below) skills, that technically can help improve the student's thesis performance. These include hard-working skills, outdoor research skills, co-operative skills, and time management skills. Research students equipped with the relevant technical skills have the potential to perform well, while pursuing thesis research.

Inner skills:

Alongside technical skills and study skills, the third category of the root cause of success yielded from this research, is inner skills. Inner skills in the context of this research include perseverance, determination, persistence, patience, self-motivation, optimistic, commitment, and ability to work well under pressure. In this research context, inner skills seem to be comparably less important than the first two skills, in respect of academic relevancy. This finding is to some extent in contrast to the required skills or qualifications in Table 2.1, Standard expectation of the Master's (Hart, 2006), where inner skills occupy more than one third of all essential skills identified. The study by Demb and Funk (1999) also reveals that, apart from academic research skills, the most successful Master's thesis students have perseverance, intrinsic motivation, and commitment (based on interviews with research

supervisors in their study). These three additional skills confirmed by Demb and Funk's study are inner skills, and thus are the root cause of success in independent Master's thesis study.

8.3 Matching the lows, the highs, and the methods

After discussing the two main methods (TOC and AI), the root causes of problems (the lows), and the root cause of success (the highs) of this research, the researcher has compiled them in a table (Table 8.1), according to their relation and relevancy.

The root causes of problems (The Lows)	The root causes of success (The Highs)	Preferred Methods
Information/guideline	Technical skills	TOC
Motivation	Inner skills	AI
Lack of knowledge and skills to do research	Study skills, Technical skills, and Inner skills	TOC and AI
Unmanageable research project	Study skills, Technical skills, and Inner skills	TOC and AI
Deadlines	Study skills, Technical skills, and Inner skills	TOC and AI
Time management	Technical skills, and Inner skills	TOC and AI

Table 8.1 The relation of Lows, Highs, and Methods

The relation and relevancy of the lows yielded from TOC (addressing the lows) and the highs derived from AI (focusing on the highs) are cross-referenced in terms of their characteristics. For example, lack of information/guidelines from the lows is relevant to the need for technical skills from the highs. TOC is recommended as a tool to address or obtain the research information/guidelines. According to the discussion in section 8.1, TOC performs well to help identify the goal (IO Map) and the weakest links (CRT). TOC identifies the conflicts (EC), the objective, obstacles, and intermediate objectives (PRT). The users of the methodology can employ some of these tools, if not all, to help identify what is missing (the gaps) or what is needed, i.e. PRT and/or IO Map. AI can also help address some of these issues, but has its limitations, as discussed in section 8.1., that led the researcher to recommend TOC.

Motivation is considered as an inner skill (from the highs) and Appreciative Inquiry (AI) fits well for addressing issues with motivation. With reference to the discussion on AI, section 8.1, AI addresses and performs well in dealing with Master's thesis students' inner skills. AI positive questions, and/or reframing can motivate research students to recognise their strengths

and past achievements, in order to utilise those success factors to improve their performance. TOC can also be employed to improve the research students' inner skills, but positive questions are imperative in this situation to elevate students' motivation.

The next three root causes of the problems, lack of knowledge/skills to do research, unmanageable research project, and deadlines, require a combination of study skills, technical skills, and inner skills, and the integration of TOC and AI to help address these. For example, in respect to the lack of knowledge/skills to do research, AI can help students identify what relevant best knowledge and skills they have. At the same time, TOC can help find out: what is the students' goal, what they need to change, what to change to, and how to cause the change. A partial analysis using TOC can be employed, if the users/students have the ability to already answer some of the above-mentioned questions.

Time management is the last of the root causes of problems identified by students to be discussed (Table 8.1). Good time management requires technical skills and inner skills, as well as both TOC and AI, to address and help improve this factor. Time management is an essential technical skill for research students, as discussed in section 8.2. In addition, to help manage time properly, inner skills, i.e. commitment, self-discipline, determination, and motivation are imperative. Accordingly, in respect of the strengths of the methods discussed in section 8.1, a combination of TOC and AI can be applied to help improve research students' time management.

Table 8.1 presents the connections of the root causes of the problems, identifying the root causes of success, and their links with the two approaches (TOC and AI). Following on from the previous discussion (sections 8.1-8.2), the proposed guidelines to help improve Master's thesis students' performance for graduate school committees, the students and their supervisors, are discussed and recommended, next.

8.4 The proposed guidelines to improve Master's thesis students' performance

One aim of this research was to develop a set of essential guidelines to help improve research students' performance, especially at Master's level. The recommended guidelines are based on the two main groups of success factors yielded from this research, and the contribution from the two contrasting approaches: the Theory of Constraints (TOC), and Appreciative Inquiry

(AI). The two main groups of success factors, as discussed in the previous sections, are derived from:

1. the root causes of a problem (the lows), and
2. the root causes of success (the highs)

The two success factors were discovered from a small group of participants. Despite the small scale of this project, other research students, supervisors, and all concerned, can learn strategies to avoid pitfalls on the low side (avoiding the root causes of a problem). Equally, they can utilise the high side (the root causes of success), and can benefit from TOC and AI's values.

Figure 8.2: Proposed Guidelines to improve Master's thesis students' performance

The proposed essential guidelines are written for Graduate school committees, research students and their supervisors. The aim for Graduate school committees is to make a difference for Master's thesis students. The committees can help prevent some potential constraints by adding an extra subject prior to Master's students' thesis year. The additional subject will provide essential guidelines and information to new research students to be ready for their thesis journey. In addition, an implementation of monitoring and a follow up sessions during the research students' candidature is required. The implemented sessions will not only provide a chance for graduate school committees to help some research students who have low

progress, but to establish research learning and sharing community where thesis students can learn from others' success and failure.

Moreover, the main aim of the proposed guidelines for research students is to gain access to the key factors that the (now former) researchers in this study found were critical to their success. By understanding the critical success factors within similar contexts, research students can apply what is applicable or most suitable for them.

Meanwhile, supervisors who coach research students can use the recommended guidelines to improve their coaching. According to Demb and Funk (1999), 70% of Master's thesis participants identified that their supervisor is the most important person during their candidature. With better understanding developed from some of the research students' success factors, research supervisors can apply some of the most relevant guidelines to improve their supervision, and promote better student performance and outcomes.

The proposed guidelines to improve Master's thesis students' performance are divided into two parts: (1) For Graduate schools committees, and (2) For Master's thesis students and their supervisors.

Firstly, for Graduate school committees:

There are two recommendations for Graduate school committees to implement for Master's research based program: the thesis seminar subject, and the seminar sessions.

The Thesis Seminar subject prior to thesis enrolment

One major role of most graduate school committees is to approve graduate courses and curricula. At VUW, almost all Master degree programmes (thesis based) focus on major subjects in relation to the main degree offered, for example, Master's in Management Studies (MMS) offers Strategic Management, Managerial Decision Making, Change Management, Human Resource Management, and other subjects within Management Studies (School of Management, VUW). There should be a class that provides a chance for future thesis students to discuss and learn what success and failure Master's thesis graduates and former thesis students had encountered. The contents of this proposed subject for Master's thesis students should include guidelines for doing research and writing a Master's thesis, a seminar on how to select a thesis/research topic, how to select and work with a thesis supervisor(s), including

tips for success and avoid pitfalls and common constraints while doing a thesis. The course coordinator should invite former thesis students and current experienced supervisors to join a focus group discussion on thesis students' performance issues. These activities offered by the proposed subject could help prepare future thesis students to prepare and avoid potential constraints in doing their research and theses. The proposed subject could be called "Thesis Seminar".

To be prepared is one common essence of both TOC and AI. TOC provides the IO Map, and Prerequisite Tree (PRT) for TOC users to be prepared for upcoming events (Chapters Two, Four and Six). Meanwhile, Anticipatory is one of AI principles that requires AI practitioners to recognise their past achievements and strengths.

The seminar sessions

Both TOC and AI emphasise improving system/organisational performance. TOC focuses on, and eliminates, constraints within the system in order to improve the whole system's functioning. Similarly, AI's main idea is to enhance an organisation through utilising its "collective power" (strengths and past achievements) by using positive inquiry. Moreover, according to Goldratt (1990), "verbalising" enhances people's action in accordance with what they said. In addition, Goldratt's last book, *The Choice* (2008, p.168), reflects his six principles: people are good; every conflict can be removed; every situation is exceedingly simple; every situation can be substantially improved; the sky is not the limit; every person can reach the full life, and there is always a win-win solution. Combining Goldratt's six principles with the "Words create Worlds" of AI's Constructionist principle (Table 2.3, Chapter Two), positive changes or improvements can take place.

To improve Master's thesis students' performance in a university, the graduate school committees can make use of an organisation's collective power and uncover the systems constraints. Apart from implementing a good preparation for new thesis students by offering a seminar course prior to pursuing a thesis, the Master's thesis committees of a graduate school or university should implement "thesis in progress presentation" sessions as part of a required activity for Master's thesis enrolment. The work in progress session should include various field practitioners to help comment on thesis students' works besides supervisors, university professors, and former thesis students. These are collective power in a thesis community who can help make a difference in improving the whole thesis systems' performance. They can

share ideas on various points the need to be improve as well as sharing the best practices or past achievements of doing a thesis. Meanwhile, the graduate school committees must take this opportunity to find and help some students who are struggling or facing a constraint from the presentation performance, or their work is behind schedule. The thesis in progress presentation and session should be organised at least 2-3 sessions a year, and it would be mandatory for all thesis students to attend and present in all sessions.

For Master's thesis students and their supervisors, to help improve research students' performance and research supervision, the proposed guidelines include the critical success factors to be discussed at each thesis stage, and the supporting activities (see Table 8.1).

8.4.1 Supporting activities for starting:

Starting: In the starting stage, supervisors and students need to inquire and discuss all the six critical success factors:

1. information/guidelines;
2. knowledge and skills to do research;
3. unmanageable research topics;
4. deadlines and time management, and
5. motivation

Information/guidelines: New research students are advised to prepare questions in relation to research information or guidelines that still are unclear to them, and discuss these with their supervisors. The questions may relate to the timeline of each thesis stage, to supervision preference styles, research funding, research topic issues, or literature review issues, i.e., what information/guidelines do you have at this stage that would help enhance your thesis performance?. However, with reference to the results of applying the Hybrid model (Chapter Six), before asking (AI) positive questions, supervisors need to help research students address their problematic issues/constraints. The modified TOC questions can be employed are: what are the problems in relation to research information/guidelines at this point in your perspectives?

Students should bear in mind that it is their own project and an independent study. Having clear research guidelines and other essential information, from the start, will enhance their quality thesis and on time completion.

For supervisors, it is necessary to prepare to answer their research students' questions, in relation to research guidelines and other information. Further, supervisors should co-ordinate with the postgraduate director in the school to provide up-to-date and clear research guidelines and other information to students. Guidelines and information must be timely to help new researchers to better understand the skills and timelines they need to develop, for advancing on their research journey.

Knowledge and skills to do research: It is useful for a student and their supervisor(s) to discuss the expected standard of work, and the strengths and weaknesses of the student. During the discussion, the supervisor(s) can employ Appreciative Inquiry (AI) positive questions (Figure 3.2, Chapter Three). Supervisors could ask their students, for example, "What were the success factors in your past studies?"

The research student can also take the initiative to inform their supervisor(s) about their weaknesses, and to get advice on how to improve. The benefits of identifying the strengths and weaknesses of research students at this stage are:

1. students can be guided to select a research project suitable, or challenging, to their skills, and
2. students can be advised which relevant skills seminars provided by learning centre, students' association, school, or university to attend

Manageable research project: This topic is crucial for discussion prior to the research proposal preparation. Research students should be warned to take this issue seriously from day one of their research candidatures. Some criteria can be given by supervisors, i.e. how time-consuming the research, complexity of the topic, accessibility of data and research participants, time-critical cases or topics where unavoidable delays would jeopardise the project.

Deadlines and time management: These two issues can be combined and discussed as one. It is helpful to let new research students realise that one year (for full-time Master's studies) is not long for conducting research and writing a high quality thesis. Research students are advised to create their own goals, plan or strategy, and that they must learn how to manage their time while doing a thesis. Time management support is offered by VUW SLSS. In this regard, the TOC IO Map can be employed to help set up either short-term, or long-term, goals, for research students. The generic IO (or Destination) Map, constructed with TOC and Hybrid interviewees' contributions, is presented at the end of this section.

Motivation: Research students and supervisors are advised to take the opportunity during their weekly or monthly meetings, to help motivate each other, and to discuss the student's inner skills. Students should inform their supervisor(s) of their strengths and weaknesses, and think about and discuss these in relation to their inner skills, to help enhance successful quality and on-time thesis completion. It is important to understand that motivation is not only important to the student, but also to the supervisor(s): *Supervisors don't come with batteries included* (anon). Conversely, Rugg and Petre (2004, p. x) argue that, "*In practice, supervisors are human... (overworked, forgetful, distracted and imperfect)*".

To enhance research students' motivation and performance, their supervisors also need to be motivated. During the discussion on motivation, supervisors are advised to use AI positive questions to share motivating factors during each high point experience. However, supervisors may share their thesis starting stage, both positive and negative experiences. Sharing positives or past success is one of AI main essences, and by sharing similar negative experiences as found in this research can neutralise the coaching session and help motivate research students to realise and utilise their strengths

8.4.2 Supporting activities in data collection stage:

In data collection stage, research students, and supervisors are advised to discuss all five main success factors in their meetings. The supporting activities for this stage are discussed below.

Information/guidelines: As research information (guidelines) was one of the main critical root causes discovered from this research, new research students are advised to critically review the research processes and find the answer from reliable sources: research methods guidelines, academics, school, or from their supervisor(s). The guidelines in this stage may include response rate issues, appropriate numbers of interviewees, or issues related to data collecting and reporting data.

Knowledge and skills to do research: At this stage, postgraduate researchers have a chance to practice, and improve their fieldwork's skills: conducting a survey, interviewing, organising a focus group, or literature search. However, being new Master's students, the participants in this research felt that conducting surveys outside the university was their new experience. They seemed to lose confidence working on new tasks. In fact, there are a lot of knowledge sources

that the students can learn and prepare for data collecting, i.e. research methods textbooks or Student Learning Support Service/Postgraduate Student Association seminars. Importantly, the students can always discuss problematic issues related to their data collection with their supervisors.

Manageable research project: While collecting data, some research projects may be unmanageable. Therefore, it is imperative for postgraduate researchers to discuss whether their research projects are manageable or not before it is too late. The experienced supervisors can judge and help their students analyse some crucial factors, i.e. low response rates, insufficient or irrelevant outcomes found from significant types of data collected. To help set criteria for manageable research prior the research students' fieldwork, the TOC IO Map is recommended.

Deadlines and time management: Research students are advised to balance their time on each research activity appropriately while pursuing their research, and writing a thesis, especially Master's students with only one year timeframe. Those who spend too much time on collecting data may encounter time constraints at the end of their theses. To help researchers evaluate their progresses, some schools organise a session for postgraduate students to present their findings after completing their data collection. This session is useful, not only allow the school supervisors to give comments or feedback to the research's outcomes, but also indirectly remind their research students on expected data collecting deadlines.

Motivation: Achieving on each thesis stage is one motivating factor for research students. Appreciative Inquiry (AI) discovers that appreciating a system's strengths, and past achievements (*AI Discovery*) are strong platforms to enhance expanding future's possibilities (*AI Dream*) of the system. Research students and supervisors are recommended to recognise the achievements on each research stage to help enhance the success of the students' upcoming research stages.

8.4.3 Supporting activities in data analysis stage:

In data analysis stage, research students and supervisors are advised to discuss the four critical success factors in their meetings (Figure 8.2), excluding manageable research project factors. The manageability of the research project should have been discussed and finalised prior to this stage. If not, it can jeopardise the on-time completion goal of the research students. The supporting activities for researchers and supervisors are discussed below.

Information/guideline: The essential research information (guideline) at this stage for new researchers are: how to analyse their research data, and to what extent the analysis should be done. These two issues can be discussion topics between the students and their supervisors, apart from some specific issues found. To help prepare questions, and/or to explore the answers, research students may find some of TOC simple tools, i.e. IO Map and/or PRT are helpful to navigate their thinking, and identify criteria, and relevant activities in order for better understanding as well as to identify obstacles that block success and intermediate objectives to overcome those obstacles and achieve the set objectives.

Knowledge and skills to do research: In this stage, new research students may find that the data analysis is more difficult than expected. Some students have to learn how to use computer software to help pre-analyse their data, but some may have to analyse manually. To embarking on an independent study, the data analysis stage is one of the most important stages that new researchers must spend time to learn how to analyse their own data. Some students may find reading similar theses or/and attending data analysis sessions provided by the learning support unit, postgraduate students' association, schools, or university are very helpful. However, to avoid the time constraints, attending the relevant courses or seminars earlier is recommended. In addition, one learning technique that research students can employ at this stage is to analyse part of the data first, and submit to their supervisors for pre-comments or feedback. Importantly, discussing any problematic/unclear issues with the supervisor(s) is essential for postgraduate students.

Deadlines and time management: The deadlines and time management are critical, especially once research students arrive at data analysis stage. Data analysis requires quality; postgraduate researchers must spend a good length of time analysing in order to meet the research standard expectations. However, balancing time is a must for those who are working on various activities, and each activity relies on the other. If you spend too much time on the first activity, it creates time constraints on the rest. The TOC *buffer* (providing 30% extra time at the end of the main project as mentioned in Chapter Four) is required. Setting deadlines and utilising time management techniques are recommended for discussion at all thesis stages.

Motivation: Motivation becomes very important factor, especially the nearly end thesis process: data analysis. Guidance and support from supervisors are extremely required for most

postgraduate students. Based on what was learned from the coaching sessions, especially using AI, research supervisors can remind their students about their relevant strengths and past achievements (discussed in the starting and previous thesis stages) such as perseverance, or commitments to motivate their students.

8.4.4 Supporting activities in writing-up stage:

Similar to analysis stage, in the writing-ups, research students and supervisors should include four critical success factors in their meetings. The supporting activities to enhance the discussion are discussed below.

Information/guidelines and Knowledge and skills to do research: The research information (guidelines) including Knowledge and skills to do research in this stage must be how to write a good thesis. New thesis students can learn how to write a thesis from various sources available at their universities: attending relevant writing courses, reading how to write a thesis' textbooks, and relevant previous year theses. Importantly, many experts advise thesis students to write earlier prior to the analysis. Then the students can submit what has been written to their supervisors for early feedback. Learning from supervisors' feedback or comments is one of the most effective ways for many research students.

Deadlines and time management: The writing-up is the last thesis stage, but deadlines and time management are crucial for many new researchers, especially those who are still behind normal thesis schedules. Some students agree that creating their own timetable, timesheets or work plan is very useful. By doing that, research students should provide enough space in their plan for their supervisors' readings and feedback. In addition, to discuss with the supervisor(s) about one's thesis writing-up, a timetable is also recommended. Furthermore, based on the coaching sessions of this research, the TOC IO Map and PRT can be optional tools to help planning (see the explanation in sections 8.4.1-8.4.3).

Motivation: In the last stage, writing-up, motivation is ultimately important. Postgraduate students who are about to complete their theses should be well motivated to utilise their relevant best strengths in order to produce a quality and on-time thesis. The research students' achievement is also the supervisors' success. Motivation cannot be ignored in any thesis stage, from beginning to end.

The proposed essential guidelines written in section 8.4, based on this research’s findings, offer both research students and their supervisors success factors to be discussed in the meetings, and necessary activities to take action in order to improve the students’ performance, and supervision at each thesis stage. Furthermore, some TOC and AI tools are recommended to help enhance the success of activities.

8.4.5 The generic Intermediate Objective (IO) Map

In this section, a generic IO Map for completing a quality and on-time Master’s thesis is provided (Figure 8.1). The generic IO Map was constructed based on the research participants’ relevant and useful information, combined with their root causes of problems (from TOC analysis), and the root causes of success (from AI analysis discussed in sections 8.2-8.3).

Figure 8.3: Generic IO Map for research students’ quality and on-time completion.

According to the IO Map (Figure 8.3), the goal is to produce a quality thesis and on-time completion. There are five major *Critical success Factors (CSFs)* or milestones for completing the set goal. The five CSFs are:

1. CSF1: Work on quality time management,
2. CSF2: Support from my family members, good friends, and my supervisor(s),
3. CSF3: Utilise my best relevant strengths and inner skills to help improve my thesis performance,
4. CSF4: Get clear research information (Guidelines), and
5. CSF5: Improve my knowledge and research skills

The above-mentioned five CSFs are critical to research students' success as discussed in the previous sections. In order to achieve each CSF, IO Map provides *Necessary Conditions (NCs)* for users to identify activities to be performed. The main activities (in green) can be supported by sub activities or lower level NCs (in blue). Although the generic IO Map (Figure 8.3) was composed from a small scale research's participants, new research students are advised to review and make the most out of this by constructing one suitable for themselves. Next, what could have been done in this research to correct the past failures is discussed.

Part II: Conclusion

Chapter Eight, Part II, has five sections: Conclusion (research achievements and contribution), Re-visited research, Research limitations, Future research, and Reflections including the chapter summary.

8.5 Conclusion

The conclusion outlines achievements and contribution.

8.5.1 Research achievements

This study sought to achieve two clear objectives:

- (1) To compare and contrast the effectiveness (and usefulness) of the two methods, Theory of Constraints (TOC) and Appreciative Inquiry (AI), in improving Master's thesis students' performance issues at VUW, and
- (2) To develop guidelines to help enhance Master's thesis students' success, using TOC, AI, and the Hybrid model (combination of TOC and AI).

8.5.1.1 Comparing and contrasting the usefulness (performance) of TOC and AI in improving Master's thesis students' performance

8.5.1.1.1 TOC Performance in an individual context: Master's thesis students

The researcher applied the TOC Thinking Processes (TPs) and tools to help address the interviewees' performance issues, step by step. The TOC TPs work by progressing from goal setting, current reality analysis (based on the information gained from interviews using the *TOC eight questions* provided by Cox et al., 2003), conflict analysis, solutions testing with forecasted future reality, and proposed implementation plan.

According to the research design, feedback came from the selected participants who took part in the coaching sessions. It was largely positive feedback. In respect of the TOC coaching sessions, the student was pleased with the solutions from the TOC analysis, as proposed by the researcher (Chapter Four). The TOC TPs and tools yielded solutions and helped gain buy-in from the system's owner.

Moreover, during the coaching sessions, with a variety of TOC tools available, the researcher was able to select the most suitable tools (IO Map and PRT) for addressing the participant's issues within the short timeframe available in each session. The practical and useful structure of the IO Map enabled the TOC participant to identify the important necessary conditions (activities) by connecting with some relevant essential activities (intermediate objectives) from the Prerequisite Tree (PRT). On top of this, the participant could make use of two-level IO Maps: depicting the system (macro) and process (micro) levels. In addition, the PRT helped the student to think and make a list of *intermediate objectives* or necessary activities by herself, in order to overcome obstacles she was (and might be) facing, and achieve her set objective. The solutions yielded from applying the IO Map and PRT offered goal and objective, milestones, and necessary activities for the participant in the TOC coaching sessions to take further action. After the student finished her Master's, the researcher received a favourable message that the coaching session was helpful (section 7.2.1, Chapter Seven).

Despite its usefulness, the full TOC TP analysis (FTPA), and CRT construction require a good length of time for users to understand and employ. TOC FTPA might not be suitable for some critical problems that require timely feedback.

8.5.1.1.2 AI Performance on an individual context: Master's thesis students

The researcher applied AI's 4-D Cycle and positive questions to help address the interviewees' performance issues. The AI processes applied and discussed in Chapter Five were: identifying an *affirmative topic* or the focused issue of each AI interviewee, appreciating the current and past success (*Discovery*), imagine what might be (*Dream*), determining how can it be/constructing the provocative statement (*Design*), and sustaining what will be (*Destiny*). The researcher identified and composed the affirmative topic, Discovery and Dream for each AI interviewee, based on the interview results (asking AI positive questions), and answers to questionnaires. Design and Destiny phases were processed according to AI instructions, as analysed and discussed in Chapter Five.

There was positive feedback from one AI interviewee who took part in both the individual interview and coaching sessions. She mentioned that she got a chance to share her *insights and* (positive) *experience* during the coaching sessions, I and II. The participant also confirmed that she had *achieved most* of what she was aiming for, as identified during the sessions.

From the researcher's observation, AI helped the AI interviewee verbalise and recognise her strengths and past achievements so that she could utilise these to enhance and improve her performance. During the coaching session II, this participant experienced highs and lows. When the researcher used AI positive questions and reframing to motivate her, she agreed and determined to work to her relevant strengths. However, there were some limitations found in this research when applying AI to the individual Master's thesis student context. The limitations as discussed in the previous chapters were:

- (1) The full AI 4-D cycle analysis was time-consuming.
- (2) AI did not perform well while critical issue(s) existed within the system (Refer to section 5.2.3).
- (3) AI Discovery requires a fair length of time to allow AI users to appreciate the best what is/was prior to continue to the Dream phase (AI users might not be able to perform well in Dream if they have not spent enough time realising their strengths and past success).
- (4) In an individual context, there is a limited resource (of experiences) to draw from. Lack of relevant strengths and modest past achievements could be one limitation to applying AI in an individual context.

These observations are supported by other researchers. Messerschmidt (2008, pp. 461-462) highlighted the time-consuming nature of AI coaching, with its need for ongoing input from facilitators. Shuayb, Sharp, Judkins and Hetherington (2009, p. 11), when investigating young people's views on community cohesion, also found that negatives must be addressed first for AI to be effective. From their study, they learned that AI would not be suitable for research focusing on negative social phenomena such as racism, poverty and bullying (2009, p.12). AI focuses on participants' personal positive experiences, visions and wishes. AI facilitators need to consider carefully whether participants have had personal experiences relating to the topic of inquiry, i.e., young people in the rural school had had little experience of people from diverse cultural backgrounds (community cohesion in the school). This indicates the need for AI participants to have personal experiences and stories to convey about the area under investigation. AI is not suitable for research where participants have very little experiences of the topic.

Both TOC and AI were useful when applied to help improve Master's thesis students' performance, but each method also had some limitations as discussed above. In this research, the researcher also applied the Hybrid model (a combination of TOC and AI) to help improve students' thesis performance. The Hybrid model's performance is discussed, next.

8.5.1.1.3 Hybrid model performance in an individual context: Master's thesis students

Apart from the aim of comparing and contrasting TOC and AI, the researcher also wanted to understand how the two approaches could be integrated to help enhance Master's thesis students' performance. In this research, the researcher merged TOC TPs and AI 4-D Cycle into one process: the Hybrid model (Chapter Six).

There were advantages and disadvantages in employing the Hybrid model to Master's thesis students' performance issues. The Hybrid model gained access to both the constraints and the strengths of each interviewee. The rich information gained provided the interviewees with two implementation plans to assist them. Each Hybrid model participant could enjoy the two options (plans) and prioritise taking action according to their preference, urgency, and the future impacts predicted. Furthermore, the Hybrid model offered flexibilities for the researcher to select varieties of tools, as applicable to the coaching session's context. The feedback from the Hybrid coaching participant confirms the researcher's observation and analysis. The

participant was able to recognise her strengths, as well as identifying critical root causes that blocked her from her potential achievements.

A disadvantage found using the Hybrid model is it is a fairly time consuming process, as two methods are applied in one session of research. Future research could help address this issue with the construction of a better Hybrid from these two useful approaches: TOC and AI.

8.5.1.2 Developing guidelines to help enhance Master's thesis students' success from TOC, AI, and Hybrid model

The research outcomes discovered by addressing both the root causes of problems (TOC), and the root causes of success (using AI), enabled the researcher to compose the essential guidelines for research students and supervisors, which was one of the main aims of this research. The proposed guidelines comprise critical issues to be discussed between a research student and his/her supervisor(s). Included are the necessary activities to be undertaken in each phase of the student's research, together with the recommended tools from the two approaches: TOC and AI.

The researcher does not wish to claim that the study is 'generalised research', given this study focused on a group of 12 Master's thesis students only (from various VUW schools/faculties in NZ). However, future readers may benefit from the fact that the guidelines were developed from the key successes and failures of participants. Furthermore, accessible guidelines, showing what to do and what not to do, may serve to enhance the success of new researchers.

8.5.2 Research contribution

The originality of this research was the comparative study of the two quite contrasting approaches, TOC and AI, from two different disciplines: *Management* (TOC) and *Organisation Development* (AI). To assess the performance of TOC, AI, and Hybrid (TOC+AI), the researcher applied the three approaches separately in the individual context of Master's thesis students. This individual context is a point of difference from the main traditional focus of most TOC or AI research.

The significant outcomes yielded from this research, mainly confirmed what has already been found when applying each individual approach to organisations (macro), especially for TOC. Meanwhile, the limitations identified in applying AI suggests a channel for further research,

i.e. AI's performance in an individual context, where critical problems exist or if there is only moderate strengths/past achievements. This research also revealed the possibility of integrating the two contrasting approaches, TOC and AI, from the results of applying the Hybrid model. The Hybrid model offered flexibilities and additional value in applying any of these two approaches to improve a system where most applicable.

Importantly, the proposed essential guidelines for enhancing the success of research students and their supervision were developed from this research. The guidelines were mainly contributed by addressing the participants' root causes of problems and root causes of success. The researcher wishes to note the above-mentioned value to the research economy.

8.5.3 Further applications

Since this thesis research began, there have been publications describing applications of AI in fields as diverse as empowering at-risk students (San Martin & Calbrese, 2011), revitalising community organisations (Paulin & Shakal, 2011), and enhancing policing (Grant, 2012), leadership (Cooperrider, 2012), healthcare (Trajkovski, Schmied, Vickers & Jackson, 2013), agritourism (Ainley & Kline, 2012) and social enterprise (Grant, 2013).

Trajkovski et al.'s (2013) study in particular highlighted that AI application is unique to each context. They also noted that the 4D phases were not rigid steps and could be adapted to the setting and participants. Overall, participant enthusiasm and commitment were highlighted suggesting appreciative inquiry provides a positive way forward in health care and health research by shifting the focus from problems to solutions.

The majority of literature on AI continues to relate to organisational settings. Bushe's (2011) review of AI cites only one instance of AI applied to individuals (Kelm, 2005). Bushe admits that there has been a lack of critique or evaluation of AI. Early reports tended to be success stories or anecdotes. Critiques of AI have become more sophisticated in recent years, coming from scholars who use and are aware of AI's limitations. However, even so, there are still no clear answers to questions like when is AI most effective, or what factors are more influential in its success or failure. He does note, however, that AI's outright rejection of problem solving approaches seems to have softened, which directly relates to the central question of this research: should one use a problem-oriented approach like TOC or a strengths-based approach like AI? Bushe argues that it should be a case of both, not either/or. He argues that

transformational change cannot occur unless AI addresses problems of real concern to participants. This view is supported by Johnson (2013), who suggests that the full potential of AI is most likely to come from embracing the polarities and tensions of problem solving and positive discourse, an approach promoted by this study's Hybrid method.

There have also been further developments of TOC, including Dettmer's renaming of the IO Map as the Goal Tree (Dettmer, 2011), underlining its purpose in clarifying the goal of the system before embarking on any improvements.

8.6 Revisiting the research:

If the researcher could go back to improve this research, three parts could benefit from some revision: the questionnaire survey; the individual interviews, and the preparation for coaching sessions.

The questionnaire survey:

Initially, "triangulation" was the main driver of the original research design. The researcher had designed the research into three phases (see Figure 8.4): web-based questionnaire survey, individual interview, and action research (coaching sessions). The researcher would use the questionnaire to survey the common problematic issues among the majority of VUW Master's thesis students. Then, the researcher would recruit the interviewees from the top ten major problems yielded from the survey to take part in the second phase: individual interviews. After that, one interviewee from the second phase would be recruited to participate in the last phase: action research (coaching sessions). Using this design, the outcomes of this research should benefit from the triangulation of the three phases.

Figure 8.4: Original three phase research design

Unfortunately, the researcher only received 35 responses from the whole university. The low response rate caused difficulties in matching the three groups (TOC, AI, and Hybrid) for the different thesis stage interviews. Therefore, the researcher could only use the web-based survey as the main channel to recruit the research interviewees.

The individual interviews:

The individual interviews conducted in this research suit TOC interviews, but not AI. In the TOC individual interviews, the participants responded well to the TOC questions and told several appealing stories. By contrast, applying AI positive questions to some students in individual interviews was quite difficult in terms of keeping a positive mode during the interview, as discussed in section 8.1.

The research design involved typing up the transcripts of the individual interviews, but without sharing the contents with other interviewees. According to the researcher's observation, this individual context was not suitable for AI. AI has a notion of focusing on positive holistic and collective sharing. According to Whitney and Trosten-Bloom, (2003, p.54), momentum for large-scale change requires a large amount of positive impact and social bonding. A solution could be one-on-one sharing of interview contents among the large group of members. However, a focus group interview may be more appropriate to collect positive stories and to enhance the rich outcomes. In this study, for the purpose of comparative analysis of TOC, AI, and the Hybrid model, the research design involved employing the same interview method for each application. Thus, individual interviews were conducted in all approaches. This gave some control over key variables to enhance research validity and reliability. In view of the low response rate of this research due to a limitation noted in recruiting interviewees, the researcher therefore might have had difficulty organising a suitably sized focus group.

The coaching sessions:

The researcher wished to change two things: the length of the coaching session should be more than one hour, and there should be minimal delay between conducting the interview and the coaching session.

Although the coaching sessions were helpful and conducted successfully in time, the one hour length was not sufficient, with many issues to be discussed. Furthermore, in the first coaching session with each three participants, the researcher had to present solutions from the first

interview, which was a time-consuming process. Longer, 90 minute, sessions would be recommended.

The timing issues: The first coaching session conducted with each of the three students took place in November 2009, almost five months after the first individual interviews. If the coaching had been conducted earlier, the data analysis and solutions yielded from the first individual interviews of the three participants could have offered “fresh” results for discussion. The proposed fresh solutions of each student might have helped them better deal with the problematic issues experienced since the first interview. In addition, there would be more connections or a better link of data and information from the first individual interview, with a logical flow from the first to the second coaching sessions. It might be more interesting to address and help students improve their performance after the first interview rather than the two coaching sessions that took place after a period of time.

As discussed earlier, the low response rate combined with the complexity of this research design for a comparative study, meant the researcher had to seek more interviewees who had similar criteria (Chapters 4-6, Tables 4.1, 5.1, and 6.1), and re-contact those who wished to take part in the next phase: coaching sessions.

8.7 Limitations of this study

This comparative research had the following limitations:

- The low response rate: Only 35 Master’s thesis students from the whole of VUW took part in this research’s web-based survey. Therefore, the researcher could not identify which problematic issues were experienced by the majority of Master’s researchers.
- The interview processes (AI): When applying AI to organisations, AI’s one-on-one interview is known as a shared interview; AI participants ask questions and share their experience in pairs. The results from shared interviews are presented and combined, with each pair reporting back to the main group.
- To compare AI in this research with TOC, the researcher had to conduct interviews on the same consistent basis. Therefore, in the AI individual interviews, the researcher had to keep the same role as when conducting TOC interviews: only asking questions. The

AI interviews' outcomes might have been limited through not sharing with other participants.

- The Hybrid sequence of asking questions: The researcher applied one consistent process in the Hybrid model's interviews by asking a set of TOC questions first followed by AI's. This practice might have yielded different outcomes, if a set of AI positive questions were asked prior to asking TOC's.

8.8 Future research

The researcher would like to recommend the following for future research:

- A comparative study of TOC or AI with other approaches: Despite the high demand tasks of comparative research, the researcher enjoyed the benefits
- Research on integrating TOC or AI with other approaches
- More research on TOC or AI at a micro level (individual contexts)
- More research on improving research students and supervision, particularly using the Hybrid model.

8.9 Reflections

“I want to teach”

That was the answer, in my early childhood, to those who asked me, “What would you like to do when you grow up?” I was impressed by the hard work of those teachers who taught me, and helped me learn how to read and write. When I was young, I studied in a small town, 500 kilometres north-east of Bangkok, the poorest part of Thailand. Most teachers travelled by bicycle for many kilometres to their school, in rain or shine. When they arrived in the classroom, they taught their students without complaint, but with their full support and kindness. The contribution from teachers is so important to their students, communities, and the country.

A teaching career has always been my dream despite the low pay. However, the low paid teaching job made me delay (but I never thought of turning back from it). I decided to do BCA (in Accounting), rather than in Education (preparing for a teaching career) because BCA offered me more career options. Most importantly, with a BCA Degree, I can always apply for a teaching career whenever I am ready.

I spent about 20 years working in business sectors in Bangkok, Thailand, and overseas. Businesses taught me to prioritise things in order to meet the target within certain timelines, and compete with other businesses within tight deadlines. However, making money (by earning higher salary in business sectors) was not my goal, and did not serve my satisfaction or sustain my happiness. Instead, my passion is to help improve my community and society, especially to help teach students to learn and think logically. Helping students improve their thinking and performance should have a positive impact on enhancing the development of the country. I have always believed that education can make a difference.

However, teaching in universities requires higher educated lecturers. The MBA Degree, non-thesis based, obtained at home was not enough. To be able to teach at any level, and be in a school or university's management committees (to join an educational reform committees in order to make positive changes in Thailand education), I must get a PhD.

“I have to do a PhD”

Getting a PhD is not easy, especially for a mature student like me who spent half of my life-time working away from universities. My PhD path got tougher when I decided to do a thesis in English, not my first language, and one that I rarely used at home. Unfortunately, my English proficiency, and educational background (non-thesis based Master's) were insufficient to pursue a PhD overseas (NZ). So I had to do another Master's, with a thesis based in English.

*With my business management background, I was impressed by the management novel taught in one of my Honours' classes of Management Studies, *The Goal* (the Theory of Constraints/TOC). I decided to do a Master's thesis by applying TOC to Master's thesis students' constraints.*

From my Master's research, I discovered that to interview my research participants and analyse the interview data on my own without interacting with the participants, did not really serve my aim of helping my research participants. I wanted to discuss and interact with my research participants to help find a better way of dealing with some critical issues through TOC. Later, I found that Action Research can offer the opportunity to conduct research the way I wanted. Therefore, I designed coaching sessions (action research) in my PhD's last research phase.

To apply only TOC in my PhD research would be quite similar to my Master's. However, I was thinking that it would be interesting to learn more about TOC through a comparative lens. By comparing TOC with some other approach might help enhance my knowledge on TOC and any other method I employed in my studies.

Appreciative Inquiry (AI) attracted my attention when I got a chance to read a few pages of one book suggested by my primary supervisor during a short visit to NZ for my Master's Degree Graduation in May 2006. From my first impression, it was so positive, and contrasting to TOC I knew. The two opposing approaches are so amazing; they have the same aim of causing huge improvements in a system, but addressing from different sides: strengths (AI) versus constraints (TOC).

Apart from the usefulness of the two methods, TOC and AI, the Master's thesis students' stories in my research inspired and motivate me to work on my PhD: on the tough big piece of academic research and writing. During my data collection period, I interviewed more than 20 students, but only 12 students' qualifications fitted my research design criteria. I enjoyed listening to their compelling stories. The TOC interviews provided stories of constraints, AI offered me success stories, and I gained both types of story (constraints and successes) from the Hybrid interviews.

Because my research individual interviews with Master's thesis students had to be conducted in sequence (starting from TOC, AI, and Hybrid with each group of four students having similar criteria), during some interviews, I wished I could have applied TOC rather than AI or vice versa. In some TOC interviews, the interviewee smiled and seemed not to have many constraints even though I thought some questions were demanding (in retrieving Undesirable effects of the problematic issues). In contrast, some AI interviewees often mentioned difficulties or trouble they experienced. However, the Hybrid model furnished me with flexibilities; I could employ TOC when my Hybrid interviewee wanted to talk about his/her problematic issues or to use AI when he/she was in a positive mood to talk about strengths and/or past achievements. After completing the analysis of my research, I was very happy that I chose these two methods, TOC and AI, for my PhD comparative study. I have gained confidence to move forward by applying them to my daily life, and continue learning from them to enhance my future.

As I mentioned earlier, doing a PhD is not an easy task; I experienced a roller-coaster syndrome every now and then, especially at the end of my PhD journey when I became seriously ill. Apart from trying to compose correct academic English while maintaining my own voice, they were several other constraints: my PhD funding limitations, my work commitments, my family obligations (my 87 year-old mother, and a blind sister were waiting for me to return home after my brother's death in 2008), half of my house was under water (flooding) in Thailand's rainy season 2011-2012. At the end of my PhD thesis stage (January – March 2013), I had pneumonia and complications requiring hospital treatment on several occasions. I had little energy for anything, let alone for working on my final PhD thesis draft. My supervisors motivated me by reminding me about my own strengths and my past achievements when working in the business sector. That helped to some degree, as some of my critical constraints had not been fixed. Then, I realised that my situation was similar to some of my PhD research interviewees.

I must follow my goal and dreams of achieving a PhD. I fixed my constraints or had them fixed one by one (TOC). I also utilised my strengths and past successes (AI) and continued working on my final draft thesis towards the end with kind support from my supervisors, my proofreader, and VUW's FCom research administrators. Lessons learned from here would be useful for my future and my career as a university lecturer, and a thesis supervisor at home in Thailand.

“I hope to help students and research societies”

I was delighted to be able to include proposed guidelines for research students and supervisors in my PhD thesis. Although, it was based on a small number of interviewees, their root causes of problems and root causes of success, their experiences were very interesting. In an independent research study context, there are so many unwritten rules. So often, we learn from success and failures. I hope that my proposed guidelines can be part of those useful written sources that research students and supervisors can benefit from.

For me and my future teaching role, I am certainly taking home what I have learned including these proposed guidelines. Although it is from a different context and culture, it provides a good platform to step forward with my new roles in education at home.

One major role of my teaching career from July 2011 onwards has been to supervise students at Roi Et Rajabhat University (RERU) in Roi Et (my hometown), in the north-east of Thailand.

Currently, I supervise 30 undergraduate students, but, after completing my PhD, I will be assigned to teach and supervise both Master's and Doctorate students. Importantly, I have recently been appointed to one of RERU graduate school committees, and the new position of Associate Dean of RERU Graduate School. With these new roles as a supervisor, and as part of the university's management, my dreams to help improve students' performance, and their thinking, as well as to take action in Thailand's educational reform, are coming closer.

TOC teaches me to identify and focus on the few constraints, step by step to achieve drastic improvements. Furthermore, what I have learned from AI, I will try my best to utilise my best strengths and past achievements from my past studies, my business sectors' working experiences as well as being the employee of the year (from Nissan Company), and the 2006 RERU's Outstanding Lecturer to make positive changes in my future work, my university, and my community, which is part of this globe: our complex world.

8.10 Chapter Summary:

Theory of Constraints (TOC) and Appreciative Inquiry (AI) are well known in their disciplines, Management and Organisation Development respectively. The two methods have been employed at a macro level, in organisations, worldwide. Despite their usefulness, very little research applying to individuals and no research on their integration was found.

This comparative study on the two different approaches, TOC and AI, discovered that the two methods could be applied to help improve the individual's performance, Master's thesis student. In addition, both TOC and AI could be integrated. The findings of this research, a micro level, could confirm what has been discovered in macro levels. There was a common disadvantage found, i.e. a time consuming process in applying and analysing the whole process of each approach, especially the Hybrid model (a combination of TOC and AI), and some tools or processes of the two methods could function individually. In addition, there were some limitations when applying AI in the individual context. AI might not be able to perform well in a system where serious issues existed, and with insufficient and irrelevant strength and past achievement. Further research on these disadvantages of AI should be conducted. Furthermore, the integrated version of TOC and AI or the Hybrid model, offered the benefits gaining access to both strengths and constraints which should enhance the system's improvements, and provided the system's owners or facilitator of the system flexibilities in employing either TOC or AI where is applicable.

Importantly, the essential guidelines to improve Master's thesis students' performance and supervision were proposed. The proposed guidelines were developed from the outcomes yielded from this research's addressing the participants' root causes of problems, and the root causes of success. The developed guidelines, although based on a small scale of this research finding, could be part of the research economy's learning sources for future research students and supervisors in order to enhance the success of supervision, and researchers' performance.

References

- AGI Goldratt Institute. (2013). *A white paper: Theory of constraints and its thinking processes – A brief introduction*. Retrieved from <http://www.goldratt.com/papersandarticles.shtml>
- Ainley, S., & Kline, C. (2012). Moving beyond positivism: Reflexive collaboration in understanding agritourism across North American boundaries. *Current Issues in Tourism*, 17(5), 404-413.
- Alreck, P.L. & Settle, R.B. (1985). *The survey research handbook*. Homewood, IL: Richard D. Irwin.
- Balderstone, S.J. (1999). *Examining the theory of constraints: A source of operational and financial performance improvement for manufacturers*. (Unpublished Master of Management Studies thesis). Victoria University of Wellington, Wellington, New Zealand.
- Barbour, R. (2007). *Doing focus groups*. London, UK: Sage.
- Barnard, A. (2010). Continuous improvement and auditing. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 403-454). New York, NY: McGraw-Hill.
- Barnard, A. & Immelman, R.E. (2010). Holistic TOC implementation case studies. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 455-498). New York, NY: McGraw-Hill.
- Blackstone, J.H. (2010). Drum-buffer-rope, buffer management and distribution. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 145-173). New York, NY: McGraw-Hill.
- Blaikie N. (2007). *Approaches to social inquiry: Advancing knowledge*. Cambridge, UK: Polity Press.
- Booth, W.C., Colomb, G.G., & Williams J.M. (1995). *The craft of research*. Chicago, IL: University of Chicago Press.
- Bourque, L.B. & Fielder E.P. (1995). *How to conduct self-administered and mail surveys*. Thousand Oaks, CA: Sage.
- Bryman, A. & Bell, E. (2003). *Business research method*. New York, NY: Oxford University Press.
- Burgess, R.G. (1997). *Beyond the first degree: Graduate education lifelong learning and careers*. Buckingham, UK: SRHE and Open University Press.

- Burton-Houle, T. (2001). *The theory of constraints and its thinking processes: A brief introduction to TOC*. Retrieved from <http://www.goldratt.com>
- Bushe, G.R. & Kassam, A.F. (2005). *When is appreciative inquiry transformational? A meta-case analysis*. Retrieved from <http://www.gervasebushe.ca/aimeta.htm>
- Bushe, G.R. (2007). Appreciative inquiry is not (just) about the positive. *Organization Development Practitioner*, 39, 30-35.
- Bushe, G.R. (2011). Appreciative inquiry: Theory and critique. In D. BoJe, B. Barnes, & J. Hassard (Eds.). *The Routledge companion to organizational change* (pp.87-103). Oxford, UK: Routledge.
- Button, S. D. (1999). Genesis of a communication current reality tree–The three-cloud process. In *Constraints Management Symposium Proceedings* (pp. 31-4). APICS-Educational Society for Resource Management.
- Chapman, D. (Ed). (1988). The thesis. In *How to do research in the MIT AI Lab*. Cambridge, MA: Massachusetts Institute of Technology Artificial Intelligence Laboratory.
- Cheng, C. (2010). Theory of constraints in prisons. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 813-841). New York, NY: McGraw-Hill.
- Cole, A.L. & Hunt, D.E. (1994). Never give up. In *The doctoral thesis journey: Reflections from travelers and guides*. Ontario, Canada: The Ontario Institute for Studies in Education, 109-114.
- Collis, J. & Hussey, R. (2003): *Business research: A practical guide for undergraduate and postgraduate students*. Hampshire, UK: Palgrave Macmillan Press.
- Conklin, T.A. (2009): *Creating of preference: An exercise in appreciative inquiry*. Retrieved from <http://jme.sagepub.com/content/33/6/772>
- Cooper, D.R. & Schindler, P.S. (1998). *Business research methods*. Singapore: McGraw-Hill.
- Cooperrider, D. (2012). Three cycles of strengths revolution. *Excellence Leadership*, 29(3): 2-3. Retrieved from <http://www.2012waic.com/wp-content/uploads/2012/03/leadership-excellence-Cooperrider-et-al.-March-2012.pdf>
- Cooperrider, D.L. & Srivasta S. (2008). Appreciative inquiry in organizational life. In D.L. Cooperrider, D. Whitney, & J.M. Stavros. *Appreciative inquiry handbook: For leaders of change*, 2nd edition (pp. 353-384). Brunswick, OH: Crown Custom Publishing.
- Cooperrider, D. & Whitney, D. (2005). *Appreciative inquiry: A positive revolution in change*. San Francisco, CA: Berrett-Koehler Publishers.

- Cooperrider, D.L., Whitney, D. & Stavros, J.M. (2008). *Appreciative inquiry handbook: For leaders of change* 2nd edition. Brunswick, OH: Crown Custom Publishing.
- Cox, J.F, Boyd, L.H, Sullivan, T.T, Reid, R.A, & Cartier, B. (2012). *The theory of constraints international certification organization dictionary*, 2nd edition. New York, NY: McGraw-Hill.
- Cox, J.F. & Schleier, J.G. (Eds.) (2010). *Theory of constraints handbook*. New York, NY: McGraw-Hill.
- Cox, J.F. & Spencer, M.S. (1998). *The constraints management handbook*. Boca Raton, FL: St. Lucie Press.
- Cox, J.F., Blackstone. J.H. & Schleier, J.G. (2003). *Managing operations: A focus on excellence*. Volume I. Great Barrington, MA: North River Press.
- Cox, J.F., Mabin V. & Davies, J. (2005). Case of personal productivity: Illustrating methodological developments in TOC. *Journal of Human Systems Management* 24, 39-65.
- Cox, J.F., Mabin, VJ & Davies, J. (2006). A case of personal productivity: Illustrating methodological developments in TOC. In B. Ronen (Ed.), *The theory of constraints: Practice and research* (pp.39-66). Amsterdam: IOS Press.
- Creswell J.W. (2003). *Research design: Qualitative, quantitative and mixed methods approaches*. Thousand Oaks, CA: Sage.
- Daellenbach, U. (Urs.Daellenbach@vuw.ac.nz). (2004, March 24). RE: I need some information. E-mail to Garoon Pongsart.
- Dave, R. (1993). Putting the blame where it belongs. In *Dissertation News*. No. 2 – 1994. Association for Support of Graduate Students (ASGS).
- Davies, J. & Mabin, V.J. (2009). Research issues: Theory of constraints. *Decision Line*, 40(2) 9-15.
- Davies, J., Mabin, V.J. & Balderstone S.J. (2005). The theory of constraints: A methodology apart? A comparison with selected OR/MS methodologies. *Omega: The International Journal of Management Science*, 33(6), 506–524.
- Demb, A & Funk, K. (1999). What do they master? Perceiving the benefits of the Master's thesis experience. *NACADA Journal*. 19(2), 18-27.
- Denholm, C. & Evans, T. (2006). *Doctorates downunder: Keys to successful doctoral study in Australia & New Zealand*. Camberwell, VIC: Acer.
- Denscombe, M. (2007). *The good research guide for small-scale social research projects*, Berkshire, UK: Open University Press.

- Dettmer, W.H. (1997). *Goldratt's theory of constraints: A system approach to continuous improvement*. Milwaukee, WI: ASQ Quality Press.
- Dettmer, W.H. (1998). *Breaking the constraints to world-class performance*. Milwaukee, WI: ASQ Quality Press.
- Dettmer, W.H. (2003). *Strategic navigation: A system approach to business strategy*. Milwaukee, WI: ASQ Quality Press.
- Dettmer, W.H. (2007). *The logical thinking process: A systems approach to complex problem solving*. Milwaukee, WI: ASQ Quality Press.
- Dettmer, W.H. (2010). Strategy. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 551-570). New York, NY: McGraw-Hill.
- Dettmer, W.H. (2011). *Our goal is ... What is our goal?* Retrieved from http://www.goalsys.com/books/documents/WhatisOurGoal-v5_000.pdf
- Ean, K.C. (2005). *Thinking smart: You are how you think*. Selangor Darul Ehsan, Malaysia: Pelanduk Publications (M) Sdn Bhd.
- Easterby-Smith, M., Thorpe, R., & Jackson, P. (2008): *Management research*. London, UK: Sage.
- Eley, A.R. & Jennings, R. (2005). *Effective postgraduate supervision: Improving student supervisor relationships*, New York, NY: Open University Press.
- Faure, M. (2006). *Problem solving was never this easy. Transformational change through appreciative inquiry*. Retrieved from <http://www.interscience.wiley.com>
- Fink, A. (1995). *The survey handbook*. Thousand Oaks, CA: Sage.
- Fitzgerald, S.P., Oliver, C., & Hoxsey, J.C. (2010). Appreciative inquiry as a shadow process. *Journal of Management Inquiry*, 19, 220. <http://jmi.sagepub.com/content/19/3/2010>
- Frey, J.H. & Oishi, S.M. (1995). *How to conduct interviews by telephone and in person*. Thousand Oaks, CA: Sage.
- Gawith, G. (2002). *Research success*. Singapore: ESA Publications (NZ).
- Ghauri, P. & Gronhaug, K. (2002). *Research methods in business studies: A practical guide*. London, UK: Pearson Education.
- Gilling, M. (Ed.). (2000). *Research: The art of juggling*. Wellington, NZ: Massey University.
- Goldratt, E.M. (1990). *What is the thing called theory of constraints and how should it be implemented?* Croton-on-Hudson, NY: North River Press.
- Goldratt, E.M. (1994). *It's not luck*. Great Barrington, MA: North River Press.
- Goldratt, E.M. (1997). Focusing on constraints, not costs. In R. Gibson (Ed.). *Rethinking the future* (pp 106-121). London, UK: Nicholas Brealey Publishing.

- Goldratt, E.M. (2008). *The choice*. Great Barrington, MA: North River Press.
- Goldratt, E.M. (2010). Introduction to TOC – My perspective. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 3-9). New York, NY: McGraw-Hill.
- Goldratt, E.M. (n.d.). *My saga to improve production: A 14-year journey*. Retrieved from <http://www.goldratt.com>
- Goldratt, E.M. & Cox, J. (1984). *The goal*. Croton-on-Hudson, NY: North River Press.
- Goldratt, E.M. & Cox, J. (1992). *The goal: A process of ongoing improvement*. 2nd revised edition. Great Barrington, MA: North River Press.
- Goldratt-Ashlag, E. (2010). The layers of resistance – The buy-in process. In J.F.Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 571-585). New York, NY: McGraw-Hill.
- Golembiewski, R.T. (1998). Appreciative inquiry: Diagnosis and perspectives on how to do it better. *Research in Organization Change and Development*, 11, 1-45.
- Grant, S. (2006). *A paradox in action? A critical analysis of an appreciative inquiry*. (Unpublished doctoral dissertation). University of Waikato) Hamilton, NZ.
- Grant, S. (2006). *Learning through 'being' and 'doing'*. Retrieved from <http://www.sagepub.com>
- Grant, S. (2012). Enhancing community policing through critical appreciative processes. *AI Practitioner* 14(3), 21-25.
- Grant, S. (2013). Social enterprise through a critical appreciative lens. In S. Denny & F. Seddon, F. *Social enterprise: accountability and evaluation around the world* (pp. 213-232). London, UK: Routledge.
- Grant, S. & Humphries, M. (2006). *Critical evaluation of appreciative inquiry: Bridging an apparent paradox*. Retrieved from <http://arj.sagepub.com/cgi/content/abstract/4/4/40103/08/2007>.
- Gray, D.E. (2009). *Doing research in the real world*. London, UK: Sage.
- Green, L. (2008). Minutes of meeting at the Biz centre on March 25, 2008, Wellington, New Zealand.
- Green, T. (2000). *Motivation management*. Palo Alto, CA: Davies-Black.
- Greenfield, T. (2002). *Research methods for postgraduates*. London, UK: Arnold.
- Haar, D.V. & Hosking, D.M. (2004). *Evaluating appreciative inquiry: A relational constructionist perspective*. Retrieved from www.sagepublication.com
- Hammond, S.A. & Royal, C. (2001). *Lessons from the field: Applying appreciative inquiry*. Plano, TX: Thin Book Publishing.

- Hart, C. (2005). *Doing your Masters dissertation*. London, UK: Sage.
- Hayes, J. (2007). *The theory and practice of change management*. New York, NY: Palgrave Macmillan.
- Ho, M. (2001). *An exploratory study into the implementation of theory of constraints (TOC) in New Zealand manufacturing organizations*. (Unpublished Master of Management Studies thesis). Victoria University of Wellington, Wellington, New Zealand.
- Hunt, K.D. (2001). *Appreciative inquiry and problem solving: A comparative study of participatory action processes*. Moscow, ID: University of Idaho.
- Hurson, T. (2008). *Think better: An innovator's guide to productive thinking*. New York, NY: McGraw-Hill.
- Hussey, J. & Hussey, R. (1997). *Business research: A practical guide for undergraduate and postgraduate students*. London, UK: Macmillan.
- Institution of Teaching and Learning. (2003). *2003 survey of higher degree research students*. Retrieved from <http://www.itl.usyd.edu.au/sreq2003>
- Johnson, P. (2013) Transcending the polarity of light and shadow in appreciative inquiry: An appreciative exploration of practice. In D.L. Cooperrider, D. Zandee. L.N Godwin, M. Avital & B Boland (Eds.). *Organizational generativity: The appreciative inquiry summit and a scholarship of transformation (Advances in appreciative inquiry, Volume 4)* (pp. 189-207). Bingley, UK: Emerald Publishing.
- Kearns, H., Gardiner, M., Marshall, K., & Banytis, F. (2006). *The PhD experience: What they didn't tell you at induction*. Adelaide, SA: Staff Development and Training Unit, Flinders University.
- Kelm, J.B. (2005). *Appreciative living: The principle of appreciative inquiry in personal life*. Wake Forest, NC: Venet Publishers.
- Kendall, G.I. (1998). *Securing the future: Strategies for exponential growth using the theory of constraints*. New York, NY: St. Lucie Press.
- Kendall, G.I. (2010). Theory of constraints strategy. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 519-549). New York, NY: McGraw-Hill.
- Kim, S., Mabin, V.J., & Davies, J. (2008). The theory of constraints thinking process: Retrospect and prospect. *International Journal of Operations & Production Management*, 28(2), 155-184.
- Krueger, R.A. (1994). *Focus groups: A practical guide for applied research*. Thousand Oaks, CA: Sage.

- Lepore, D. & Cohen, O. (1999). *Deming and Goldratt: The theory of constraints and the system of profound knowledge*. Great Barrington, MA: North River Press.
- Lewis, S., Passmore, J., & Cantore, S. (2008). *Appreciative inquiry for change management: Using AI to facilitate organization development*. London, UK: Kogan Page.
- Litosseliti, L. (2005). *Using focus groups in research*. London, UK: Continuum.
- Litwin, M.S. (1995). *How to measure survey reliability and validity*. Thousand Oaks, CA: Sage.
- Ludema, J.D., Whitney, D., Mohr, B.J., & Griffin, T.J. (2003). *The appreciative inquiry summit: A practitioner's guide for leading large-group change*. San Francisco, CA: Berrett-Koehler Publishers.
- Maani, K.E. & Cavana, R.Y. (2002). *Systems thinking and modelling: Understanding change and complexity*. Auckland: Pearson Education New Zealand.
- Mabin, V.J. (1999). Goldratt's "theory of constraints" thinking processes: A systems methodology linking soft with hard. Retrieved from <http://www.systemdynamics.org>
- Mabin, V.J. & Balderstone, S.J. (2000). *The world of the theory of constraints: A review of the international literature*. New York, NY: St. Lucie Press.
- Mabin, V.J. & Balderstone, S.J. (2003). The performance of the theory of constraints methodology: Analysis and discussion of successful TOC applications. *International Journal of Operations & Production Management*, 23, 568-595.
- Mabin, V.J. & Davies, J. (2010). The TOC thinking processes: Their nature and use - Reflections and consolidation. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 631-669). New York, NY: McGraw-Hill.
- Mabin, V.J., Davies, J. & Cox, J. (2006). Using the theory of constraints thinking processes to complement systems dynamics' causal loop diagrams in developing fundamental solutions. *International Transactions in Operational Research*, 13, 33-57.
- Mabin, V.J., Davies, J., & Kim, S. (2008). Rethinking tradeoffs and OR/MS methodology, JORS, doi:10.1057/jors.2008.90
- Madsen, D. (1992). *Successful dissertations and theses: A guide to graduate student research from proposal to completion*. San Francisco, CA: Jossey-Bass Publishers.
- Manalo, E. & Trafford, J. (2004). *Thinking to thesis: A guide to graduate success at all levels*. Auckland, NZ: Pearson Education New Zealand.
- Mauch, J.E. & Birch, J.W. (1998). *Guide to the successful thesis and dissertation: A handbook for students and faculty*. New York, NY: Marcel Dekker.

- McDaniels, T. (2004). *Notes on my approach to advising graduate students regarding theses and projects*. Retrieved from <http://www.scarp.ubc.ca/McDaniels-supervision/>
- Messerschmidt, D. (2008). Evaluating appreciative inquiry as an organizational transformation tool: An assessment from Nepal. *Human Organization*, 67(4): 454-468. Retrieved from <https://sfaa.metapress.com/content/xp341p168m141641/resource-secured/?target=fulltext.pdf>
- Moore, N. (1987). *How to do research*. London, UK: Library Association Publishing.
- Moore, N. (2000). *How to do research: The complete guide to designing and managing research projects*. London, UK: Library Association Publishing.
- New Zealand Vice-Chancellors' Committee (2001). *University graduate destinations 2001: report for the year ended 31 December 2000*. Wellington, New Zealand: Datastream Instant Print.
- New Zealand Vice-Chancellors' Committee. (2000). *University graduate destinations 2001: report for the year ended 31 December 1999*. Wellington, New Zealand: Datastream Instant Print.
- Noreen, E., Smith, D., & Mackey, T. (1995). *The theory of constraints and its implication for management accounting*. Great Barrington, MA: North River Press.
- Ogden, E.H. (2007). *Complete your dissertation or thesis in two semesters or less*. Lanham, MD: Rowman & Littlefield.
- Olie, R.L. & Olffen, W.V. (2002). *The essential guide to theses and internship reports in organization studies: Version 1.2*.
<http://www.personeel.unimaas.nl/p.berends/thesis%20information/the%20OS%20thesisguide%20version%201.3.pdf>
- Oliver, P. (2004). *Writing your thesis*. London, UK: Sage.
- Orem, S.L., Binkert, J. & Clancy, A.L. (2007). *Appreciative coaching: A positive process for change*. San Francisco, CA: Jossey-Bass.
- Patrick, F.S. (2001). *Using resistance to change (and the TOC thinking processes) to improve improvements*. Retrieved from www.focusedperformance.com
- Paulin, S., & Dhakal, S.P. (2011). Using appreciative inquiry as a tool for revitalizing community organisations: A case study of WISALTS Inc. *The International Journal of Environmental, Cultural, Economic and Social Sustainability*, 7(4), 299-309.
- Peelle III, H.E. (2006). Appreciative inquiry and creative problem solving in cross-functional teams. *The Journal of Applied Behavioral Science*, 42(4), 447-467.

- Phillips, A. (2004). Supervision and a win-win relationship, *3rd Degree October 2004*, *Journal of Victoria University of Wellington*. Wellington, NZ: Post-Graduate Students' Association, Victoria University of Wellington.
- Phillips, E. & Pugh, D.S. (2005). *How to get a PhD: A handbook for students and their supervisors*. Maidenhead, UK: Open University Press
- Pongsart, G. (2005). *Postgraduate students' constraints in doing a Masters degree thesis*. (Unpublished Master's thesis). Victoria University of Wellington, Wellington, New Zealand.
- Postgraduate exit survey, Adelaide graduate centre, University of Adelaide*. (2004).
<http://www.adelaide.edu.au/graduatecentre/Forms/exitsurvey.pdf> 22/04/2004
- Postgraduate student opinion*. (1993). Retrieved from
<http://www.cpa.ed.ac.uk/bulletinearchive/1993-1994/01/information.html>
- Preskill, H. & Catsambas, T.T. (2006). *Reframing evaluation through appreciative inquiry*. Thousand Oaks, CA: Sage.
- Quinn, R.E. (2004). *Building the bridge as you walk on it: a guide for leading change*. San Francisco, CA: Jossey-Bass.
- Reed, J. (2007). *Appreciative inquiry: Research for change*. Thousand Oaks, CA: Sage.
- Rennie, J.L. (2004). *Quality and the pressure to complete: The experiences of doctoral scholarship holders – A summary*. Retrieved from <http://www.qpr.edu.au>
- Results of the 1993 ASGS dissertation study Report of the ASGS survey of member students asking about problems they experienced in their dissertations*. (1993). Retrieved from
<http://www.asgs.org/Ann1.html> 12/04/2004
- Reynolds, R.A., Woods, R. & Baker, J.D. (2007). *Handbook of electronic surveys and measurements*. Hershey, PA: Idea Group of Reference.
- Ridges, L., William, E., Arthur, E. & Davey, I. (2002). Final plenary panel discussion: Achieving quality and timely completion. *Quality in Postgraduate Research*. Canberra, ACT: University of Canberra.
- Roberts, L.D. (2007). Opportunities and constraints of electronic research. In R.A. Reynolds, R. Woods & J.D. Baker (Eds.), *Handbook of electronic surveys and measurements*. Hershey, PA: Idea Group of Reference.
- Rountree K. & Laing T. (1996). *Writing by degrees: A practical guide to writing theses and research papers*. Auckland, NZ: Addison Wesley Longman NZ.
- Rowland, R. (2000). *The creative guide to research: How to find what you need online or offline*. Franklin Lakes, NJ: Book-Mart Press.

- Roxborough, J. (2004). *Post-graduate research and marking criteria for theses*. Retrieved from <http://roxborough.com/Research/Doctorates.htm>
- Rugg, G. & Petre, M. (2004). *The unwritten rules of PhD research*. Berkshire, UK: Open University Press.
- Russo, J.E., and Schoemaker P.L.H. (1990). *Decision traps*. New York, NY: First Fireside.
- Ryan Y. & Zuber-Skerritt O. (1999). *Supervising postgraduates from non-English speaking backgrounds*. Buckingham, UK: SRHE and Open University Press.
- Salant, P. & Dillman, D.A. (1994). *How to conduct your own survey: Leading professionals give you proven techniques for getting reliable results*. New York, NY: John Wiley & Sons.
- Samraj, B. (2008). A discourse analysis of Master's theses across disciplines with a focus on introduction. *Journal of English for Academic Purposes*, 7, 55-67.
- San Martin, T.L., & Calabrese, R.L. (2011). Empowering at-risk students through appreciative inquiry. *International Journal of Educational Management*, 25(2), 110-123.
- Saunders, M., Lewis, P. & Thornhill A. (2000). *Research methods for business students*. Essex, UK: Pearson Education.
- Saunders, M., Lewis, P. & Thornhill A. (2011). *Research methods for business students*. 5th edition. Essex, UK: Pearson Education.
- Scheinkopf, L.J. (1999). *Thinking for a change: Putting the TOC thinking processes to use*. Boca Raton, FL: CRC Press.
- Scheinkopf, L.J. (2010). Thinking processes including S&T trees. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 729-783). New York, NY: McGraw-Hill.
- School of Social & Cultural Studies (2004). *Getting started on your Master's thesis*. Albany, NZ: School of Social and Cultural Studies Postgraduate Committee, Massey University. Retrieved from <http://ssls.massey.ac.nz/thesisguide.htm>
- Schragenheim, E. (1999). *Management dilemmas: The theory of constraints approach to problem identification and solutions*. Boca Raton, FL: CRC Press LLC.
- Scott, D. (2004). *Retention, completion and progression in tertiary education 2003*. Wellington, NZ: Ministry of Education. Retrieved from <http://www.minedu.govt.nz>.
- Sharp, A., & Howard, K. (1996). *The management of a student research project*. Hants, UK: Gower.
- Shuayb, M., Sharp, C., Judkins M., & Hetherington, M. (2009). *Using appreciative inquiry in educational research: Possibilities and limitations*. National Foundation for

- Educational Research Report*. Retrieved from <http://www.nfer.ac.uk/publications/AEN01/AEN01.pdf>
- Styles, I., & Radloff, A. (2000). Affective reflections: postgraduate students' feelings about their theses. In: M. Kiley & G. Mullins (Eds), *Quality in postgraduate research: Making ends meet. Proceedings of the 2000 Quality in Postgraduate Research Conference* (pp. 203-213). Adelaide University of Adelaide, Advisory Centre for University Education
- Sue, V.M. & Ritter, L.A. (2007). *Conducting online surveys*. Los Angeles, CA: Sage.
- Suerken, K. (2010). TOC for Education. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp. 787-812). New York, NY: McGraw-Hill.
- Techervision (2003). *Research paper: Establish your topic*. Retrieved from <http://www.techervision.com/lesson-plans/lesson-1760.html>
- Thatchenkery, T.J. (2007). *Appreciative inquiry and knowledge management: A social constructionist perspective*. Cheltenham, UK: Edward Elgar Publishing.
- Thatchenkey, T. & Metzker, C. (2006). *Appreciative intelligence: Seeing the mighty oak in the acorn*. San Francisco, CA: Berrett-Koehler Publishers.
- The world unemployment rate*. (2007). Retrieved from <http://www.globalcareernews.com>
- Thomas, E.C. (2007). *Appreciative inquiry: A positive approach to change*. Retrieved from <http://www.ipspr.sc.edu/ejournal/ejournal0611>
- Tracy, B. (2003). *Goals. How to get everything you want – faster than you ever thought possible*. San Francisco, CA: Better-Koehler Publishers.
- Trajkovski, S., Schmied, V., Vickers, M., & Jackson, D. (2013). Implementing the 4D cycle of appreciative inquiry in health care: A methodological review. *Journal of Advanced Nursing*, 69(6), 1224-1234.
- Treffinger, D.J., Isaken, S.G., and Stead-Drval, K.B. (2006). *Creative problem solving: An introduction*. Waco, TX: Prufrock Press.
- Walker, E. (2010). TOC for Education. In J.F. Cox & J. Schleier (Eds.), *Theory of constraints handbook* (pp.13-44). New York, NY: McGraw-Hill.
- Watkins, J.M. & Mohr, B.J. (2001). *Appreciative inquiry: Change at the speed of imagination*. San Francisco, CA: Jossey-Bass/Pfeiffer.
- Watkins, J.M., Mohr, B.J., & Kelly, R. (2001). *Appreciative inquiry: Change at the speed of imagination*. Hoboken, NJ: John Wiley & Sons.

- Watson, K.J., Blackstone, J.H., & Gardiner, S.C. (2007). The evolution of a management philosophy: The theory of constraints. *Journal of Operations Management* 25, 387-402.
- Whitney, D., Cooperrider, D.L., Trosten-Bloom, A. & Kaplin, B.S. (2001). *Encyclopedia of positive questions: Volume one*. Brunswick, OH: Crown Custom Publishing.
- Whitney, D. & Trosten-Bloom, A. (2003). *The power of appreciative inquiry*. San Francisco, CA: Berrett-Koehler Publishers.
- Willoughby, G. & Tosey, P. (2007). Imagine Meadfield: Appreciative inquiry as a process for leading school improvement. *Educational Management Administration and Leadership*, 35, 499-520.
- Yaeger, T.F., Sorensen, P.F. & Bengtsson, U. (2005). Assessment of the state of appreciative inquiry: Past, present, and future. *Research in Organizational Change and Development*, 15, 297-319.
- Yin, R.K. (2009). *Case study research: Design and methods*. Thousand Oaks, CA: Sage.
- Zikmund, W.G. (1991). *Business research methods*. Chicago, IL: Dryden Press.
- Zuber-Skerritt O. (1992). *Action research in higher education: Examples and reflections*. London, UK: Kogan Page.

Appendix A: questionnaire survey

**Title: Theory of Constraints (TOC) and Appreciative Inquiry (AI):
A Comparative Study on their Effectiveness
for Understanding and Improving Master's thesis Students' Performance.**

Dear VUW Master's thesis Students,

Quality and successful completion on time are our common goal in pursuing a Master's thesis. However, according to the report at www.minedu.govt.nz in March 2004 only 40% of students had completed their degree, 9% were still studying towards completion and 51% had left without finishing. Why was the completion rate so extremely low? What were the problems students encountered? What are the key success factors to enhance their performance and success? How can these issues be addressed to help those students complete their degree successfully on time?

Please take 10-15 minutes to contribute your valuable thesis experience to this research project which is part of my PhD thesis (MGMT690) in Management Studies at Victoria Management School (VMS), Victoria University of Wellington (VUW), New Zealand. Your valued input will enable me to discover the core problems and the positive core in completing a Master Degree thesis. I will apply the Theory of Constraints (TOC) and Appreciative Inquiry (AI) to address the major issues found in order to help VUW Master's thesis students improve their performance. The results will be provided if requested. Names of participants will not be used in my report. Only the researcher and the supervisors will have access to the original information obtained.

Your completed questionnaire on this webpage will be treated as your consent to participation. You can view the results of this survey from this website during May - August 2009. Your contribution and support are critical to the success of this research.

Questionnaire

Instruction: please answer questions 1-3 in the provided space.

1. When did you enrol to do a two trimester Master's thesis?

Month: Year:

2. When was your original completion date?

Month: Year:

3. When do you expect to submit your final thesis?

Month: Year:

Instruction: questions 4-20, and 26 please check (X) only one most appropriate choice.

4. At what stage are you in your thesis?

- ☐ Starting
- ☐ Proposal/Literature review
- ☐ Data collection/ analysis
- ☐ Write-up
- ☐ Finishing

5. What was your primary reason for undertaking a thesis?

- ☐ Personal satisfaction
- ☐ To pursue my PhD later
- ☐ Career enhancement
- ☐ Other (specify)

6. What is your gender?

- ☐ Male
- ☐ Female

7. What is your age?

- ☐ 30 or under 30
- ☐ 31-40
- ☐ 41-50
- ☐ 51+

8. Do you live?

- ☐ on your own
- ☐ with friend (s) or flatmate (s)
- ☐ with your spouse or partner
- ☐ with other (specify)

9. Do you have to support any family members while doing a Master's Degree thesis?

- ☐ Yes (specify).....
- ☐ No

10. Are you in paid employment or other job while doing a Master's Degree thesis?

- ☐ Yes
- ☐ No

11. Are you a full-time student? (while doing a Master's Degree thesis)

- ☐ Yes
- ☐ No

12. How many hours per week do you work on your thesis?

- ☐ 10 or less
- ☐ 11-20
- ☐ 21-40
- ☐ 40+

13. Are you on schedule?

- ☐ Yes
- ☐ No

☐ Don't know

14. Do you have a thesis buddy or support group?

☐ Yes

☐ No

15. How are you financing your thesis?

☐ Scholarship/fellowship/grant

☐ Loan

☐ Personal funds

☐ Other (specify).....

16. Rate the suitability of your qualification prior to your enrolment in VUW

Master's Degree as preparation for your thesis:

☐ Very good

☐ Good

☐ Satisfactory

☐ Poor

☐ Very poor

17. Was there any research course work component as preparation for your postgraduate research?

☐ Yes

☐ No

If no, go to question 19

18. If there was a research coursework component please rate the suitability of this coursework as preparation for your postgraduate research.

☐ Very good

☐ Good

☐ Satisfactory

☐ Poor

☐ Very poor

19. How did you select your supervisor?

- ☐ Self
- ☐ By School's recommendation
- ☐ Other (specify)

20. What is your goal in pursuing a Master's Degree thesis?

- ☐ On-time completion
- ☐ Quality thesis
- ☐ Quality and on-time completion thesis
- ☐ Other (specify)

21. What are the 3 most important success factors to achieve your goal identified in question number 20?

- 21.1
- 21.2
- 21.3

22. The following is a list of problems others have encountered when doing their theses. Please check (✓) to indicate the degree of difficulty (very low to very high) that you have encountered for each problem in only one appropriate column or not applicable beside each given answer. Please add any additional problems at the end and indicate the degree of difficulty beside each problem.

Degree of difficulty (from low to high)

Problems encountered in completing theses	Very low	Low	Med	High	Very high	N/A*
A1.Staying motivated for your thesis						
A2.Meeting family obligations						
A3.Meeting job obligations						
A4.Meeting social demands						
A5. Financing your thesis/degree						
A6.Finding time for thesis						

A7.Keeping healthy/fit						
A8.Keeping your deadlines/timeline						
A9.Selecting a topic						
A10.Feeling your study is valuable or worthwhile						
A11.Selecting your supervisor						
A12.Meeting with your supervisor						
A13.Feeling supported/motivated						
A14. Getting supervisor's timely feedback						
A15. Knowing how to get started						
A16.Designing your study						
A17.Gathering info for the literature review						
A18.Organising literature found						
A19.Knowing when to stop reading literature						
A20.Writing the proposal						
A21. Ethical approval						
A22.Writing acceptable English						
A23.Writing the literature review						
A24. Writing the method section						
A25. Finding subjects						
A26. Securing permission to do the study						
A27. Collecting data						
A28.Scoring/coding data						
A29. Using computer for statistical analysis						
A30. Analysing & interpreting data						
Problems encountered in completing theses	Very low	Low	Med	High	Very high	N/A*
A31.Reporting data						
A32. Using the computer for word processing						
A33. Using computer for database organising						

A34. Writing the results section						
A35. Proofreading						
A36. Defending your oral exam						
A37. Other (specify).....						
A38. Other (specify).....						
A39. Other (specify).....						
A40. Other (specify).....						

N/A* = Not Applicable

23. From question number 22, please select the 3 major problems that caused or may cause a delay in your thesis submission.

(23.1). Problem number A....

(23.2). Problem number A....

(23.3). Problem number A....

24. How did you solve the problems in question number 23?

.....

.....

.....

.....

.....

.....

.....

.....

25. What are your 3 major strengths in doing a Master's Degree thesis?

25.1

25.2

25.3

26. Would you like to take advantage of the opportunity to contribute more of your valuable thesis experiences by participating in an interview for this project?

() Yes, I am willing to take part in an individual interview

() No, I am not willing to participate in any interview

If “Yes”, please go to question 27, if “No” go to question 28

27. If your answer is “Yes” to question number 26, please give your contact address (mailing address/e-mail address/telephone number) for further contact. Your contact detail in this regard will be automatically entered to a lucky draw for a gift voucher.

.....
.....
.....
.....

28. If your answer is “No” to question number 26, and you want to enter a lucky draw for a gift voucher please provide your contact detail (mailing address/e-mail address/telephone number) below:

.....
.....
.....
.....

Thank you very much for your valuable time and kind support.

Good luck on your thesis!

Sincerely yours,

Garoon Pongsart

VMS PhD student

The researcher: Garoon Pongsart

Current address: 15A Portland Crescent, Thorndon, Wellington 6011, New Zealand.

Office: Room 102, The Rutherford Building (1st Floor), Telephone#+64-4-4635233 ext.8912,
Mobile phone#021-1503439 e-mail address: Garoon.Pongsart@vuw.ac.nz

Supervisors:

(1) A/P Dr. Victoria Mabin, Associate Dean Teaching and Learning, Faculty of Commerce and Administration (FCA).

Current address: RH1203, 12th floor, Rutherford House, The Faculty of Commerce and Administration, Victoria University of Wellington, Wellington, New Zealand.

Telephone number+64-4-4635140(DDI) 5140(EXT), Fax number+64-4-463-5253,

E-mail address: Vicky.Mabin@vuw.ac.nz

(2) Dr. Deborah Laurs, Senior Learning Advisor

Current address: Student Learning Support Service, Level 0, Kirk Wing, Hunter Courtyard, Kelburn Campus, Victoria University of Wellington.

Telephone number +64-4-4635908, Fax number +64-4-463-5400,

E-mail address: deborah.laurs@vuw.ac.nz