

WHAKATIPU IWI NUI: GROWING GREAT PEOPLE.

Māra Kai and Service-Learning – an evaluation of a culturally responsive approach to teaching in an English-medium mainstream school in Aotearoa New Zealand.

Tina-Maree Swann

A thesis submitted in partial fulfilment of the requirements for
the degree of Master of Applied Practice

Unitec Institute of Technology, 2019

ACKNOWLEDGEMENTS

The completion of a thesis is not an easy undertaking and the time involved to do so is much greater than I had anticipated. However, I was fortunate to be supported by many and only through their support have I completed it.

I would like to acknowledge the leadership team at my school for allowing and supporting me to complete research in the school. Even more so, I would like to thank my colleagues and the students for their ongoing encouragement and support. In particular I truly thank the participants, tutors, kaumātua, whānau and local businesses involved in the study for their time, honesty and willingness to be part of the study project and research process.

Acknowledgement is graciously made to the expertise, encouragement and support provided by my Unitec Institute of Technology supervisors, Dr. Jo Mane and Dr. Lisa Maurice-Takerei. Their feedback and guidance challenged and motivated me to progress and their professional but understanding manner provided encouragement and reassurance.

I would like to thank TeachNZ for funding my research, which provided me with the opportunity to dedicate my time fully to the initial stages of the research process, and to the school's Board of Trustees for supporting my application. In reference to this, I would also like to thank my school Principal for providing advice and encouragement in my application to TeachNZ and during the research process.

Finally, my heartfelt thanks and gratitude to my family and friends, particularly my husband and children, for the support and encouragement they provided me to complete this journey. Without their understanding and tolerance this kaupapa would have been so much harder and may never have seen the light of day.

Nga mihi kore mimiti mai toku ngakau kia koe mo to aroha me to kaha ki te tautoko i au. Ki te kore, kaore au e taea te whakatutuki pai ai i tenei kaupapa.

KARAKIA TIMATANGA

Nau mai e ngā hua	<i>Welcome the gifts of food</i>
o te wao	<i>from the sacred forests</i>
o te ngakina	<i>from the cultivated gardens</i>
o te wai tai	<i>from the sea</i>
o te wai Māori	<i>from the fresh waters</i>
Nā Tane	<i>The food of Tane</i>
Nā Rongo	<i>of Rongo</i>
Nā Tangaroa	<i>of Tangaroa</i>
Nā Maru	<i>of Maru</i>
Ko Ranginui e tū iho nei	<i>I acknowledge Ranginui who is above me,</i>
Ko Papatūānuku e takoto nei	<i>Papatūānuku who lies beneath me</i>
Tuturu whakamaua	<i>Let this be my commitment to all!</i>
Kia tina! TINA! Hui e! TĀIKI E!	<i>Draw together! Affirm!</i>

ABSTRACT

This thesis presents a qualitative study on the value of māra kai as a vehicle for culturally responsive service-learning at a provincial intermediate school in Aotearoa New Zealand. Connections are made between gardening, service learning, Te Ao Maori and the development of skills and knowledge within and beyond the curriculum. Students' perspectives of their learning experience form the basis of the data gathered and contribute to the findings which detail the value of māra kai as an opportunity to develop significant and meaningful learning experiences.

PREFACE

Ko Matawhaura te maunga,
Ko Rotoiti-kite-a- Īhenga te roto,
Ko Ngāti Pīkiao te iwi,
Ko Tapuaeharuru toku marae.

Heoi ano, i te nuinga o te wa i noho au i raro i te māru o Hikurangi maunga me nga tahataha o te awa o Tapuaeroa e rere awa.

This study represents in many ways my own journey. The study was a pathway to exploring and understanding my work as a Māori woman in education, Mother, Auntie, Grandmother, Wife and worker of the land. It has been a way to make sense of my own path, multiple identities, career and life choices. This study has been an opportunity to take some time, consider my own place and develop my thinking in an educational and personal domain. It brings together my work and my world and so has allowed the growth of many thoughts. This thesis represents a small portion of a wide exploration of thoughts, developments, ponderings and meanderings.

This has been a personal journey as well as an intellectual pursuit.

Table of Contents

CHAPTER ONE: INTRODUCTION	1
1.1 The Study	1
1.2 Inequities in New Zealand Education	2
1.3 Kaupapa Māori in Education	4
1.4 Cultural Responsiveness	4
1.5 Technology Curriculum and Gardens in Schools	Error! Bookmark not defined.
1.6 Key Competencies and Student Agency	5
1.7 Affective and Emotional Development.....	Error! Bookmark not defined.
1.8 Service-Learning as a Vehicle for Collective Practice	6
1.8.1 Mara Kai: Maori Food Gardens.....	7
1.9 Educational Setting.....	7
1.10 Context	8
1.11 Researcher Declaration	9
1.12 The Project	10
1.13 Research Aims and Questions.....	12
1.13.1 Research Questions	13
1.14 Rationale	13
1.14.1 Rationale for Incorporating Kaupapa Māori in English-medium Schools	14
1.15 Thesis Outline.....	17
CHAPTER TWO: LITERATURE REVIEW.....	18
2.1 Introduction.....	18
2.2 Challenges for Education in Aotearoa New Zealand	20
2.2.1 Equity	22
2.2.2 Diversity.....	22
2.2.3 Future-oriented learning.....	Error! Bookmark not defined.
2.3 Potential Pedagogical Responses to Educational Challenges.....	25
2.3.1 Cultural Responsiveness	25
2.3.2 Ka Hikitia	26
2.3.3 Key Competencies.....	30
2.3.4 Student Agency: Student-Centred Learning.....	31
2.3.5 Experiential Learning	33
2.4 Gardening in schools	34
2.4.1 Gardening as a Context for Technology Education.....	Error! Bookmark not defined.

2.5	Māra kai.....	36
2.5.1	Taonga tuku iho associated with māra kai	39
2.5.2	Contemporary māra kai in the community.....	45
2.6	Service-Learning.....	46
2.6.1	Roots and theoretical beginnings	46
2.6.2	Defining the essence of service-learning.....	47
2.6.3	The pedagogy and practice of service-learning.....	48
2.6.4	Types of service.....	49
2.6.5	The value of service-learning in education	50
2.6.6	Service-learning as a culturally responsive pedagogy.....	52
2.6.7	Chapter Summary.....	53
CHAPTER THREE: METHODOLOGY		56
3.1	Introduction	56
3.1.1	Research Project	56
3.1.2	Aims and Research Questions.....	56
3.2	Theoretical paradigm	57
3.2.1	Ontology	57
3.2.2	Epistemology	58
3.2.3	Insider Status.....	59
3.3	Research approach.....	60
3.3.1	Kaupapa Maori Approach	60
3.3.2	Defining Kaupapa Māori Research in this Study	60
3.3.3	Justification for a Kaupapa Māori Approach in this Research.....	61
3.4	Practitioner Research	62
3.4.1	Practitioner Research in Education	62
3.4.2	Justification for Practitioner Research	63
3.4.3	Critique of Practitioner Research	64
3.5	Description of Participants	65
3.6	Ethical Considerations	65
3.6.1	Kaupapa Māori research ethics	66
3.7	Data Gathering and Analysis	70
3.7.1	Interpretive Approach to Data	71
3.8	Data Collection Methods.....	72
3.8.1	Questionnaire	72
3.8.2	Focus	Groups
	75	
3.10	Personal Communications	77
3.11	Analysis approach.....	78

3.11.1	The Delphi Technique.....	78
3.11.2	Identifying Themes	78
3.11.3	Organising the Themes.....	79
3.12	Validity	80
3.12.1	Empathetic Validity in Practitioner Research.....	80
3.13	Trustworthiness	81
CHAPTER FOUR: FINDINGS AND ANALYSIS		83
4.1	Introduction	83
4.1.1	Research Questions	83
4.2	Key themes.....	84
4.2.1	Aspects attributable to the nature of the project	85
4.2.2	Real-life Learning.....	85
4.2.3	Active Learning	86
4.2.4	Having Fun and Wider Engagement	87
4.2.5	Creativity.....	88
4.2.6	Autonomy through responsibility	88
4.2.7	Empowerment.....	89
4.2.8	Leadership and Mana	89
4.2.9	Engaging with Complexity.....	90
4.2.10	Taonga Tuku Iho.....	90
4.2.11	Māra Kai	91
4.2.12	Wairuatanga	92
4.2.13	Maramataka.....	92
4.2.14	Summary of aspects attributable to the nature of the project.....	93
4.3	Collaborative aspects fostered by the project.....	95
4.3.1	Whakawhanaungatanga - Building Relationships	95
4.3.2	Manaakitanga - Inclusiveness - Belonging	96
4.3.3	Community Connections through Service-Learning	98
4.3.4	Teamwork.....	100
4.3.5	Ako - Reciprocal Learning.....	102
4.3.6	Tuakana-Teina Relationships	103
4.3.7	Summary of collaborative aspects fostered by the project.....	104
4.4	Knowledge and skills-based learning by students fostered by the project	107
4.4.1	Communication Skills.....	107
4.4.2	Thinking Skills.....	108
4.4.3	Horticultural Skills	108
4.4.4	Different Way of Learning	109

4.4.5	Inter-Disciplinary Learnings.....	111
4.4.6	Summary of Knowledge and Skills-based Learning	112
4.5	Attitudes and value-based learning on students fostered by the project.....	116
4.5.1	Confidence - Self-esteem - Positive attitude	116
4.5.2	Thinking of Others - Empathy	117
4.5.3	Doing Good for Others and Leaving a Legacy	118
4.5.4	Generosity of Spirit - Manaakitanga	119
4.5.5	Responsibility - Self-Management – Doing a job well.....	120
4.5.6	Perseverance - Resilience	121
4.5.7	Potential influence on higher learning pathways and career choice	122
4.5.8	Summary of Attitudes and Value-based Learning of Participants.....	123
CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS		127
5.1	Introduction	127
5.1.1	Authentic learning through direct experience	127
5.1.2	Transformative learning through student agency	130
5.1.3	The power of collaboration to extend student's capabilities.....	133
5.1.4	Service-Learning, community connections and reciprocity	134
5.1.5	Cultural inclusiveness and engagement with learning	138
5.1.6	Attitudes and value-based learning due to participation in the project.....	141
5.2	Conclusions	142
5.3	Limitations	142
References		147
Appendices		
Appendix A: Māra Kai Resource		7.i
Appendix B: Research Project Information Sheet.....		
Appendix C: Consent form		
Appendix D: Questionnaire		
Appendix E: Focus Group Questions		

Table of Figures.

Figure 1.	First blank canvas outside Technology block.	10
Figure 2.	Second blank canvas between Staffroom and Administration block.	11
Figure 3.	The third blank canvas. Remembrance Garden Courtyard in progress.	11
Figure 4.	The fourth blank canvas. Local business and whānau establishing infrastructure for community garden. The climbing frame is to be transformed into a propagation house.....	12
Figure 5.	Snack time during offsite learning session at the tertiary campus gardens.....	55
Figure 6.	Students posing and pondering.....	55
Figure 7.	Working together is faster and easier.....	81
Figure 8.	An example of collaboration and 'many hands make light work'.	82

Figure 9. Having fun potting on their tomatoes.	94
Figure 10. Digging out the pathways and painting the planter boxes.	106
Figure 11. Teamwork in action.	106
Figure 12. Students' recipe for their compost.	113
Figure 13. Preparing the pathways for paving.	114
Figure 14. Working together to lay the paving stones.	114
Figure 15. The Remembrance Garden Courtyard in progress.	115
Figure 16. Stage 1 of Remembrance Garden completed.	115
Figure 17. Lining the planters with weed-mat in preparation for planting.	125
Figure 18. Planted out with a mix of flowers and vegetables.	125
Figure 19. Same planter from a different angle, also shows the old school desks re-purposed as outdoor tables.	126
Figure 20. The same planter, shows the chair students designed and built into the other side.	126
Figure 21. One of the three raised gardens built in collaboration with the wider community.	128
Figure 22. Students planting out the triangle garden after filling it with their compost.	129
Figure 23. Several weeks later...Voila!	129
Figure 24. Initial plans for Remembrance Garden Courtyard. Shows measurements and existing infrastructures.	132
Figure 25. Conceptual plans for Remembrance Garden Courtyard.	132
Figure 26. Students' computer generated conceptual design plan for their community	136
Figure 27. The early stages of the community garden showing the compost making bins and the worm bath.	137
Figure 28. The other side of the community garden showing the old shed that will be turned into a chicken coop and feijoa trees planted along the fence.	137
Figure 29. Karakia before work.	140
Figure 30. Whanaungatanga – brothers and sisters in gardening - from different mothers and fathers.	141
Figure 31. Student made garden sign – “We are all different flowers from the same garden”.	145
Figure 32. Just chilling out in the gardens during an off-site visit to tertiary campus.	146

1 CHAPTER ONE: INTRODUCTION

This chapter first provides an overview of the research and unpacks some of the key ideas that provided a basis for my thinking in this study. In particular the chapter presents a brief overview of challenges in New Zealand education for Māori, and the benefits of māra kai and service-learning as a way to reconsider these challenges. The chapter goes on to outline the context for this particular study, including an outline of the school setting, the project; a rationale for the key focus, research aims and questions. Finally, this chapter outlines the shape of the thesis and provides brief chapter outlines.

1.1 The Study

This qualitative study was undertaken using a Kaupapa Māori approach to Practitioner research. The purpose of this research was to explore the deeper learning opportunities presented during the Whakatipu Iwi Nui project. An important aspect of this study is that it listens to and includes the voices of the 10-13 year old participants. I hoped their perspectives would offer unique insights into the outcomes of this research regarding māra kai or traditional Māori food gardens as a culturally responsive approach to teaching and learning in an English-medium mainstream school.

The primary motivations that influenced the direction of this research included the desire to incorporate mātauranga Māori in this English-medium mainstream school in a way that was authentic and purposeful. Secondly, anecdotally in my experience as a food technology teacher, students showed a disconnection in regard to the source of their food. Overarching this research is the intention to contribute toward school improvement. In this regard, the study directly references the school's strategic plan for student well-being and positive engagement with the wider community. The school's vision statement, 'Growing Great People - Whakatipu Iwi Nui' is used in the title of this thesis to highlight the relationship between the study and the aspirations of the school to recognise, acknowledge and value the unique position Māori have within Aotearoa New Zealand.

The pedagogical approach known as 'Service-Learning' was incorporated to acknowledge, consolidate and build on students' prior learning developed during the school's recent studies

around conflict and war, ANZAC day commemorations and the concept of 'service'. In this regard, service-learning provided students and staff with a recognised concept base from which bridges could be built between familiar learning and new teachings from Te Ao Māori (the Māori world). Wolpert-Gawron (2016) assert that service-learning offers a teaching model which, its best, is about connecting students to their community in ways that show a shared sense of purpose and enhance students' group, organisational and interpersonal skills (Delgado, 2006).

Education at its most fundamental level, according to Tearney (2016), is about growing talent so that people can live happy and rewarding lives. Moreover, Packer & Goicoechea (2010) contend schools are in a position to positively influence the kind of person a child becomes. Packer & Goicoechea (2010) argue, when learning interacts with the cultural heritage of students education has the potential to overcome cultural estrangement, misunderstanding and division. This research espouses principles of equality, diversity, authentic experience, collaboration, interdependence and collective practice through the integration of Māori knowledge and practices related to gardening in an English-medium mainstream school.

1.2 Inequities in New Zealand Education

Scholars in the field of education in Aotearoa New Zealand note an historic systemic failure for Māori students in mainstream schools (Bishop, 2003; 2008; 2010; 2012; Bishop & Berryman, 2006; Bishop, Berryman, Cavanagh, & Teddy, 2008; Bolstad, Gilbert, McDowall, Bull, Boyd, & Hipkins, 2012; Smith, 1997). The Ministry of Education (2015) itself agrees that there is much room for improvement in how well the education system performs for particular groups of students, including Māori. Moreover, as Bishop (2003) contends, the negative impact of educational inequities for many Māori students, their whānau, and the wider community are significant.

Snook & O'Neill (2014) assert that recent education policies and proposals issued from the government have led to a renewal of long-standing debates about the extent to which Māori student failure is related to the failure of the Aotearoa New Zealand education system to cater for Māori. The Education Review Office (2010) has been asking schools questions regarding Māori student achievement for over a decade, and has made many recommendations to improve practice in individual school reports. Over this time, the Education Review Office has found that while many Māori students have been successful in education, national and

international testing data continues to show significant disparity between the achievement of Māori and non-Māori students. In addition, they have published five national evaluation reports on this topic since 2001 which have identified system-wide issues and recommended steps to be taken by schools and the Ministry of Education to promote success for Māori in education (Education Review Office, 2010).

1.3 Ka Hikitia

Our ambition for Māori youth, states Reti (2012), is for them to be resilient individuals who can stand in both worlds: strong in their cultural identity within Te Ao Māori - old and new, past and present, and, competent in Te Ao Pākehā - the Western world. This aspiration was stimulated by the government's education strategy, *Ka Hikitia: Managing for Success 2008-2012* (Ministry of Education, 2008), which focused on improving the performance of the education system for Māori.

The commitment from the Ministry of Education to raise the achievement of Māori learners is mirrored in *Me Kōrero - Let's Talk* (Ministry of Education, 2012). This document provides an outline of the Ministry's refreshed Māori education strategy - *Ka Hikitia: Accelerating Success 2013-2017* (Ministry of Education, 2013). It explains that the vision of "Māori enjoying and achieving education success as Māori" has been carried forward from the preceding strategy, and how the Ministry aims "to make a greater and faster difference for and with Māori learners over the next five years and beyond" (Ministry of Education, 2012, p. 3). As well as explaining what the strategy is about, providing the current data, the government's priorities and how progress will be measured the Ministry has also used this document as a means of inviting readers to share their ideas about "what works well for Māori learners so that they are able to enjoy and achieve education success and be proud and happy being who they are as Māori" (Ministry of Education, 2012, p. 30). My response to this invitation forms the basis of this thesis.

Many researchers suggest further research that gathers the voices of young Maori is needed as another way forward in terms of addressing some areas of inequity (Bishop, 2008; 2010; 2015; Bishop and Berryman, 2006; Smith, 1997). This study represents a commitment to teaching students the 'how's and whys' of growing their own food, and an opportunity to consider an alternative teaching approach within a mainstream education programme that

may align well with the Ka Hikitia strategy by connecting learning to the community, and the Māori culture that sits with the land and characterises a large proportion of the wider community that this school resides within.

1.4 Kaupapa Māori in Education

In education, Graham Smith (1997) describes Kaupapa Māori as a way of countering negative theories, like deficit theory and self-esteem theory, by encapsulating and validating Māori desires to affirm their cultural philosophies and practices (Pihama, Cram and Walker, 2002). These desires, according to Pihama, et al (2002), have rarely been recognized by the Western mainstream education system which, she contends, has traditionally sought to 'civilize,' 'assimilate,' and 'integrate' Māori. In light of this, it is understandable that early works by Bishop (1996) and Smith (1997) proposed that Kaupapa Māori, as a resistance and reconstruction strategy, is best undertaken outside of the Eurocentric English-medium education system. It was from this thinking that Kura Kaupapa Māori, mainstream Māori-medium schools, were developed.

However, as Mane (2009) contends, Kaupapa Māori is not only about theorising for the reconstruction of a Māori world but that it is also directly related to the practical development of sustainable interventions for whānau Māori. Supporting literature highlights the importance of consistently re-asserting Kaupapa Māori within the context of Māori communities, including those in English-medium schools, and to consider Māori understandings as the heart of the process of research and analysis (Eketone, 2008; Mane, 2009; Pihama, 2010; Smith, 2006).

1.5 Cultural Responsiveness

According to the Education Review Office (2010), in order for Māori to achieve greater success in education it is crucial that all educators in New Zealand recognise, support and develop the inherent capabilities and skills that Māori students bring to their learning.

This is particularly important given the argument put forward by Tuuta, Bradnam, Hynds, Higgins and Broughton (2004) that currently accepted standards of achievement in education do not adequately reflect achievement in Māori terms. In fact, Mazarno, Waters and McNulty (2005) argue that most educational innovations do not address the existing framework of perception and belief paradigms but rather assume “that innovation is assimilated into existing beliefs and perceptions” (p, 162). They suggest reforms that are more likely to succeed are those that are fundamentally ontological in nature and provide participants with an experience of their paradigms as constructed realities (Mazarno, et al., 2005, p. 162). This research project explores Mazarno, et al’s. (2005) suggestion by reframing the context of gardening in schools and grounding it in māra kai or the traditional Māori worldview of food gardens.

The literature reviewed suggests māra kai is an appropriate context that can allow the Māori language, knowledge, culture and values to be normalised, validated, and legitimised (Te Waka Kai Ora, 2010; Moon, 2005; Royal, 2003). It is hoped that by grounding the teaching and learning from the ontological paradigms of traditional Māori gardening and relating them to familiar concepts in service-learning (Sigmon, 1979; Skogh & de Vries, 2013; Sleeter, 2011), and the key competencies in the New Zealand curriculum document (Ministry of Education, 2007), students and staff will gain a greater awareness, understanding and empathy with Māori ways of knowing and being (Marsden, 1992; Mead, 2003; Moon, 2005; Royal, 2003; Tāwhai, 2013; Te Waka Kai Ora, 2010),).

1.6 Key Competencies and Student Agency

Key competencies, sometimes also referred to as ‘soft skills’, are the personal attributes that enable someone to interact effectively and harmoniously with other people. According to Robles (2012), they include character traits, attitudes, and behaviours - the intangible, nontechnical, personality specific skills that determine one’s strengths as a leader, facilitator, mediator, and negotiator— rather than technical aptitude or knowledge (p. 457).

The five key competencies the Ministry of Education (2007) deem important for developing independent, lifelong learning skills are: 1) using language symbols and text; 2) thinking; 3) relating to others; 4) participating and contributing, and; 5) managing self (p. 12). These competencies are about developing the dispositions and sense of agency that empowers the

individual, to better understand and negotiate the perspectives and values of others in order to contribute towards a more productive and inclusive society (Ministry of Education, 2007, p. 12). As a vehicle for enacting the New Zealand Curriculum vision (2007, p.8) they provide a rationale for continuous improvement with a major focus on change, flexibility and education for the future.

A range of studies associate learner agency within the dispositions that are embedded in these key competencies (Carr, 2004; Hipkins, 2010; Hipkins & Boyd, 2011). Student agency is about shifting the ownership of learning from teachers to students, enabling students to have the understanding, ability, and opportunity to be part of the learning design and to take action to intervene in the learning process to affect outcomes and become powerful lifelong learners. As agentic learners, students use and strengthen key competencies (Charteris, 2015).

The key competencies also provide a link between technology, gardens in schools and culturally responsive approaches in mainstream teaching. As suggested by Skogh and de Vries (2013) Swedish researchers in the field of technology education, competence development is an outlook or approach to education and life that needs to be fostered not only at the individual level, but in collaborative environments as well.

1.7 Service-Learning as a Vehicle for Collective Practice

In essence, service-learning can be defined as a way of teaching and learning that benefits not only the students but the surrounding community as well (Spallino, 2017). She says it works by teaching concepts in the classroom, which can be applied within that community and, as a result, is mutually beneficial to everyone involved (ibid).

Spallino (2017) also states that service-learning requires students to not only apply their learning to real life scenarios, but to also reflect on their learning in order to learn more deeply about the real life practice of critical concepts such as empathy, social justice and trustworthiness. Mazarno, et al (2005) asserts the importance of providing participants with “an experience of their paradigms as constructed realities and an experience of consciousness other than the ‘I’ embedded in their paradigms (p, 162).

1.8 Mara Kai: Maori Food Gardens

Māra kai or māhinga kai are both terminologies used to describe Māori food gardens and gardening depending on differing iwi (tribes) dialects. Māra which literally means ‘below the ground’ and kai, the Māori word for food, translates māra kai as ‘food from the ground’. Māhinga means ‘garden, cultivation, or food-gathering place’. This thesis mostly uses the term māra kai. However, māhinga or māhinga kai is also used in reference to Māori gardening.

Māra kai is not new, it's a re-discovering of traditional approaches applied in a contemporary context which, as a sustainable intervention for whānau Māori, aims to get people to grow food. Much of the tikanga associated with gardening is founded upon accumulated knowledge which stems from observations of cause and effect (Mead, 2003). As many authors explain (Marsden, 1993; Mātāmua, 2017; Mead, 2003; Moon, 2005; Royal, 2003; Tāwhai, 2013; Te Waka Kai Ora, 2010), this is done through observation of the natural environment, celestial occurrences and wildlife behaviour. A full description of the tikanga and mātauranga Māori associated with māra kai used in this project is provided as a separate resource which can be viewed in Appendix A.

In terms of the project outlined in this thesis, māra kai presents a way to link key horticultural skills with the New Zealand Curriculum, key competencies, service-learning and traditional Māori knowledge and practices.

1.9 Educational Setting

The school in which this project took place is an English-medium state funded intermediate school situated in the central business district of a provincial city in Aotearoa New Zealand. The government decile rating of 3 (10 being the highest) reflects the relatively low socio-economic neighbourhood it draws its student body from. The population of the school is 50% Māori, 4% make up a small immigrant group from many countries in the Americas, Australia, Asia, Africa, Europe and the Pacific Islands, while the remaining 44% identify as Aotearoa New Zealand Europeans (Pākehā). The school has an average roll of 600 students aged ten to thirteen across Years 7 and 8; all classes comprise a mix of both year groups.

The region in which the study school is situated has the highest proportion of Māori whānau in Aotearoa New Zealand (Statistics New Zealand, 2013); fifty percent of the students enrolled at the study school identify as Māori (Ministry of Education, 2017), and; fifty percent of the participants self-identify as Māori.

1.10 Context

As with any practitioner research project, one of the key goals of the study is to contribute to the improvement of school life therefore links between the study and the school's guiding principles are also made. Aspects of this project that link to the school's guiding principles, include the study's participatory and collaborative nature, service-learning, key competencies and the incorporation of Te Ao Māori. These principles and the link to associated aspects of the project (in brackets) are outlined are to:

Put students welfare and learning at the centre of all our decisions (Student Agency)
Build relationships with our school whānau and community (Service-Learning)
Prepare students with core skills and values (Key Competencies)
Respect our social, cultural and physical environment (Te Ao Māori)

Here in Aotearoa New Zealand, the Education Review Office is the governmental department charged with evaluating and reporting on the quality of education and care provided in early childhood services and schools. This school's latest Education Review Office report (2016) notes their vision of 'Growing Great People: Te Whakatipu Iwi Nui', underpins all aspects of school life and operations. The report states that there is a genuine learning culture based around the schools values of respect, integrity, self-management and excellence (R.I.S.E) through the promotion of innovative teaching and learning initiatives (Education Review Office, 2016).

However, within the school Māori student achievement overall has yet to be raised to the level of other students in the school (Education Review Office, 2016). This project seeks to address some of this inequity. Recommendations from the ERO report highlight the importance of revisiting and enhancing expectations for effective teaching practices that support accelerated outcomes for students through culturally-responsive teaching practices (Education Review

Office, 2016). The report specifically identifies the need for the explicit inclusion of Te Ao Māori and bicultural practices throughout the curriculum and all class environments. As it is a goal of this study to contribute to school improvement the project makes direct reference to these recommendations.

The research context referred to in this thesis is also Māori, thus reflecting the cultural identity of both myself as the researcher and those the research concerns.

1.11 Researcher Declaration

I have been told by my kaumātua (tribal elders), that in order to understand where one wants to go, you must first understand where you have come from. Correspondingly, for the reader to understand the position I have in my approach to this study, I would like to briefly outline where I have come from.

Today, I write from the position of a mature woman of Māori and Pākehā descent. I am a mother and grandmother, and have very close relationships with our large extended whānau (wider family group) and members of our hapori whānui (community). I work in the education sector and although originally from a low socioeconomic background I could now be more accurately be described as middle class.

For most of my 24 years in education I have worked in the mainstream primary-education sector as a multidisciplinary classroom teacher of emerging adolescent students. However, since 2013 I took on the specialist role of teaching food and nutrition within the study school's technology department. My interest in using māra kai and service-learning as a pedagogical approach for this project grew from reflections on personal observations of my years as a classroom teacher, but especially from recent observations and experiences in my role as the specialist teacher of food and nutrition at the school this project takes place.

As a Māori teacher undertaking practitioner-research employing Kaupapa Māori methodologies, I declare a possible conflict of interest. I wish to point out that the language, values and teachings of Te Ao Māori (Māori worldview) are very important to me. Even though

I deliberately choose to teach within the English-medium sector, my own children attended Kura Kaupapa Māori (Māori-medium schools).

1.12 The Project

The initial impetus for this project grew from an issue which came to light after the cooking room garden was concreted over during the Ministry of Education's renovations to repair 'leaky building' issues in 2015. Having an interest in children participating in the design of their environments, I approached the fledgling garden club to seek an indication of interest in co-designing a school māra kai. The response was overwhelmingly enthusiastic. The Principal wholeheartedly supported the kaupapa (initiative) but the Property Manager highlighted some significant issues we needed to consider. We quickly realised we would need expert help.



Figure 1. First blank canvas outside Technology block.

Research following ad hoc conversations with the community liaison officer of a local hardware store; a colleague and her brother who was a horticulture tutor at a local tertiary provider, introduced me to the idea of community service and the educational concept of service-learning.



Figure 2. Second blank canvas between Staffroom and Administration block.



Figure 3. The third blank canvas. Remembrance Garden Courtyard in progress.

This project was driven by students' ideas for outdoor learning spaces and their desire to build a food garden for the school community. A systematic approach was taken to enable students to conceptualise their plans to redesign outdoor spaces around the school into garden-based learning landscapes. It was facilitated by myself in collaboration with kaumātua, colleagues and professionals from the wider community. Ongoing momentum was sustained through the development of horticulture extension technology classes and carried out using service-learning pedagogical practices in partnership with kaumātua and experts from the wider

community. Although involved at the inception of the project as both teacher and facilitator, I did not take on the role of researcher until 2017 so this project began long before any thoughts of 'research' was even considered, and has continued to grow beyond the confines of the research period.



Figure 4. The fourth blank canvas. Local business and whānau establishing infrastructure for community garden. The climbing frame is to be transformed into a propagation house.

1.13 Research Aims and Questions

The overarching aim of this research was to explore the opportunities and benefits of deeper learning within and beyond the curriculum through the nexus of interface between Māori practices of māra kai and Western service-learning approaches in English-medium schools.

Underlying the aim of this study were two research goals: First, to gain insights into the students' experiences and perceptions of creating gardens as an opportunity for deeper learning within and beyond the curriculum. Second, to understand how māra kai and service-learning contribute toward a culturally responsive approach to teaching and learning.

Research Questions

The following sub-questions guided the data collection and analysis of this research:

1. What understandings and learnings do the participants attribute to their involvement in the Whakatipu Iwi Nui project?
2. How can māra kai contribute to deeper learning within and beyond the curriculum?
3. How can service-learning within a māra kai context contribute to a culturally responsive approach in an English-medium mainstream intermediate school in Aotearoa New Zealand?

1.14 Rationale

My interest in investigating an alternative teaching approach stems from my reflections on personal observations and experiences during my role as one of the Tech/Arts teachers at this school. I teach Food & Nutrition and my colleagues cover Music, Dance/Drama, Art, and Industrial Tech. I realised that a major portion of instruction within the Tech/Arts department (my own included), while active and purposeful, is often teacher-directed with emphasis primarily on comprehension, procedures and product outcomes. Considering the time restrictions and organisational constraints of these lessons it is understandable why this traditional teaching approach is an effective pedagogy in some technology classes.

A literature search of procedural and instructive teaching methods points out that students taught using these traditional approaches develop a form of static knowledge that is of limited use to them in unfamiliar situations (Bereiter & Scardamalia, 1987; Garner, 1990; Scardamalia & Bereiter, 1991; 2005). Further, a report carried out by the New Zealand Council for Educational Research (NZCER) highlighted the need for new teaching and learning approaches that will help our young people develop the characteristics needed to productively engage in the 21st century world (Bull & Gilbert. 2012).

The 2016 ERO report for the study school acknowledged that teachers “deliver quality programmes with the potential for real-life application outside of our classrooms”. The words, ‘*potential for*’ real-life application stood out and prompted me to rethink what I regarded as ‘real-life application outside of our classrooms’.

It is common knowledge, and not just within the realm of education, that powerful economic and societal forces are creating different criteria for students to achieve success in education and life in general. This report highlighted for me, that while we deliver life skills and academic learnings that *may* be used in real-life applications, are those connections and the transferability of skills taught explicit for the students? Not the type of person to stand still on teaching and learning methods. I asked myself: How could I change ‘*potential for*’ into ‘*implementation in*’ - real life applications? Moreover, what abilities and traits will serve intermediate age students in a world of rapid changes and developments?

While the scope of this study prohibits a comprehensive review of all 21st century competencies, I will endeavour to provide a broad definition of widely recognised competencies relevant to a future-oriented pedagogy.

Rationale for Incorporating Kaupapa Māori in English-medium Schools

Smith (2012) asserts, Kaupapa Māori is literally ‘a Māori way’ of ‘doing and being’ that incorporates Māori thinking and understanding with a central aim of making a difference for Māori. As this research explores the benefits for students’ learning through the nexus of interface between Māori practices within māra kai and Pākehā practices of service-learning in an English-medium state school, some may see this as merely a “browning of the curriculum” (Smith, 2012). In a small way, this research challenges Smith (2012), and the assertion by researchers such as Bishop (1996) and Smith (1997) that Kaupapa Māori is best undertaken outside the Eurocentric English-medium education system.

Underpinning this research is my belief in the importance of incorporating and validating mātauranga Māori for students in the English-medium mainstream education sector. I argue that these students deserve the best of both worlds. This is especially important for those Māori students who may be unsure how, or if, they belong in Te Ao Māori (the Māori world).

However, I also argue the importance for all students in state schools, regardless of ethnicity, to gain an awareness and understanding of the Māori worldview.

Although Kaupapa Māori traditionally challenges and critiques Pākehā hegemony as it is applied in New Zealand education, Smith (2006) explains that this does not mean a rejection or exclusion of Pākehā culture. In support, Irwin (1994) asserts that Kaupapa Māori begins in Te Ao Māori and extends to include Te Ao Pākehā. Similarly, Pihama (2010) points out that a Kaupapa Māori approach does not have to be a one-or-the-other choice, it is about positioning oneself and taking on an indigenous world view that prioritises Māori values. This thinking aligns with Mahuika, Berryman and Bishop's (2011) assertion that when the notion of culture is central to teaching and learning, an environment is created that reinforces for Maori students that their cultural identity, knowledge and practices are acceptable, valued and accepted.

Linda Tuhiwai-Smith (1999) refers to this as “retrieving space” for Māori “ways of knowing being” (p. 183). Retrieving space, according to Moewaka-Barnes (2000) is about including Te Ao Maori as a ‘normal’ part of learning. Bishop (2003) points to the need for this ‘space’ to also be included within the English-medium education sector. Indeed, as Kaupapa Māori educationalist, Tangiwai Rewi (2011) contends, the practice of teaching Māori students in English-medium state schools should inherently, and explicitly, include experiences and mātauranga Māori (Māori knowledge) that reflect a Māori worldview.

This is especially relevant in light of recent statistics which show ninety percent of Māori in primary and secondary education attend English-medium schools (Ministry of Education, 2018). Furthermore, incorporating and validating taonga tuku iho (cultural heritage) and mātauranga Māori in English-medium mainstream schools is vital to realising the *Ka Hikitia* (Ministry of Education, 2008) vision of Māori achieving and enjoying academic success as Māori within all state sector schools. Additionally, Bolton (2017) presses for urgency to ensure the country's education system works for these learners because current population projections show that Māori and Pasifika children will make up the majority of English-medium primary school students by 2040.

However, just having access to this knowledge on its own is insufficient because, as Heron and Reason (1997) state, “to truly experience a world, one has to participate in it” (p.3). Coe

(1999) argues that really worthwhile evidence comes from trying something out in an authentic learning situation and testing to see whether it has had the desired effect.

Eketone (2008) and Mane (2009) both discuss the importance of Māori understanding and knowledge building not being located solely within Māori academia. As Mane (2009) contends, Māori knowledge building should also come from community voices where the Māori way of living is 'intrinsic' and 'everyday'. Pere and Barnes (2009) also argue that there should be specific aims and objectives in Māori research that are directed at helping people in their daily lives. Jackson (1987, p. 41) aptly describes this attitude as one that 'seeks not merely to describe, but to seek out seeds of understanding that make for better relationships among communities' (cited in Pere & Barnes, 2009, p. 6).

As Pere and Barnes (2009) point out, the Māori attitude toward knowledge acquisition is essentially holistic. The abstract value concepts inherent in Kaupapa Māori such as: whānaungatanga (relationship building); manaakitanga (hospitality and generosity); aroha (caring and mutual respect); ako (reciprocity); mana (empowerment), and; māramatanga (enlightenment), encompass an attitude that promotes benefits for the collective rather than focusing on the individual. These values are not just a set of words, rather they describe a set of actions that can potentially open avenues for beneficial teachings and learnings.

Kaupapa Māori has been deliberately chosen as the appropriate theoretical paradigm and methodology for this research because it accepts and validates the integrity and potential within Te Ao Māori to add valuable knowledge and build positive relationships. In keeping with Moewaka-Barnes (2000) suggestion stated earlier, this research project is an attempt to retrieve 'space' to validate and 'normalise' a Māori worldview through gardening, in the Eurocentric environment of the study school.

This study allows me to explore the possible benefits of merging aspects of the Western pedagogy of service-learning within traditional Māori practices. Incorporating service-learning recognised existing knowledge and provided a scaffold for new teachings and to make relevant links between concepts and principles embedded within both ontological and epistemological perspectives. Drawing attention to the interactive connections and congruence between the values and principles of Kaupapa Māori and Service-Learning, it is hoped this research provides an example of a culturally responsive approach that encourages student agency and contributes towards deeper learning for all participants.

1.15 Thesis Outline

Chapter One: Introduction

In Chapter One, I provided an overview of the study and unpack some of the key ideas that provided a basis for my thinking in this study. The context for this particular study is outlined, including the school setting and project. I have also declared my position as the researcher and explained the rationale for the research, set out the research aims and questions, and concluded with an outline of the thesis.

Chapter Two: Literature Review

In the literature review, I review the literature relevant to the key topics introduced in Chapter One. I critically explore literature relating to challenges in New Zealand education, gardening in schools, māra kai and service-learning.

Chapter Three: Methodology

In Chapter Three, I explain my epistemological and ontological stance and how these relate to Kaupapa Māori and Practitioner research. This chapter also explains why specific data collecting methods were chosen and how validity and ethical issues were addressed.

Chapter Four: Findings and Analysis

Chapter Four presents the findings of the study collated based on the questionnaire, focus group interviews, and researcher notes. The findings are outlined by the key themes that emerged from the data.

Chapter Five: Discussion, Conclusion and Limitations

In Chapter Five, I discuss with reference to the literature, how key findings have led to recommendations that may be considered when implementing a culturally responsive pedagogy in this English-medium mainstream school and the benefits of service-learning. The chapter also includes an outline of the limitations of this study and considerations for further study.

2 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter further unpacks the key topics introduced in chapter one by reviewing the literature regarding challenges in Aotearoa New Zealand education and possible pedagogies that may address these challenges.

In the first section of this chapter, *The New Zealand Curriculum* is outlined to provide a basis from which this review develops.

In the second section, literature associated with some of the challenges in the Aotearoa New Zealand educational environment are outlined. Issues such as: Maori underachievement, equity, diversity and future-focused learning are discussed.

The third section explores literature relating to potential pedagogical practices that may provide a response to these challenges. This section includes discussions on cultural responsiveness, Indigenous teaching and learning orientations, Ka Hikitia and future-focused learning including key competencies, student agency and experiential learning.

Section four provides an overview of gardening in schools and the place food gardens hold as a context for technology education.

Literature relating to gardening in schools and māra kai is reviewed in the fifth section. While a search for literature specifically relating to māra kai in schools was fruitless, literature which explores the relevance of māra kai is reviewed and presented.

The sixth section of this chapter provides an overview of the literature regarding service-learning including literature that tracks the early theoretical underpinnings of this area.

This chapter concludes with a summary of the main points drawn from the literature review.

2.2 The New Zealand Curriculum

The New Zealand Curriculum enables all schools to design their own learning programmes to meet the needs of their communities and students (Ministry of Education, 2007). According to the Ministry of Education (2007) every school's curriculum should be a unique and responsive blueprint of what they and their community consider is important and desirable for students to learn. The vision, values, principles and key competencies of *The New Zealand Curriculum* provide a framework for stakeholders to engage in discussion about the kind of people they want students to be, and the best means to support students to develop their potential (Ministry of Education, 2007). The curriculum principles are expected to be the basis of curriculum decision-making at schools. There are eight principles of *The New Zealand Curriculum* that apply equally to all schools and to every aspect of the curriculum (Ministry of Education, 2007). The eight principles are as follows:

- 1) **High expectations:** The curriculum supports and empowers all students to learn and achieve personal excellence, regardless of their circumstances.
- 2) **Treaty of Waitangi:** The curriculum acknowledges the principles of the Treaty of Waitangi and the bicultural foundations of Aotearoa New Zealand. All students have the opportunity to acquire knowledge of te reo me ōna tikanga.
- 3) **Cultural diversity:** The curriculum reflects New Zealand's cultural diversity and values the histories and traditions of all its people.
- 4) **Inclusion:** The curriculum is non-sexist, non-racist, and non-discriminatory; it ensures that students' identities, languages, abilities and talents are recognised and affirmed, and that their learning needs are addressed.
- 5) **Learning to learn:** The curriculum encourages all students to reflect on their own learning processes and to learn how to learn.
- 6) **Community engagement:** The curriculum has meaning for students, connects with their wider lives, and engages the support of their families, whānau and communities.
- 7) **Coherence:** The curriculum offers all students a broad education that makes links within and across learning areas, provides for coherent transitions, and opens up pathways to future learning.
- 8) **Future focus:** The curriculum encourages students to look to the future by exploring such significant future-focused issues as sustainability, citizenship, enterprise and globalisation. (Ministry of Education, 2007, p. 9).

When the principles are used well the Ministry of Education (2007) states they put students at the centre of teaching and learning by fostering the design of a curriculum that includes, engages and challenges them.

2.3 Challenges for Education in Aotearoa New Zealand

An Education Review Office report (2012) regarding curriculum decision-making in schools states that when the principles of the curriculum are not fully enacted, students do not have the opportunities to experience a broad and deep curriculum that caters for their interests, strengths and learning needs, and promotes their independence, self-responsibility and engagement (Education Review Office, 2012). This report identified that some schools are still confused about the different intent and role of the principles, values and even the key competencies, to improve outcomes for all students. Rather than using the principles as a starting point for curriculum design, the Education Review Office found in many schools, the principles have often been something grafted on retrospectively, if they have been considered at all. It is disappointing that in this evaluation (Education Review Office, 2012) found a greater percentage of schools displayed minimal evidence of the principles in the school curriculum or classrooms than in the previous 2011 report. The Education Review Office also concluded that it is unlikely learners from diverse cultures or those that need additional support will accelerate their progress in schools that are not focused on the principles of *The New Zealand Curriculum* (Education Review Office, 2012).

In this regard, literature identifies a clear disparity in educational achievement between Māori and Pākehā (non- Māori) students in English-medium mainstream schools (Bishop, Berryman, Tiakiwai, & Richardson, 2003; Bolstad, et al., 2012; Provost, 2012; Walker, 2016). Smith (2012) argues that the origins of this achievement gap lie more appropriately within the education system - structured as it was to retain economic and political power within the hegemony of Western Pākehā society. Dr Ranginui Walker's (2016) whakapapa (chronology) of these achievement gaps from the 1930s through to 2003 confirms the disparity as a structurally entrenched artefact of New Zealand's colonial history. According to Bishop et al. (2003), effective measures to address this issue were few and far between and tended to 'deficit theorise'. Deficit theorising, explains Linda Tuhiwai Smith (2012), is effectively a form of blaming the victim. Indeed, early policy initiatives intended to improve services to Māori,

such as; "Ka Awatea" (1991) and "Closing the Gaps" (1999), were later reconsidered because they were seen to reflect deficit thinking (Provost, 2012).

Māori underAchievement

Since the 1970s, Walker (1973) has hypothesised that deficit theorising developed due to the New Zealand education system being conceptualised and delivered through a single cultural frame of reference that was generally ignorant of Māori culture. In fact, Wharehuia Hemara's research into traditional Māori pedagogical practices highlights how education was used as a specific tool to hegemonise Māori through a process of acculturation. As Hemara (2000) states:

“When the Western European education system was introduced to Māori in the early 19th century, its proponents believed they were imparting a ‘divine gift’ to benighted natives who required systemic adjustments to themselves, their culture and their communities. It was implied that mechanisms for entrenching Pākehā domination were mechanisms for freeing their souls and minds.” (p. 80).

While some trends in educational achievement seem to be improving and many Māori students do very well at school, the Office of the Auditor-General's report, *Education for Māori: Context for our proposed audit work until 2017* states that overall our English-medium schools do not support Māori students to achieve as highly as other students; nor do they retain Māori students for as long as other students (Provost, 2012). Furthermore, Provost (2012) asserts that people of indigenous cultures are more likely to experience enduring effects of educational under-achievement as a barrier to progress in life.

As shown, the New Zealand Curriculum acknowledges the principles of the Treaty of Waitangi and the bicultural foundations of Aotearoa New Zealand (Ministry of Education, 2007, p. 9), however, Alton-Lee (2003) reveals that the New Zealand education system performance has been persistently inequitable for Māori learners through: low inclusion of Māori themes and topics in English-medium education; fewer teacher-student interactions; less positive feedback; more negative comments targeted to Māori learners; under-assessment of capability; widespread targeting of Māori learners with ineffective or even counterproductive

teaching strategies (such as the 'learning styles' approach); failure to uphold mana Māori in education; inadvertent teacher racism; peer racism, and; mispronounced names.

It is therefore not surprising that Māori have had a disjunction with the education system that was often contentious. For while Māori were more than willing to adopt some aspects of this foreign system, they were unwilling to change their ways of being or their world views (Hemara, 2000). Furthermore, as Pohatu (2003) asserts, not valuing the potential held within Māori bodies of knowledge and ways of being has had the effect of limiting visions, horizons, and expectations for Māori students. The implication of this is that many Māori students still feel the education system has little relevance to them (Bishop, 2012; Bolton, 2017).

Equity

An equitable education system, states Bolton (2017), is one where all students, regardless of their ethnicity, socioeconomic status, or abilities, can succeed. Hosted by the Ministry of Education to research equity in New Zealand's primary and secondary education system, Axford Fellow Sarah Bolton (Washington, DC) identifies a clear moral imperative exists to better support and engage with Māori communities under the Treaty of Waitangi (Bolton, 2017). In this regard, the New Zealand Curriculum states that *all* [italics added] students [should] have the opportunity to acquire knowledge of te reo Māori me ōna tikanga Māori – the language and cultural practices of Māori (Ministry of Education, 2007, p. 9). In addition, the ninth National Education Goal (NEG 9) encourages increased participation and success by Māori through the advancement of Māori educational initiatives that are consistent with the principles of the Treaty of Waitangi (Ministry of Education, 2004).

A major challenge noted by the Ministry and other sources, according to the Office of the Auditor-General, is how to measure Māori achievement when that requires determining who the Māori students are and what their needs are without focusing on them in deficit-thinking terms (Provost, 2012). Ministry staff, the Education Review Office, and others noted that many teachers and school leaders express discomfort with what they view as "singling out" their Māori students, believing that all students should be "treated the same" (Education Review Office, 2012, p. 12).

None-the-less, according to Bolstad, et al., (2012), achieving equity is not just about addressing the underachievement or disengagement of particular groupings of students and communities and then trying to bring everyone closer to a single normative standard of what counts as success by traditional means. Rather, as Bishop, (2008) argues, equity includes educators creating learning contexts that allow all students to feel valued while providing the tools that will enable them to participate and contribute in the democratic society of Aotearoa New Zealand.

Diversity

The term diversity can be unpacked across many dimensions to include differences in skill level, prior learning experiences and influences of gender, family and culture (Alton-Lee, 2007). In this study diversity refers to the indigenous Māori students of Aotearoa New Zealand and the influences that their culture and heritage bring to the classroom. These influences, integral to the identity of the learner, have not been able to intersect appropriately within traditional Eurocentric mainstream learning contexts. Consequently Māori students have not been well served by the Pākehā dominated curriculum.

Jones (2012) argues that new ideas and critiques need to be developed in the spirit of whanaungatanga - that is, building family-like relationships that demonstrate on-going recognition and respect for others. As Bolstad, et al., (2012) assert, diversity needs to be recognised as a strength, something to be actively fostered and not as a weakness that lowers the system's performance.

Future-focused Learning

The New Zealand Ministry of Education (2007) expects teachers and schools to provide “a curriculum that engages and challenges the students, is forward-looking and inclusive, and affirms New Zealand’s unique identity” (p. 9). However, as the Education Review Office report (2012) Evaluation at a glance: Priority learners in New Zealand schools indicates, there is a lot more work to be done before teacher practice reflects the spirit of reciprocity that fosters students to become the “confident, connected, actively involved, lifelong learners” espoused

by the Ministry of Education (2007, p. 8). For educators to lift their practice and raise the achievement levels of priority learners, particularly Māori students, this report indicates two of the most pressing impediments are:

- 1) To knowledgeably implement a rich and responsive curriculum, and;
- 2) To shift the teaching focus to student-centred learning (Education Review Office, 2012).

New Zealand educational research analyst, Freya Tearney (2016), suggests the primary focus of future-focused education should be on educating to live well within diverse and changing environments. Similarly, when discussing his vision for education in the 21st Century, Emeritus Professor Ivan Snook believes education should pay particular attention to preparing people for life in all its richness: not only as workers, but as parents, spouses, neighbours, community members and participative citizens (Education Aotearoa, 2014, p.25). This 'vision' aligns with Bolstad, et al's., (2012) call for co-shaping education through greater engagement with learners, their whānau/family and local communities. This is much broader than simply teaching skills and imparting knowledge so young people can get jobs, co-shaping the curriculum requires educators to consider and address the needs, strengths, interests and high level educational aspirations of the students, their whānau and the community as a whole (Bolstad, et al., 2012). It also means we need to focus on ways to develop character traits, and teach skills and ethics that align with the challenges and opportunities that may lie ahead.

Therefore, rather than supporting students to passively reproduce existing knowledge or follow a set of instructions, an educator's role in 21st century schooling, as described by Bull & Gilbert (2012), is to support students while they actively interact with knowledge in order to 'do things with it' that help them to understand, critique, manipulate, transform and create new learnings. In doing so, Bolstad, et al., (2012) assert, all students - no matter where they are from or where their learning happens – will have opportunities to develop and succeed, not just in education, but also life in general.

2.4 Potential Pedagogical Responses to Educational Challenges

In response to the challenges outlined in the previous section, this section explores literature relating to cultural responsiveness, Indigenous teaching and learning practices, and Ka Hikitia - the government's educational strategy aimed at accelerating and managing the success of Māori learners more appropriately. The key competencies, student agency and experiential learning are also discussed as possible pedagogical practices that may contribute toward more equitable and future-oriented teaching practices.

According to the Organisation for Economic Cooperation and Development (OECD) (2012) high-performing education systems are those that value diversity and combine equity and inclusiveness in order to provide students with many opportunities to gain a quality education (p. 3).

Cultural Responsiveness

In 1995, Joan Metge argued that an effective pedagogy for Māori students in mainstream schools would be one that was understandable in Māori epistemological terms, addresses the ongoing power imbalances that exists in neo-colonial New Zealand, and creates a context that reorders the relationships between teachers and students in classrooms and mainstream schools (Metge, 1995, p. 190). This is reinforced by Pere and Barnes (2009) in their call for education to clearly articulate the nature of students' culture as it is lived every day. An effective culturally responsive pedagogy, states Pere and Barnes (2009), raises students' expectations of their learning and engages them actively and holistically to consider how they might achieve and enhance these expectations (ibid, p.169). As Russell Bishop (2008) advocates, when the Māori learner's own culture is central to their learning activities, they are able to make meaning of new information and ideas by building on their prior experiences and understandings (p. 168).

The whakatauki (cultural proverb), '*E tipu, e rea*', by Sir Apirana Ngata advised young Māori to seek both the cultural treasures of their ancestors and the technical skills of the Pākehā, which he linked together in the context of a wider allegiance to God, who created all things -

including *both* Māori and Pākehā (Metge, 1976). Thus while Ngata contrasted Māori and Pākehā ways, and stressed the differences, he also saw them as complements capable of integrating into a greater whole. Metge (1976) suggests that embracing Māori and Pākehā knowledge as complementary to each other rather than from the preconceptions which originate in the standards and customs of the dominant culture, can unify society [and schools] through the development of shared understandings. Moreover, multicultural educator Christine Sleeter (2011) asserts, culturally responsive pedagogies can support empowered learning for a wide diversity of students.

However, Gay (2000) contends traditional classroom interaction patterns do not often create learning contexts where the culture of the child can be present. Sleeter (2011) puts forward the view that culturally responsive pedagogies are often [mis]understood in limited and simplistic ways that give an illusion of having made meaningful change - without having done so. She further argues that a teachers' perception of cultural responsiveness often only involves the steps they take to get to know their students, usually without ever leaving the classroom, and through ineffective conceptions of cultural responsiveness practices such as: cultural celebration; trivialisation; essentialising, or; substituting culture for a political analysis of inequalities (Sleeter, 2011, p. 12). As Bishop, Ladwig and Berryman (2014) explain, teachers can unwittingly create negative relationships for Māori students by the very images they hold and the language they use to explain and activate these images.

Just as it is not useful to find fault with the students or their parents, the solution to raising Māori achievement levels will not be found through blaming teachers. An agenda to strengthen culturally responsive pedagogies, asserts Sleeter (2011), should identify the relationships between culture and learning, and connect teaching practice with its impact on students. This type of 'relationship-based' pedagogy, as advocated by Bishop, et al. (2014), consciously places positive relationship-forming practices at the centre of whatever we do in education.

Ka Hikitia

Acknowledging that Māori students do much better when education reflects and values their identity, language and culture, the national strategy for Māori education - *Ka Hikitia* – is intended to guide and measure the provision of quality education for and with Māori students

and their whānau (Ministry of Education, 2008). Deputy Secretary of Māori Education, Apryll Parata states that “legitimising and recognising the distinct learning conditions, whereby Māori students are in control of their learning, requires educators to ensure that their practice is built on strong, respectful, culturally informed and responsive relationships” (Ministry of Education, 2008, p. 9).

The overarching strategic intent of Ka Hikitia, in all its phases, is ‘Māori enjoying and achieving education success as Māori’ (Ministry of Education, 2008). Māori achievement, as asserted by Tuuta, Bradnam, Hynds, Higgins, and Broughton (2004), is seen in terms of one’s knowledge of, and pride in, being Māori. It is whānau based and holistic, and although individual achievement is recognised, the success of the collective is highly valued (Tuuta, et al., 2004). The Ministry of Education (2008) states this will be realised when Māori learners are able to:

- excel and successfully realise their cultural distinctiveness and potential,
- successfully participate in and contribute to te Ao Māori,
- work with others to determine successful learning and education pathways,
- gain the universal skills and knowledge needed to successfully participate in and contribute to Aotearoa New Zealand and the world.

A central focus of Phase One: *Ka Hikitia - Managing for Success 2008-2012*, was on setting directions and building momentum at the systems level, with the primary target audience being the Ministry of Education itself (Ministry of Education, 2008). Phase Two: *Ka Hikitia - Accelerating Success 2013- 2017*, was designed to be relevant and practical, and to support all those who have a role to play in lifting education system performance for all Māori students (Ministry of Education, 2012). It identifies the elements required to support education success for Māori students; guides action to make a significant difference for Māori students in education, and; provides a framework for action by all who have a role to play in raising education system performance for Māori students, including the students themselves, their parents, whānau, hapū, iwi, Māori organisations, communities and businesses (Ministry of Education, 2012). Phase 3 of Ka Hikitia - *Realising Māori Potential 2018-2022*, extends and builds on the preceding phases in order to sustain system-wide change, innovative community, iwi and Māori-led models of education provision, with the end goal being Māori students achieving at least on a par with the total population (Education.govt.nz).

As the Education Review Office (2010) contends, for Māori to achieve greater success in education it is crucial all educators in New Zealand recognise, support and develop the inherent capabilities and skills that Māori students bring to their learning. This requires us, as educators, to modify our practices accordingly.

Indigenous Teaching and Learning Orientations

Indigenous people have ways of ‘viewing’ the world, through the lens of their own philosophical orientation, logics, discourse and practices, which are different to the Eurocentric view perpetuated in mainstream education (Smith, 2012).

Meaning is looked for in everything, especially in the workings of the natural world. As Cajete (2004) explains, all things comprising Nature are viewed as the teachers of mankind. Ritual, mythology, and the art of storytelling combined with the cultivation of relationships to one’s inner self, family, community and natural environment are utilised to help individuals realise their potential for learning and living a complete life (Cajete, 2004). Before Aotearoa New Zealand was colonised, states Hemara (2000), Māori curricula was closely related to the spiritual, intellectual, social and physical well-being of both the individual and the community. Traditionally, tribal elders were revered for their wisdom and considered essential to the teaching of practical and social skills along with esoteric and ethical principles (Cajete, 2004; Hemara, 2000).

Indigenous people place as much focus on learning with the heart as on learning with the mind (Cajete, 2004; Hemara, 2000). According to Cajete (2004), one of the most important elements common to Indigenous teaching and learning revolves around ‘learning how to learn’, with great importance placed on cultivating the capacities of listening, observing and experiencing with all one’s senses in order to develop intuitive understanding. Respect for the time-tested traditions of learning ‘naturally’ forms the basis of the skills used in every process of indigenous teaching and learning (Cajete, 2004).

In keeping with international literature on Indigenous pedagogies, Wharehuia Hemara (2000) describes Māori pedagogies as being predicated on three basic criteria: flexibility, viability

and effectiveness (Cajete, 2004). To ensure the well-being of the tribe, it was crucial children learned a variety of skills, positive attitudes to work, and moral codes (Hemara, 2000). Relationships between the curricula and environments in which the students lived were strong and recognisable. Connecting the learning of new topics seamlessly or obliquely to what was known allowed for controlled-risk experimentation and relaxed learning (Hemara, 2000). Hemara (2000) describes how, a simple lesson on a complex subject would be delivered first, then, when the student was capable of internalising what they had learnt, the teacher would draw out deeper and more complex learnings. Hemara (2000) concludes this style of teaching allowed for considered and imaginative learning perspectives that were probably just as valuable as correct answers but which could also lead to limitless potential, unpredictable, and sometimes exciting understandings (p. 40).

As parents were often caught up in the business of providing the things essential to survival or economic and social wellbeing, the older whānau members often had the responsibility of bringing up young children. Māori grandparents overseeing the upbringing and education of their mokopuna (grandchildren) was, and still is for many, a common practice. This principle of direct and sustained intergenerational involvement in raising and educating their children is seen today in Kōhanga Reo, Kura Kaupapa Māori and Wānanga Māori.

According to Ka'ai (2004), key aspects of effective teaching practices common in Māori-medium schools and kōhanga reo environments include:

- Māori concepts and contexts used as a basis for learning;
- Ako - resulting in fluidity of roles between learner and teacher;
- Agency - resulting in student control over the sequence and pace of learning, and;
- Whānau involvement in classrooms – teachers' actively encouraging whānau participation.

Ka'ai's research (2004) notes that these aspects of pedagogy differ from traditional teaching practices in English-medium mainstream schools and as Tuuta, et al., (2004) assert, these pedagogical features are likely to present a challenge to English-medium teachers who are used to delivering set lesson content in a traditional classroom setting.

Affective Socio-Emotional Development

According to Brett, Smith, Price and Huitt (2003), affective development is the development of awareness, discernment and management of one's emotions and the processes concerning their outward expression. Socio-emotional development, according to Sloan (2013), encompasses the ability to connect to the emotions of others. Therefore, 'Affective Socio-Emotional Development' is important to cultural responsiveness because it enables learners to recognise how feelings, cultural values, and social behavior are connected (Saarni, 2011; Sloan, 2013).

Saarni (2011) asserts that by positioning culture at the centre of teaching and learning both the intra- and inter- personal processes required for affective socio-emotional development are encompassed. As Brett, et al. (2003) explains, the way a person responds to or interprets a socio-emotional scenario can be a reflection of one's value system. In this regard, Sloan (2013) discusses how educating students about shared values provides a catalyst that empowers learners to recognise and sustain a change in attitude that can make a positive difference to intercultural relationships.

Key Competencies

Embedded in *The New Zealand Curriculum*, the key competencies are described as "the capabilities that young people need for growing, working, and participating in their communities" (Ministry of Education, 2007, p. 12). As chief researcher for the New Zealand Council for Educational Research (NZCER), Rosemary Hipkins asserts, thinking about the key competencies as capabilities is a very important way to frame them (Te Kete Ipurangi, 2015). Framing them as capabilities, states Hipkins, immediately focuses your attention on the child as a whole person - the person they are now, and the person that they're capable of being and becoming in their future (Te Kete Ipurangi, 2015). In this way, the key competencies are more than just knowledge and skills, they encompass dispositions for lifelong learning (Charteris, 2015).

As stated in Chapter One, the key competencies in the New Zealand curriculum (Ministry of Education, 2007) sets goals for students to be competent at: thinking, using languages symbols and texts; participating and contributing; relating to others, and; managing self (p.12). The Ministry of Education (2007) asserts these competencies take account of, and build skills for, the vast changes in society, work, knowledge, and technology that are occurring and impacting on the relevance of today's education systems. It is important to note that the curriculum document is quite emphatic that these competencies should not be interpreted as stand-alone or separate skills to be taught in isolation but should be woven into the fabric of all learning areas (Ministry of Education, 2007).

Opportunities to develop the key competencies occur in social contexts (Te Kete Ipurangi, 2015). They require learners to draw on ideas, skills, knowledge, attitudes and values in ways that can be carried forward into life beyond the classroom - a notion Hipkins refers to as building aspects of 'action competence' (Te Kete Ipurangi, n.d). Hipkins explains that for action competence to be present, the intended learning needs to be clear and non-trivial, and it also needs to matter in some bigger way to the learner's future (Te Kete Ipurangi, 2015). In this sense, the key competencies through 'action competence' is seen as a powerful way for students to experience what it means to be a productive member of a particular type of community of practice and potentially has strong links to career competencies, pathways or transition initiatives (Te Kete Ipurangi, n.d).

Autonomy through Student Agency

Student agency places students at the centre of their own learning and refers to the level of autonomy and power that a student experiences in the learning environment (Ministry of Education, 2007, p. 38). Derek Wenmoth (2014) describes the three overarching features of student agency as: 1) the awareness one has of the responsibility of one's own actions on others; 2) the way agency mediates and is mediated by the sociocultural context of the classroom, and; 3) the level of initiative or self-regulation of the learner. As described by Bean (2017), students who possess a high level of agency are not passive participants in their learning but active players engaged in seeking meaning and purpose in their learning experiences that help them achieve the accomplishments they desire.

Deeply rooted in the New Zealand Curriculum's key competencies, student agency is developed through learning activities that are meaningful and relevant to learners. Bean (2017) suggests self-initiated learning tasks, driven by student interest with appropriate guidance from teachers, promote and encourage agency. According to Garrity some of the skills a more agentic approach to teaching and learning promotes, include students being able to set goals, make decisions about what they need for their learning, share responsibility for constructing a learning path, monitor the progress and outcomes of their learning, and collaborate effectively with their peers (Te Kete Ipurangi, 2016).

Fundamental to Māori epistemologies is the concept of *Rangatiratanga* or the right to determine one's own destiny (Bishop, 2008). In keeping with the definition of student agency, Bishop (2008) suggests one way of implementing rangatiratanga in classroom contexts is by acknowledging and allowing students' culture to influence their participation in the decision-making process of curriculum content and the directions their learning may take. Applebee (1996) contends this process of developing 'knowledge-in-action' is far closer to what happens in real life.

Teaching for student agency requires educators to get out of the way and let the students drive the learning more. Bean (2017) cites: inflexible thinking, and; the inability to work outside of comfort zones, as the two main hindrances for teachers trying to co-ordinate student agency effectively in their classroom programmes. The idea that teachers need to restrict students and tell them how their outcomes should look is an example of inflexible thinking. Student agency requires taking risks and adopting an adaptive stance toward instruction (Te Kete Ipurangi, 2014). This does not abdicate the teacher's role however. As Vaughan (2018) reminds us, the teacher is still required to provide the necessary learning support, structures, and guidance, but, he cautions, when teaching for student agency also be prepared to go off on tangents the teacher may not have considered.

When teachers and schools develop systems, processes and connections that put students at the heart of learning and teaching in ways that are dynamic and responsive to students' culture and interests, over time students begin to develop a productive identity as a learner: someone who can take the initiative, make sense of, and work on increasingly complex problems (Education Review Office, 2012). In other words, they can 'stand on their own two feet' as learners, and know that they can go on doing so in their learning futures (Te Kete Ipurangi, 2014).

Experiential Learning

Experiential education has been described as a methodology that is used purposefully to engage learners in direct experience and personal reflection in order to improve knowledge, develop skills, clarify values, and increase one's capacity to contribute to the local community (Djonko-Moore, Leonard, Holifield, Bailey, & Almughyirah, 2018). According to the educational philosophy of John Dewey (1990), learning occurs when knowledge is directly linked to active experience (Crump, 2002). Similarly, Kuh, Kinzie, Schuh, Whitt, and Associates' (2005) propose students learn more when they are actively and collaboratively involved in their education.

One of the foremost assumptions of experiential education is that it is "student rather than teacher based" (Joplin, 1995, p. 20), and the learner's experience is a valid basis for knowledge (Estes, 2004). When students are provided with opportunities to collaborate with others to solve problems or master difficult material, and empowered to apply what they have learned in different settings, argues Kuh, et al., (2005), they acquire valuable skills that prepare them to deal with the 'messy, unscripted' problems they may encounter in life (p.193).

Unfortunately all too often in practice, teachers' socialisation causes them to see themselves as more student-centred than they actually are. Research by Djonko-Moore, et al., (2018) reveals many educators and students operating in Western educational traditions are so socialised into epistemologies that value teachers as authorities, that neither teachers nor students are consciously aware of any inconsistency (p. 245). In other words, teacher-controlled processing of experiential activities fits the Western educational world view of what teacher-student relationships should look like. The way teachers use this power to convey their own messages while processing experiential activities, can make experiential education, as it occurs in practice, more teacher-centred than student-centred (Djonko-Moore, et al., 2018, p. 245).

While experiential educators may unintentionally fall into the habit of assuming power over student learning, it is probable that an increased awareness of this problem will promote and motivate them to engage in conversations directed at increasing rangatiratanga and student agency in experiential education practices.

2.5 Gardening in Schools

In earlier eras, respected philosophers such as: Rousseau, Gandhi, Montessori, and Dewey, promoted school gardens as a pragmatic and normative way to teach life skills through experience, connect children to nature, and shape children's moral outlook. Psychologist Dr. Emily O'Leary (2017), argues that natural settings, such as gardens, are not only important for our primary needs but also for our emotional, psychological and spiritual needs. According to her research, for children, the ability to take their learning outside has a multitude of long-term benefits for physical, social, emotional and cognitive development, and fosters a sense of identity, feelings of autonomy, psychological resilience and healthy behaviours. In addition, she contends children who experience high levels of contact with nature have higher levels of self-worth and higher cognitive function (O'Leary, 2017).

In response to issues such as: childhood obesity and the converse situation of children going to school hungry discussed in many health, social science and educational circles, the Education Review Office (2016a) made recommendations regarding healthy food and physical activity programmes in schools. In order to decrease the rise of childhood obesity, Blair (2009) argues that children need to re-personalise food and broaden their perspective on what is healthy food. As Morris, Koumjian, Briggs and Zidenberg-Cherr (2013) assert, few children today know the origins of their food or appreciate the importance of local agriculture to food production. In fact, Blair (2009) proposes that for many families today, it is the norm to purchase anonymous, pre-packaged food which arrives at supermarkets from industrial, energy-intensive, polluting, and often obesity-promoting food manufacturing systems.

School gardens are recognised as a possible solution and, fortunately, educators are in a position to make a difference (Morris et al., 2013). Many researchers suggest school gardens not only teach children where their food comes from, they have the potential to change peoples' attitude toward fresh fruits and vegetables (Blair, 2009; Lee, et al., 2015; Moss, et al., 2013; Thorp & Townsend, 2001).

A review of relevant literature suggests that edible gardens in schools have the potential to provide a wide range of physical, social, psychological and academic benefits (Blair, 2009; Lee, et al. 2015; Moss, Holmes, Boyd, & King, 2011; Wake, 2010; Wake & Birdsall, 2016).

School gardens are reported to keep participants: physically active, promote healthy eating, enhance students motivation to learn, improve peer interactions and relationships, attitudes, behaviour, school attendance and academic achievement, all while developing a sense of ownership and pride in the educational setting, and encouraging conservation, ecological commitment, involving parental and community participation (Blair, 2009; Lee, et al., 2015; Moss, et al., 2011; Wake, 2010; and; Wake & Birdsall, 2016). Furthermore, Moss, et al. (2011) assert school gardens enable and encourage the transfer of positive behaviour, skills, attitudes and knowledge from the children to their parents and whānau (wider family).

The act of gardening changes the status of food for all involved and has the potential to increase knowledge and transform attitudes towards healthy food. When one gardens, state Thorp and Townsend (2001), food can no longer be viewed as a mere commodity for consumption; we are brought into the ritual of communal goodness that is found at the intersection of people and plants. Food that we grow with our own hands becomes a portal for personal transformation (p. 357). Growing food from seeds is exciting, even miraculous; and the product is something special to be taken home to share. Literature highlights how excited children were to put their hands in dirt and in doing so, students made better connections to the agri-systems of daily life in and beyond the school (Blair, 2009; Wake, 2010; Wake & Birdsall, 2016).

In disagreement, Caitlin Flanagan (2010) is critical of the integration of food gardens in schools. She believes school gardens cheat our most vulnerable students of hours they might otherwise spend reading books or learning math. However, literature shows disciplines such as science, maths, writing, language, art, social studies and environmental education have incorporated successful academic learning in the context of a garden (Blair, 2009; Lee, et al. 2015; Williams & Dixon, 2013). For example, an American study by Pounders and Beliveau (2010) found that children who participated in their school's garden club achieved an average improvement of 12 to 15 percent in their maths and science test results, and had corresponding improvements in their reading and language skills. Moreover, based on teachers' anecdotal observations of reductions in classroom misbehaviour and increases in attendance, Pounders and Beliveau (2010) contend students' behaviour and attitude also improved. International programmes that use gardens for interdisciplinary educational purposes are many and diverse, and include: the Kitchen Garden Project and Garden-based learning (UK), Sprouting Healthy Kids and Edible Schoolyard (US), as well as the School Garden Program (US), and Gardens for Life (Lee, et al., 2015).

From an environmental perspective, school gardens may seem to be a limited substitute for interacting more closely with nearby landscapes (Blair, 2009). However, Moore (1995) reports that the most feasible pedagogical vehicle for promoting daily environmental learning is indeed the school vegetable garden. In Aotearoa New Zealand, school gardens in primary and intermediate schools have been established in conjunction with programmes such as the Garden to Table initiative (Ministry of Education, 2017b; Morgan, 2015) and Enviroschools (Enviroschools Foundation, 2010; Wake, 2010). The Garden to Table programme, according to Morgan (2015), aims to educate children about how to grow, harvest, prepare and share fresh, healthy, seasonal produce in ways that enable schools to engage with their community. While the Enviroschools programme aligns to the New Zealand curriculum and is organised along eight theme areas of waste, food production, food distribution, biodiversity, water, energy, and energy building (Ministry of Education, 2007). Funded by the Ministry for the Environment and supported by the Toimata Foundation, the Enviroschools Foundation was established in 2002 with an aim “to foster a generation of people who instinctively think and act sustainably.” (Enviroschools Foundation, 2010).

Although not declared as affiliated to any such programme, a school garden at Ilminster Intermediate School in Gisborne, Aotearoa New Zealand became a source of excitement for its pupils. As Clare Browning (2009) reports, the children’s enthusiasm for gardening spread through the community. Alongside being able to take home fresh vegetables, learning about horticulture, nutrition, and physical activity, the garden at Ilminster School also created the impetus for science projects such as a weather station set up to study the effect of weather on soil and plant growth (Browning, 2009).

Both Blair (2009) and Lee, et al. (2015) discuss the empirical research into the effectiveness of gardening in schools programmes as inconclusive and call for more research. However, as Sue Wake (2015) maintains, the positive benefits for student’s developing and maintaining garden spaces in schools is moving from assumption to supported fact.

Māra Kai

Food gardens or *māra kai* are part of the rich cultural heritage of New Zealand that long predates European settlement (Earle, 2011). Before widespread settlement of Aotearoa, having a food garden was integral to daily Māori life alongside hunting, fishing and collecting

wild foods, and was seen as essential for survival (King, 2006). Hirini Moko Mead (2003) describes Māori ways of being as made up of interwoven connections to place, social and spiritual relationships; systems of kinship; cultural practices; access to resources; and creation narratives that emphasize a fundamental relationship between people, the natural world and a pantheon of elemental 'deities'. For Māori, the sense of belonging and self is anchored in whānau (extended family), hapū (sub-tribal) and iwi (tribal) links with affiliations to one or several marae (meeting houses). Cultural connectedness, explains Mead (2003), is reinforced through reciprocal acts of manaakitanga that speak to a collective act of caring for the wider social group.

Gardening is a deceptively simple activity to grasp, but one rooted in complexity. Gardening refers to a site for basic human sustenance and aesthetic enjoyment, and for growing social ties and relationships, reproducing traditions, knowledge and connections (Li, Hodgetts, & Ho, 2010; Moon, 2005). In essence, Māori gardens provide spaces to connect and re-connect with the very essence of what it means to be Māori.

For Māori, gardening is part of a broad philosophy embedded in mātauranga Māori (Māori knowledge). Māra kai encompasses all aspects of Māori knowledge, including philosophy, beliefs, language, methods, technology and practice (Harmsworth & Awatere, 2013; Kawharu, 1975; Moon, 2005). It is an expression of their worldview underpinned by the metaphysical and holistic understandings that also explain how and why Māori care for their environment (Marsden & Henare, 1991).

Traditionally, states King (2003), gardens were a hub of activity within Māori communities and substantial plantings were commonplace among iwi and hapū groups. Through their gardens Māori were able to maintain their collective identities; their traditions and their shared knowledge (Moon, 2005; Walker, 1990). According to Kawharu, (1975) it is in the everyday, practical activities such as gardening, storytelling and sharing food that a Māori sense of being, which centralises social, physical and spiritual connections, can be gained and brought to the fore in everyday life.

The depth of understanding of being and one's place in the world comes to the fore for Māori through practical and emplaced practices such as growing food, eating communally and conversing with others (Kawharu, 1975). To lose one's sense of these connections through,

for example, loss of land and displacement is not simply a matter of losing sight of who you are, it also involves a loss of the many support structures that are crucial to the preservation of a person's sense of existence, self, and belonging within collective structures and processes that compose the universe (King, P., Hodgetts, D., Rua, M, & Te Whetu, T. 2015).

Although in the Māori language there was no word for religion, Papatūānuku - 'Mother Earth' or the natural world - from a Māori perspective, "has a spirit [wairua] and life [mauri] of its own that must be respected and supported" (Royal, 2003, p. 51). Because gardening connects Māori with Papatūānuku - Mother Earth or the natural world - relationships between people and the physical and metaphysical realms were central in precolonial Māori gardening practices (Moon, 2005).

This interconnectedness refers to the concept of mauri (life force), which Marsden describes as "the bonding element that knits all the diverse elements within the Universal 'Procession' giving creation its unity in diversity. It is the bonding element that holds the fabric of the universe together" (Royal, 2003, p. 44). Through gardening, both Moon (2005) and Marsden (Royal, 2003) discuss how Māori are able to acknowledge the mauri of all things (Moon, 2005) and strengthen their connection with the atua (deities of the natural world). (see Māra Kai Resource – Appendix A).

Traditionally, the success of Māori gardens was not only measured in the instrumental advances to feed people, but also in terms of social advances and nurturing human connectedness; gardening was a collective responsibility and provided for the collective (Kawharu, 1975; Moon, 2005). Within Te Ao Māori, the sharing of food fulfilled "social obligations to the gods and manuhiri [guests] and no expense was spared in manaakitanga [extending hospitality to guests]" (Marsden, 1992, p. 9). As Hohepa Kereopa explains, the sharing of food was always secondary to the strengthening of relationships (Moon, 2005). Like many other cultures, sharing a meal together is one of the ways Māori connect with each other (Moon, 2005, pp. 24–25). Through growing food, eating communally and conversing with others, Kawharu (1975) suggests a depth of understanding of one's place in the world comes to the fore.

Taonga Tuku Iho Associated with Māra Kai

As stated previously, despite an extensive search, literature associated with māra kai in a schooling environment was not found. However, as outlined in the New Zealand Curriculum (Ministry of Education, 2007), the concept of values holds a central place in education (p.10). It is to the concept of values that this literature review now turns as a way to work an understanding of māra kai in the absence of specific literature.

In order to speed the process of assimilation into western paradigms of learning, mātauranga Māori (Māori knowledge) and tikanga Māori (cultural practices) have remained very much out of sight and absent from mainstream school curricula for over a century (Royal, 2013, p. 3). Reverend Māori Marsden (1924 -1993) refers to taonga tuku iho as Māori cultural values, ways of being that have been passed down through many generations (Royal, 2003). These values express cultural identity, govern Māori in all aspects of life, and are seen as an important aspect of food cultivation. Taonga tuku iho or cultural values associated with mātauranga Māori and māra kai are referred to by a number of authors (Bishop, 2001; Marsden, 1992; Mead, 2003; Moon, 2005; Royal, 2003). These include the conceptual values of: wairua, kaitiakitanga, manaakitanga, aroha, mana, whanaungatanga, ako/tuakana-teina, and māramatanga. These values are directly referenced in the study and thus the literature associated with these concepts is briefly reviewed below to provide an understanding of these concepts in relation to this research.

Wairua

Mead (2003) describes wairua as incorporating aspects of spirituality, harmony, imagination and morality. In regard to gardening, Te Waka Kai Ora (2011) describe wairua as the spiritual health of the whenua (land), the kai (food), and tangata (people). Protecting and having respect for the wairua of te taiao (the environment), those who do māra kai (gardening) is important for the safety of the kaimahi (workers) and also for the produce (Te Waka Kai Ora, 2011).

Central to the protection and respect of the wairua in māra kai is the tikanga of karakia. Barlow (1991) describes karakia as Māori blessings or prayers used to invoke spiritual guidance,

goodwill and protection to increase the likelihood of a favourable outcome. Te Waka Kai Ora (2011) assert karakia provides kaimahi with focus and awareness of the working environment and safety.

The māra, Hutchings (2015) asserts, is a place where one can feel a balance of mind, body and soul.

Kaitiakitanga

For Māori there is an intimate relationship between tangata whenua (indigenous Māori people of Aotearoa New Zealand) and their environment (Nikora, 2007). It is common for tribal members to claim a deep connectedness to a certain place. This place is a source of one's identity and it is usually a geographical feature – a mountain, sea shore, or river (Nikora, 2007).

Indigenous Māori developed an intricate, holistic and interconnected relationship with the natural world and its resources from a rich knowledge-base (mātauranga) developed over thousands of years (Harmsworth and Awatere, 2013). From a Māori worldview human beings and the land are seen as one - people are not superior to nature (Harmsworth and Awatere, 2013).

For tangata whenua, Harmsworth and Awatere (2013) emphasise the health of a community is reflected in its environment and vice versa. Māori believe the natural world is able to 'speak' to humans and give them knowledge and understanding (Royal, 2003; 2007; Moon, 2005; Harmsworth and Awatere, 2013). This is done through observation of the natural environment, seasons, celestial occurrences and wildlife behaviour. For example, if waterways were unclear or polluted, something was amiss with the local people (Royal, 2003; 2007; Moon, 2005; Harmsworth and Awatere, 2013). For Māori the loss of their whenua and the depletion of natural resources were destabilising factors on health and well-being. Moreover, the degradation of their whenua undermines and debases their spiritual and cultural values resulting in the disconnection of whānau and the loss of cultural knowledge associated with the land (Royal, 2003; Moon, 2005; Harmsworth and Awatere, 2013; King, Hodgetts, Rua, and Te Whetu, 2015).

Another reason why land is so important to Maori is, as Kereopa Hohepa explains: when people work the land they are really connecting with themselves, and everyone else whose mauri (energy, life force) has been returned to the earth (Moon, 2005). Hohepa believes that through gardening Māori are not only able to grow kai (food) but in doing so, they reconnect with Papatūānuku, Mother Earth, the supporter of life and provider of all their needs. He notes that although Papatūānuku, is the giver of life, she is also the receiver of those who have left this life, because eventually all living things that come from the earth therefore their mauri goes back to the earth (Moon, 2005).

Whanaungatanga

Whakawhanaungatanga is described by Bishop (2001) as the process of establishing links, making connections and relating to the people one meets by identifying in culturally appropriate ways. Mead (2003) tells us whanaungatanga refers to whānau-like relationships that demonstrate engagement and connectedness, and therefore, an unspoken but implicit commitment to other people who, through shared experiences, feel and act as kin (Mead, 2003). Within this type of relationship, in receiving support from the group, there is a responsibility to provide reciprocal support.

In a learning context, Bishop, Ladwig & Berryman (2014) contend the process of whanaungatanga demands a focus on the quality of teaching-learning relationships and interactions, and the agency of the teacher in establishing a whanau-like context that supports engagement and learning (p. 28). Developing a sense of family connection and working together provides people with a sense of belonging.

Manaakitanga

The word manaaki embodies the concepts of mana (authority) and aki (urging someone to act quickly) and describes the immediate responsibility and authority of the host to care for their visitor's emotional, spiritual, physical and mental wellbeing (Mead, 2003).

Professor Cleve Barlow (1991) explains manaakitanga in this way: manaaki is derived from the power of the word as in mana-a ki, and means to express love and hospitality toward people by providing an abundance of food, a place to rest, and speaking nicely to visitors. To exhibit manaakitanga, Professor Mānuka Henare (1997) states, is to raise ones mana (mana-a ki) through generosity. Henare (1997) summarises manaakitanga as relating to the finer qualities of people, rather than their material possessions. It is the principle of the quality of caring, kindness, hospitality and showing respect for others.

In this way, manaakitanga encourages communities to care for and respect each other. As Mead (2003) explains, manaakitanga is about looking after people, nurturing relationships, and taking care how you treat others. The personal relationships formed by knowing your neighbours can stimulate a more holistic community. In this context manaakitanga can be associated with the notion of cultural and social responsibility.

In an educational context manaakitanga encompasses the need to provide safe, nurturing environments that care for children and young people as culturally located human beings. This includes validating and sustaining the language, culture and identity of Māori students to ensure they have the opportunity to learn and experience educational success.

Aroha

Manaakitanga also encompasses the concept of aroha. Aroha, according to Barlow (1991) is a quality of goodness, expressed by loving care for people, the land and all living things. Mead (2003) describes it as love, respect and compassion. Aroha, says Mead (2003) is an essential part of manaakitanga and is an expected dimension of whakawhanaungatanga. A person who has aroha expresses genuine concern towards others and acts with their welfare in mind without discrimination.

Ako

Ako refers to traditional Māori thinking about the transfer and absorption of skills, knowledge, wisdom and experience (Hemara, 2000). The English language uses two words – teach and learn – to mean different things. To ‘teach’ refers to the transfer of knowledge and skills while to ‘learn’ references the absorption of the teachings (Stucki, 2010). However, Ako means to

both teach and learn at the same time (Bishop, 2001; Hemara, 2000; Ministry of Education, 2008; Stucki, 2010).

While current western thinking places children at the centre of learning, Hemara (2000) tells us that traditional Māori pedagogy locates students and teachers in the same place. Ako speaks to a symbiotic relationship between teachers and learners which involves mutual teaching and learning experiences. That is, teaching and learning, experience and experimentation were co-operative ventures in which everyone involved learnt something new.

The Ministry of Education (2008) describes the concept of ako as a reciprocal relationship where the educator is also learning from the student. Metaphorically, Bishop (2001) says this term emphasises reciprocal learning, where the “teacher does not have to be the fountain of all knowledge, rather he/she is a ‘partner’ in the conversation of learning” (p. 205). More importantly ako is a teaching-learning practice that involves teachers and students learning in interactive, dialogic relationships. With ako, teachers use strategies that promote effective teaching interactions and relationships with their learners; teachers can learn from students just as students learn from teachers. It is in contexts like these that Bishop (2010) contends co-construction of knowledge is likely to occur.

Tuakana – Teina

Ako acknowledges that reciprocal learning can also occur between students. Tuakana-Teina is an integral part of learning in traditional Māori society which refers to the teaching and learning relationship between young people (Hemara, 2000). The tuakana is recognised as an older or more expert young person, and the teina is a younger or inexperienced student (Hemara, 2000; Ministry of Education, 2009a; 2009b). *Te Aho Arataki Marau mō te Ako i Te Reo Māori: Kura Auraki* - The curriculum guidelines for teaching and learning Te Reo Māori in English-medium schools - describes the tuakana-teina approach as a model for buddy learning systems (Ministry of Education, 2009b). In a learning environment that recognises the value of ako, the tuakana-teina roles may be reversed at any time. For example, the student who yesterday was the expert on Te Wā and could explain the lunar calendar may later need to learn from her classmate how manaakitanga (hospitality) is practised by local hapū (Ministry of Education, 2009, p. 28).

The New Zealand Ministry of Education (2008) endorse embracing the principle of ako as it allows students to participate to their full potential and enables teachers to build caring and inclusive learning communities where each person feels that their contribution is valued. This powerful concept is also supported by educational research which shows that when teachers facilitate ako in their classrooms student achievement improves (Alton-Lee, 2003).

Mana

The word, mana, as defined by Williams (1957:172) has a range of meanings: ‘authority, control’; ‘influence, prestige, power’; ‘psychic force’, and; ‘effectual, binding, authoritative’ (in Mead, 2003, p, 29). In modern times, Barlow (1991) purports the term mana has taken on various meanings in regard to power. For example: the power of the gods; the power of ancestors; the power of the land and the power of the individual.

In relation to māra kai, Te Waka Kai Ora (2011) and Hutchings (2015) discuss mana as enabling autonomy, security and self-determination for iwi, hapū, whānau and individuals and how māra kai plays a critical role in providing sustenance, strength, and cohesiveness to our communities. Traditionally, the tikanga of māra kai does not focus on profit, or even money, but on relationships of reciprocity that strengthens communities. Within Te Ao Māori, it is important that the benefits derived from the māra kai are shared with the wider community ensuring that the māra kai is equally supported and nurtured by the community.

Māramatanga

Te Waka Kai Ora (2011) defines māramatanga is the insight and enlightenment we gain through the tikanga of māra kai. An understanding and awareness of the environment is important in guiding all practices in māra kai and to enable one to refine and enhance the quality and integrity of both the whenua and the kai it produces. Māramatanga can be gained through the observance and understanding of nature and celestial occurrences, particularly the Māramataka and seasons (see Appendix A). Motivated by concerns about the sustainability of natural resources and a desire to create technologies that are more

environmentally as well as socially compatible, Roberts, Weko, and Clarke (2006) claim scientists are also becoming interested in understanding the scientific basis of the traditional knowledge possessed by Maori.

Contemporary Māra Kai in the Community

Aotearoa New Zealand used to be a 'grow your own food' nation according to Michael King (2006). Statistics NZ (2013b) provide evidence that most Māori today live in urban areas, away from their ancestral marae and no longer grow their own kai (food). However, many of our home, marae and communal gardens have been replaced with grass, flower beds, commercial crops of maize and car parking. Kereopa (Moon, 2005) suggests this is due to the advent of supermarkets, two worker families and itinerant living practices (Moon, 2005). Tanzcos (2009) states that today few families contribute towards communal gardens, relying instead on imported and processed foods bought from the supermarket.

As part of a wider sustainability picture, Browning (2009) states māra kai approaches have been recently undertaken in community based initiatives for the social and physical health benefits that they can provide to communities. For example, in 2009 Te Puni Kōkiri funded community based māra kai initiatives intended to boost the level of health, financial and social benefits of Māori. Maori Affairs minister, Pita Sharples asserts that on the most immediate level it will result in measurable benefits in terms of healthy produce to eat but he contends, there are other less-tangible but just as significant benefits to be gained, such as: encouraging and promoting outdoor activity; learning the skills of planting, growing, harvesting and storing fruit and vegetables, and; building positive relationships within communities (Browning, 2009). King, Hodgetts, Rua, and Te Whetu (2015) explain that Māori gardens are also able to provide spaces that connect and reconnect with the very essence of what it means to be Māori by manifesting memories, histories, heritage, group identities and ways of being. Similarly, Moon (2005) says that for Māori, gardening is an expression of a values system and cultural identity, and the act of collective gardening reinforces relationships and builds bonds.

Hirini Moko Mead (2003) contends students should be exposed to 'mātauranga Māori'; that is Māori knowledge which encompasses the past, present and still developing knowledge as an integral part of the learning in the school system of Aotearoa New Zealand. Skelton (2013) contends this is another distinctive benefit of māra kai is that the younger generation are

working with the older generation as it is the older generation who hold the knowledge - the how to, techniques, and cultural practices of traditional māhinga or māra kai.

In Aotearoa New Zealand, the Enviroschools programme is a national initiative that can involve gardening, Māori knowledge and cultural practices (Enviroschools Foundation, 2010; Wake, 2010). Although enviroschools is the umbrella beneath which many schools have established food gardens and used them as a gateway into teaching other skills, Browning (2009) and Wake (2010) suggest its primary focus is generally more about sustainability with a wider environmental perspective. However, as Browning (2009) asserts enviroschools is a more amorphous concept than māra kai.

2.6 Service-Learning

Despite a growing number of international studies, Perry (2011) says the research on service-learning in Aotearoa New Zealand remains scant, as such the bulk of the literature included in this section is from international research. However, the few national studies available are also drawn on.

By its very nature, service-learning is complex and therefore not easily explained or understood (Billig, 2002) as a result there are significant variations in terms of service-learning's interpretations and implementations (Billig, Root, & Jesses, 2005; Billig, 2000; Bringle, 2003, Chong, 2014). The following discussion attempts to shed some light on the notion of service-learning and the learning outcomes often associated with it

Roots and Theoretical Beginnings

The service-learning movement grew out of concerns and activism in America during the 1960's and early '70's but with roots that ran deeper into the earliest days of the twentieth century (Dornsife & Dornsife, 2017). Speck & Hoppe (2004) explain that in the early 20th century, civic and political activism shaped American educational philosophy into a vehicle for social change. Educators such as John Dewey (1859-1952) and Paulo Freire (1921-1997) provided the philosophical underpinnings for educational reform while social activists like

Martin Luther King (1929-1968) and Cesar Chavez (1927- 1993) provided the inspiration for citizen action (Dornsife and Dornsife, 2017).

According to Speck & Hoppe (2004), a key development in service-learning was a massive employment program for youth. In 1935, the American National Youth Administration, created jobs and educational service-learning opportunities for more than 700,000 citizens aged 16 to 25, in order to “teach by example, the practice, responsibilities, and rewards of citizenship” (ibid, p.35-36).

The pedagogy of service-learning was given a boost in the '70's and early '80's through the work of cognitive psychologists such as Lev Vygotsky (1896-1934) and Jerome Bruner (1915-2016). These psychologists pointed out that learning involves the creation of meaning and is highly individualized, which, according to Dornsife and Dornsife (2017), has enabled service-learning educators to point out the validity of using out-of-classroom experiences in helping students make meaning of more abstract theories and concepts.

While a number of early proponents saw service-learning as a way of addressing issues of social and economic justice, others saw the practice as a way of transforming our educational institutions (Dornsife and Dornsife, 2017; Speck & Hoppe,2004). Fundamentally, service-learning was influenced by the philosophy of experiential education (Dewey, 1899; 1959) and the theories of experiential learning (Kolb, 1984), transformative learning (Mezirow, 1991), and student engagement (Kuh, 2003), with their common thread being the strengthening of democracy (Dornsife and Dornsife, 2017; Speck & Hoppe, 2004). A primary goal of service-learning ‘pioneers’ asserted by Eyler, Giles and Dwight (1999) was to have students learn knowledge, skills, and self-awareness through structured reflection, so they would be more effective both in their service and throughout their lives.

Defining the Essence of Service-Learning

Regardless of the fact service-learning has been around for decades, a review of the literature revealed that researchers and practitioners have yet to come to an agreement on how best to characterize this concept (Furco, 2011; Chong, 2014). Even with the surge in scholarly

interest, the confusion surrounding the terminology 'service-learning' has not been completely eliminated (Howard, 2001; Saltmarsh, 1996).

A search of the literature revealed countless definitions of service-learning, some so broad as to include any service that takes place off the educational institution, others so narrow that they exclude many appropriate pedagogical models (Billig, 2002; Chong, 2014; Dornsife and Dornsife, 2017; Eyler, 2009; Furco, 2011). In fact, Kendall (1990), former executive director of the National Society for Experiential Education, professes to find more than 147 definitions within service-learning literature.

This study recognises Sigmon's (1994) explanation of service-learning because of its equal weighting on both the service goal and the learning goal. Sigmon (1994) asserts that the purpose of service-learning should in essence, equally benefit the provider and the recipient of the service.

However, the service experience alone does not ensure that either significant learning or effective service have occurred. As Eyler, et al. (1999) expounds, reflection is the framework within which students learn to process and synthesize the information and ideas they have gained through their service experience. Thoughtful reflection throughout the process encourages students to deliberately think about their role in the project and their role in the larger community. Jacoby (1996) asserts that reflection also provides a connection between the project and the students' academic goals. It is, he says, the practice of thinking critically about experience and relating it to other ideas and experiences that is critical to the learning process (ibid).

The Pedagogy and Practice of Service-Learning

Furco and Billig (2001) describe service-learning as a multi-faceted pedagogy connected to a wide range of dynamic social issues that operate within a broad range of community contexts. While this allows for local adaptation and meaningful engagement in the messy process of learning, it also makes it difficult to have one clear cut definition for all service-learning

programs. It is therefore not surprising that among both researchers and practitioners, there are considerable variations in how service-learning is defined.

The pedagogy of service-learning, according to Jacoby (2003), is grounded in experience as a basis for learning (p. 4). This supports the assertion by Densmore (2013) that the basic theory of service-learning comes from John Dewey's writings on the interaction of knowledge and skills, and how personal experience is a key factor in learning. In the foreword of Jacoby's (1996) writings on service-learning, Thomas Ehrlich poetically justifies the practical application aspect of service-learning as:

"Students learn best by opening the doors and windows of experience."

Supporting Ehrlich, Chong (2014) further describes the interaction between service-learning and experiential education as an active transaction between the learner and the learning environment.

Service-learning can be most impactful, argues Spallino (2017), when it is genuinely student driven and the biggest rewards are reaped by encouraging and enabling students to develop personal investment and ownership through collaboration. As Saltmarsh (1996) asserts, learners need to be recognized as the "creators and makers" in their own learning experiences (p. 15).

Types of Service

Service-learning is central to developing a sense of human community at the local level. Speck and Hoppe (2004, pp. 69-129) synthesised various philosophical perspectives that have influenced the evolution of service-learning, and provide three distinct models: a) The Philanthropic Model (p.69), which Furco (2011) calls Volunteerism; b) the Civic Engagement Model which speaks of civic action as public or collective action (p. 77), and; c) the Communitarian Model which assumes that "humans are social beings, not self-interested individual egotists: (p. 129). According to Speck and Hoppe (2004), the Communitarian paradigm applies the notion of the golden rule at the societal level, that is, it characterizes the 'good' society as one that nourishes both social virtues and individual rights (p.129).

Jude Barback (2013) succinctly sums up service learning as a unity of pedagogical objectives with social responsibility through practical action and relational engagement. According to Perry (2011), relational engagement is a particular benefit cited by many proponents of service-learning. This study seeks to actuate the underlying principle of relating to others in more selfless ways advocated in the Communitarian Model of service-learning (Furco, 2011; Speck & Hoppe, 2004). In this model, everyone in the community has some responsibility for the pastoral care of others in their community.

The Value of Service-Learning in Education

A search of the literature shows outcome studies conducted on service-learning are not as prevalent as articles discussing the concept and implementation of service-learning programs (Billig, 2010; Chong, 2014; Furco, 2011; Perry, 2011). Researchers who have investigated the claims of service-learning, report only a small literature base to support program effectiveness (Billig, 2010). Champion (1999) thinks one reason for the lack of research support may be that researchers are in a quandary about an appropriate research focus. Supporting Champion's opinion, Serow (1997) points out, program evaluators are challenged to not only capture the essence of the service-learning experience, but to also show that students are converting that experience into other outcomes. As this change often takes more than one school year to appear and many service-learning programs usually last less than that, the long-term benefits for individual students involved in service-learning projects are difficult to assess (Champion, 1999).

However, research designed to explore the impact of service-learning on youth developed a set of surveys that was presented at the Global Service-Learning Summit (1995). Results of these surveys indicated that service-learning was a positive experience for the students involved, and benefits included getting to know the people that they helped, feeling involved in what they were doing, and realizing that it feels good to help others. The students completing the surveys did not necessarily believe that the service experience significantly improved basic academic skills but it was reported that the experience made them think more deeply about issues that they normally did not think about (Champion, 1999). Experts at the Summit stated that research emphasis should be placed on the effects service-learning had on improving competencies such as critical thinking and problem solving abilities rather than on purely academic skills (Champion, 1999). With regard to this directive, Fran Champion (1999)

proposes quality service-learning experiences may have more to do with how they help youth think and work collaboratively more than improvements of basic academic skills.

Service-learning breaks away from traditional classroom formats. Spallino (2017) maintains this offers students a chance to connect what they are learning with action, while at the same time helping to improve the lives of others around them. When you want to really drive home a concept concerning the importance of your community and civic responsibility, Dr Jessica Spallino (2017) asserts that service-learning provides the ultimate forum for students to learn concepts such as empathy, reliability, contribution and trust.

Given the increasing diversity in our society and the growing economic disparities between the haves and the have-nots, Sonia Nieto (2013) proposes placing service-learning as a more transformative model of civic conscience. While caring cannot be taught, Nieto (2013) asserts, “caring can be modelled” and service-learning provides one of the few pedagogies in Western education where this is most likely to happen (p. xi). When an ethic of care is modelled, says O’Grady (2013), the potential to change hearts as well as heads is enhanced. In an American study of service-learning among middle school students, Scales, Blyth, Berkas, and Kielsmeier (2000) found participants showed greater concern for others’ welfare than the control group, both immediately after the conclusion of the project and over an extended period of time. Kendall (1990) attests service-learning strengthens the community that is being helped and asserts that the person giving their time and energy also benefit socially, emotionally, and spiritually. It is this reciprocity that helps shift service-learning from an individual feel-good experience to a social responsibility.

While research on the influence of service-learning in America is well established, Perry and Perry (2015) assert similar studies in an Aotearoa New Zealand context are uncommon. This could well be attributed to similar programmes in Aotearoa New Zealand not being defined as service-learning. That being said, a case study conducted by Bolstad and Whatman (2016) for the New Zealand Council for Educational Research, promotes Epuni Primary School as an example of a sustained and successful service-learning programme. The findings from this research (Bolstad & Whatman, 2016) concluded core values and principles central to the service-learning approach resonated across the school culture. Values and principles such as: the concept of reciprocity, or as Epuni School called it, “the giving hand and the receiving

hand”; engaging with and learning from other adults, and; feeling valued - that their contribution meant something to others - were important findings (Bolstad & Whatman, 2016).

Quantitative findings from Perry’s (2011) mixed methods, Naturalistic Inquiry of service-learning in higher education during the aftermath of the devastating Christchurch, NZ earthquakes, clearly demonstrate a statistically significant improvement in student engagement. Qualitative data supported these findings. Perry (2011) concluded that service-learning added intrinsic value to learning experiences that engaged both eager and reluctant learners by providing: opportunities for personal growth; consistent avenues to participate and contribute to causes learners deemed worthwhile, and; space and time to reflect on their personal experience of helping community organisations in a time of need.

While advocates of service learning seem to be most interested in changes in student’s attitudes and behaviours, Lipka (1997) also indicates there is little research available about the connection between service-learning and adult life in terms of persistent, long-range effects on behavior, attitudes and predispositions. As a result, educators are left to assumption and estimation to determine the effectiveness of some service-learning research. He suggests the evidence of future consequences on students should be based on reasonable empirical evidence (Lipka, 1997). To this end, Lane Perry’s (2011) research on service-learning in Aotearoa New Zealand sought to identify the relationships among: service-learning, the outcomes typically attributed to it and student engagement. Perry’s findings suggest student engagement, the enhancement of academic achievement, civic engagement, and personal growth, appear to have significant positive gains (2011).

Service-learning as a culturally responsive pedagogy

The perception of service-learning as a developmental process for relational engagement that can expose students to opportunities to learn about issues of compassion, diversity, social justice, and social responsibility is supported in literature (Boyle-Baise & Efiom, 2013; Rice & Pollack, 2013; Rosner-Salazar, 2003).

Boyle-Baise and Efiom (2013) assert that service-learning can be a process of relational learning that is able to prepare self-reflective, culturally aware, and responsive contributors to

communities. For example, Boyle-Baise and Efiom (2013) maintain that when carefully structured, service-learning can provide a context for learning perspectives of cultures other than one's own. As an example, the Māori concept of manaakitanga (Mead, 2003) closely relates to the principles of both the Communitarian service-learning model (Speck & Hoppe, 2004) and multicultural service-learning (Rosner-Salazar, 2003).

As a culturally responsive paradigm of service-learning, Rosner-Salazar (2003) conceptualized a specific model known as Multicultural Service-Learning (p. 65). Literary work by both Endo (2015) and Rice and Pollack (2013) discuss multicultural service-learning as a 'process' that addresses specific social issues and community needs through collaborative academic-community partnerships in which culture and equity are inextricably intertwined with service. Furthermore, as Sleeter (2013) asserts, the processes used in multicultural service-learning encourages an awareness and appreciation of cultural diversity that, over time, might be enough to jolt and challenge stereotypes.

Chapter Summary

This chapter has considered literature on separate but interrelated areas linked to the study reported in this thesis. In response to the challenges for education in New Zealand, the literature presents māra kai as a culturally responsive basis for gardening in schools that links student learning with taonga tuku iho me ona tikanga Māori (Māori values and knowledge); cultural diversity and equity; student agency; affective socio-emotional development; the key competencies, and; service-learning. This has been important in order to situate my research project within current literature.

The literature reviewed recognises that Māori learners' and their communities' needs are not currently met by the education system and that English-medium mainstream schools still deliver education that is generally ignorant of Māori culture. Importantly, Ka Hikitia as the Government's recognition of this, advocates and supports a culturally responsive approach to 'local solutions for local change, by local communities' (Ministry of Education, 2012).

From this review, it is clear that an effective culturally responsive pedagogy in Aotearoa New Zealand is one that provides a learning environment that promotes success and enhances

learning opportunities for Māori, as Māori. At its best, a culturally responsive pedagogy is one which allows students to learn from, and relate respectfully with, people of their own culture as well as those from other cultures by providing students with opportunities to develop sophisticated collaborations and build positive relationships with other students, teachers, whānau and the wider community (Ladson-Billings, 1994). The literature also discusses the affective socio-emotional benefits of empowering learners to recognise and sustain a change in attitude that can make a positive difference to intercultural relationships.

The review presented a strong case for teachers to include students as active participants in their learning and provide learning activities that are meaningful, relevant, driven by student interest, and collaborative. Research suggests allowing students to feel some control over their school lives encourages student agency and the development of skills needed to become independent, lifelong learners (Te Kete Ipurangi, 2016).

In terms of the project outlined in this thesis, māra kai is seen as a way to recognise, validate and normalise Māori ways of being and doing, while service-learning provided a familiar anchor on which new cultural understandings could be scaffolded. The literature suggests that māra kai could give relevance and coherence to learning by growing social ties and relationships, reproducing Māori traditions, knowledge and connections, and providing students with opportunities to develop an understanding of their place and responsibilities as citizens of Aotearoa New Zealand.

Within the Whakatipu Iwi Nui project, my study investigates what learning experiences resulted and how this was linked to the way the project was conceptualised and implemented.



Figure 5. Snack time during offsite learning session at the tertiary campus gardens.



Figure 6. Students posing and pondering.

3 CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter outlines and justifies the methodology undertaken in this research project. The theoretical basis for the research paradigm is outlined first. This is followed by a discussion regarding the research approach taken and the relevance of the particular methodologies used is established. Following on is a description of the participants and a discussion of how potential ethical issues were considered and addressed. Finally, the data gathering methods employed and the analysis approach taken is presented.

Research Project

The 'Whakatipu Iwi Nui' project reported on in this thesis explores the implementation of māra kai in an English-medium Intermediate school in Aotearoa New Zealand. Grounded within the holistic Māori worldview, this project also included principles from the pedagogical approach of service-learning.

Aims and Research Questions

The overarching aim of this research was to explore the opportunities for deeper learning within and beyond the curriculum. The research explored how the nexus of interface between Māori practices of māra kai and Western service-learning approaches could benefit students learning in English-medium schools.

The following questions guided the data collection and analysis of this research:

1. What understandings and learnings do the participants attribute to their involvement in the Whakatipu Iwi Nui project?
2. How can māra kai contribute to deeper learning within and beyond the curriculum?

3. How can service-learning within a māra kai context contribute to a culturally responsive approach within an English-medium mainstream intermediate school in Aotearoa New Zealand?

This study was informed by a Kaupapa Māori Research philosophy (Eketone, 2008; Smith, G. 2012; Pihama, Smith, Taki & Lee, 2004) and the unique perspective afforded through a Practitioner Research approach (Middlewood, Coleman & Lumby, 2012).

3.2 Theoretical Paradigm

It is widely accepted that researchers in the social sciences cannot avoid their assumptions shaping every aspect of their work (Denzin & Lincoln, 2000; Hammersley, 2000; Bowling, 2002). Grant and Giddings (2002) assert the importance of researchers being cognisant of their own underlying beliefs and assumptions that may affect the research process. Crotty (1998) insists this is imperative because the researcher's beliefs and assumptions can directly influence the choice of methodology, data collection and analysis methods. Indeed, Bracken (2010) contends it is essential for the researcher's ontological and epistemological positions to closely align with the choice of methods for data gathering and interpretation. Accordingly, Scotland (2012) suggests researchers should declare their position regarding the philosophical views and assumptions that underpin their research.

Ontology

As Dilts and DeLozier (2000) point out, a person's ontological and epistemological position can affect the 'filters' they apply to their worldview. In line with this, I attempt to outline my position, as researcher and practitioner, and the 'filters' that may have influenced my research choices and interpretation of data (Dilts & DeLozier, 2000).

My own indigeneity has shaped this research project. As a Māori (Ngāti Pikiao, Ngāi Tūhoe and Ngāti Porou), Kaupapa Māori is the ontological foundation of the work reported on in this thesis.

I believe there is a symbiotic unity between the physical, spiritual and natural environment. Te Ahukaramū Royal (2009a) suggests this ontological position is in keeping with an indigenous view of the world. 'Indigenous', says Royal (2009a), is taken to mean those cultures whose worldviews place special significance or weight behind the idea of the unification of the human community with the natural world, or as Ritchie (2013) asserts, an indigenous ontology positions human beings as "part of and reliant upon, rather than superior to and detached from" the natural environment (p.396).

Kaupapa Māori acknowledges the inter-connection between mind, body and spirit. According to Henry and Pene (2001), it is both a set of philosophical beliefs and a set of social practices referred to as tikanga Māori. Professor Hirini Moko Mead (2003) says tikanga is a segment of mātauranga Māori (Māori knowledge) which can be broadly described as practices Māori see as necessary for good relations with people and the land. Both Mead (2003) and Henry and Pene (2001) discuss tikanga as being founded on principles of: whānaungatanga and kotahitanga - the collective interdependence between and among humankind; manaakitanga - nurturing relationships, looking after people and being very careful about how others are treated; wairuatanga - a sacred relationship to the 'gods' and the cosmos – Māori believe we are not just physical beings, and; kaitiakitanga - acknowledgement that humans are the guardians who have a responsibility to protect the environment. Together, these ethics inform traditional Māori ontology and assumptions about human nature; that is what is 'real' for Māori.

Epistemology

Culture plays an important role in communicating and receiving information. Ladson-Billings (1994) asserts culture is influential in shaping the thinking process of groups and individuals. Kaupapa Māori is first and foremost shaped by the knowledge and experiences of Māori (Smith, 2012) and the values and belief systems of our culture are manifested in our thoughts and actions. As Reverend Māori Marsden articulates:

"How we think is how we live, and how we live is a pretty good indication of how we think. A man's metaphysics is the sum total of the beliefs out of which develop the basic convictions and assumptions by which he directs and guides his life" (Royal, 2003, p. 27).

I uphold the values and principles of a Māori epistemology as outlined by Henry and Pene (2001). Customary knowledge, ethics and philosophy drive a Māori epistemology; that is, to

live according to tikanga Māori which is promoted by the values of tika, pono and aroha (to be correct, to uphold truth and love) (Smith, 2012; Bishop & Berryman, 2006; Henry & Pene, 2001). Traditionally, these core values were integral to how Māori lived.

Kaupapa Māori also emphasises interdependence and spirituality as a fundamental component of intellectual endeavour and knowledge construction. It is implicitly founded on collective consciousness, and historical concepts that Henry and Pene (2001) contend are not necessarily reflected in qualitative-quantitative, or positive-interpretive-critical categorisations. This does not negate the application of qualitative or quantitative methods as research techniques, Henry and Pene (2001) posit, rather it speaks to the underlying assumptions, processes and application of research, for both the researcher and the researched; from a 'non-positive' stance.

Insider Status

Researchers need to maintain a professionalism that makes themselves and their research practice safe for their community, states Cram (2009). This is because they will, of necessity, be looking "in from the outside while also looking out from the inside" (p. 318). Cram (2009) asserts that researchers need to acknowledge and negotiate the multiple ways in which they will be insiders and outsiders to a community they are doing research with. As a Māori woman and a practicing teacher at the school where this research takes place, I was not detached from the topic of this investigation. My viewpoint and position was informed by my personal and professional background. I am on the "outside" as a practitioner-researcher who speaks from the "inside" about Māori aspirations with respect to Māori education. It is this insider knowledge and the relationships developed that contributed to the rapport established between myself as the researcher and the participants that allowed them to speak freely about their experiences. However, this did not negate the need to be mindful of the potential power imbalance between myself as teacher-researcher and the young participants. Mitigating strategies included reiterating that there were no 'right or wrong' answers, only their honest feedback mattered.

3.3 Research Approach

The following section presents the specific methodologies used in this research. First, a discussion regarding Kaupapa Māori and the relevance of employing this approach within an English-medium mainstream school is provided. Then an outline of Practitioner Research and the suitability of it for this study is given. This is followed by a description of the participants. This section concludes with a discussion of the ethical considerations undertaken during this research.

Kaupapa Maori Approach

Born out of socio-political shifts in Māori society during the 70s and 80s, Kaupapa Māori research developed in response to the Crown's Treaty of Waitangi obligations to redress inequality that resulted from the impact of colonisation. Inequalities including land loss and social assimilation policies that Smith (1997) contends, led to the erosion of the cultural heritage, customs, language, and knowledge of Māori.

Although popularised during the latter half of the twentieth century, it would be inaccurate to suggest a Kaupapa Māori research approach is a new phenomenon or, as illustrated by Rangimarie Mahuika (2008), "a simple revamp of existing Western theories disguised in culturally appropriate Māori vocabulary and attire" (p. 36). As Kaupapa Māori educationalist, Tuakana Nepe (1991) clarifies, as a "body of knowledge Kaupapa Māori has distinct epistemological and metaphysical foundations which date back to the beginning of time and the creation of the universe" (as cited in Mahuika, R. 2008, p. 36). Nepe (1991) argues that Kaupapa Māori research is distinctly different from Western approaches in that it is driven by tikanga Māori. Therefore, as Leonie Pihama (2001) asserts, a Kaupapa Māori approach to research needs to encompass Māori experiences and practices.

Defining a Kaupapa Māori Approach to Research in this Study

According to Eketone (2008), in academic circles 'Kaupapa Māori' traditionally refers to a philosophically Māori approach to a field of practice or theory that focuses on challenging well established Western ideas about knowledge generation.

Today, Royal (2009b) asserts the term 'Kaupapa Māori' is used by Māori in a much broader way to also mean any particular 'plan of action' created by Māori, expressing Māori aspirations and certain Māori values and principles. Royal (2009b) further postulates that although there may be a range of purposes for the action taking, within Kaupapa Māori it is generally held that the design of the proposed action is created by Māori and reflects Māori aspirations, ideals, values and perspectives. As Smith (2012) contends, we Māori need to act ourselves to address in practical terms the issues in our own [school] communities.

Essentially, a Kaupapa Māori approach cannot exist without practice. Kaupapa Māori scholar and educationalist, Graham Smith (2012) emphasises the fundamental need for Kaupapa Māori principles to be in an active relationship with practice. Mane (2009) further positions Kaupapa Māori as being action based within the community.

As a small-scale, practical, and holistic initiative designed to address issues in one particular school community, the Whakatipu Iwi Nui project this thesis reports on is a practical application of* Kaupapa Māori principles.

Justification for a Kaupapa Māori Approach in this Research

Tuhiwai-Smith (1996) explains Kaupapa Māori research has particularities which makes it very different to other forms of research. These specific requirements are summarised as research which is undertaken 'by Māori', 'for Māori', 'with Māori', using and valuing Māori knowledge and concepts (Bishop, 2003; Kiro, 2000; Mahuika, 2008; Pihama, 2010; Smith, 2012). By acknowledging how this study relates to these specifications, further relevance for employing a Kaupapa Māori approach to this research is provided.

As previously stated, I am of Māori descent and my ontological and epistemological beliefs align with a Māori view of the world. Additionally, the community this study is situated in and the research participants have a high percentage of Māori. However, 'just being Māori' on its own is not justification for undertaking a Kaupapa Māori approach, the applied worldview or thinking behind the research must also be from a Māori perspective (Smith, 2011).

The project this research is concerned with employed practices grounded in traditional Māori horticultural tikanga. Pihama (2010) argues that in order to understand, explain and respond

to issues for Māori, there must be a theoretical foundation that has been built from Papatūānuku (Mother Earth), not from the building blocks of imported theories (p. 11) because as Houkamau and Sibley (2010) attest, Māori identity emanates from the land.

Practitioner Research

Social science researcher, Helen Kara (2012) describes practitioner research as practice-based rather than purely academic. As she explains, practitioner research developed as a recognised type of research in the last quarter of the 20th century and refers to workplace research performed by individuals who also work in a professional field, as opposed to being full-time academic researchers. In this context, 'practitioner' means someone who delivers public services: services run by society for society, such as health, social care, criminal justice, and education (Kara, 2012).

Practitioner Research in Education

Viviane Robinson (1993) asserts that traditionally, teachers viewed 'research in education' as something that was done by outsiders who came to school with preconceived ideas of what to study. Robinson & Lai (2006) describe how this process often involved strangers as researchers who came in for a specific period, collected data, analysed it, then wrote a report which the school would decide whether or not to use.

Conversely, 'practitioner research in education' is described by Menter, Elliot, Hulme, Lewin, & Lowden (2011) as a systematic enquiry carried out by a practicing educator working within the same institution, or investigating practice across other educational settings: the outcomes of which are shared with other practitioners. The phrase 'in educational settings' is usually taken to be a reference to classrooms, but Menter, et al., (2011) suggest it could also be interpreted as activities outside the classroom, such as this research project. Robinson and Lai (2006) discuss this methodology in terms of teachers enquiring into their educational practices with the aim of improving teaching and learning. Similarly, Helen Kara (2012) states practitioner researchers in education are often referred to as 'teacher researchers' and it is usually assumed that the research being undertaken is within the teacher's own practice.

Menter, et al., (2011) suggest teachers are often sceptical of the relevance others' research can have to their own settings. In this regard, Robinson and Lai (2006) claim some teachers believe that published research makes limited contribution to the understanding and improvement of educational practice because it often by-passes, rather than engages with, the complexities and peculiarities of particular settings. While much can be learned from the research of others, Robinson and Lai (2006) argue that there are considerable advantages in learning how to produce research rather than just consume it. Rather than relying only on the research of others, Robinson and Lai (2006) emphasise the importance of educational practitioners conducting research that is sufficiently rigorous to yield trustworthy information on issues with immediate relevance to their own problems and questions.

Justification for Practitioner Research

Sachs (2003) refers to teaching as 'a transformative activity' and Menter, et al. (2011) asserts practitioner research as an essential element of transformative teaching that can play a major part in making change more systematic and sustainable.

Kate Wall and Elaine Hall (2017) discuss three overlapping purposes evident in teacher research literature as enquiry undertaken primarily for: 1) personal purposes; 2) political purposes; and 3) school improvement purposes (p.36). While it is hoped this study contributes in some way to all three, the first and foremost purpose for choosing a practitioner research methodology in this study aligns more closely with the purpose given by Robinson and Lai, (2006), that is, to improve outcomes for students (p. 11). Improvements in student outcomes cannot be achieved by doing what schools and the Ministry of Education have always advocated doing because for some students the learning opportunities provided so far have not met their particular needs, and doing more of the same is unlikely to make a difference. As Viviane Robinson and Mei Kuin Lai (2006) assert, "all parties interested in improving student achievement need to interrupt their routines, reflect on current practices and seek out new ones" (p. 8).

Practitioner research was deemed appropriate to include in this research methodology because it enabled me to learn, through my inquiry, how to adjust my practices in ways that

have the best possible impact on the attitudes, understandings, and achievement of the students.

Practitioner research was also chosen for its ability to be a flexible and situationally responsive methodology (Cohen, Manion & Morrison, 2002), as well as being a powerful tool for building collegial relationships that improve practitioner knowledge (Payne, 2008). Practitioner research afforded me the flexibility to simultaneously employ complimentary Service-Learning approaches and Kaupapa Māori principles within the Whakatipu Iwi Nui project. In doing so, practitioner research facilitated working alongside knowledgeable kaumātua and community experts and allowed me to benefit from their experience and skills with the students. The potential of practitioner research in its processes and outcomes to transform the emotional dispositions of people towards each other so that greater empathy and regard are created (Dadds, 2008), further warranted its inclusion in this research.

Critique of Practitioner Research

However, practitioner research has its share of criticism too. One of the criticisms levelled against practitioner research is that its influence can be very limited. In 'A Guide to Practitioner Research', Ian Menter and associates (2011) argue that rather than contributing to an extended form of teacher professionalism, sometimes practitioner research can actually lead to a more restricted professionalism, where the teacher's contribution is constrained to their own direct field of practice.

There are also concerns raised by Oolbekkink-Marchand, van der Steen and Nijveldt (2014) about the ability of practitioners to undertake good, robust research, especially when research participants are the children whom you teach. Latham (2013) and Crouch & McKenzie (2006) both suggest 15 to 20 participants in a qualitative study helps a researcher build and maintain a close relationship and thus improve the "open" and "frank" exchange of information. This can help mitigate some of the bias and validity threats inherent in qualitative research.

Despite these drawbacks, practitioner research still has much to offer teaching practitioners. Especially its ability to: empower practitioners; reinforce the idea of educators as self-

regulating professionals; validate teaching practice, and; enhance professional learning (Kincheloe, 2012).

3.4 Description of Participants

The perspectives of twenty students were given a voice in this study. All participants attended the school where the research project took place were between 11 and 13 years old, and equally divided between Year's 7 and 8. Twelve participants were female and eight male. Ethnicity breakdown showed eight participants identified themselves as Māori, with one other student self-identifying as Māori/Pasifika. Seven indicated NZ European ethnicity, and four students each identified as either American, Macedonian, Indian or Asian.

Participants were children who put themselves forward for selection. This could have limited the findings due to a prior interest in or motivation to learn more about horticulture. As a result they do not necessarily represent the majority of students at the school. However, this also allowed for student interest, one of the components advocated as necessary for student agency to evolve.

Alongside the staff at the study school, other community partners included kaumātua (tribal elders), tutors from a regional polytechnic and the CEO of a large, locally based horticulture business.

3.5 Ethical Considerations

Ethics is about values, and ethical behaviour reflects values held by people at large. To gain ethics approval I had to prove that my methods and behaviour during the period of data gathering and subsequent write-up would not harm or compromise any of my participants. Ethical concerns were approached from both a Kaupapa Māori perspective and the unique perspective of Practitioner Researcher.

As an Insider Researcher (Mutch, 2013), I am cognisant of the unique ethical demands of insider/practitioner approaches including care with confidentiality. However, child participants

will doubtless want to please the teacher/researcher with their responses and may not feel comfortable sharing anything negative and it is possible pre-existing relationships could affect how accurate the responses were or how they are perceived. In my role as the teacher-researcher I will assure students that it is their genuine responses that are of value to the project and that I have no personal expectations of what their responses should be other than reflecting their authentic student voice.

Kaupapa Māori research ethics

Kaupapa Māori research ethics primarily guided the way I engaged in this research: from how the research idea was developed, methods selected, and how participants were involved and treated, to the data analysis and dissemination. In Kaupapa Māori research, ethical emphasis is not just on how it is carried out but also on the effects that it has on the participants and community. Ensuring cultural relevance, appropriateness and rigour are maintained where both the researched and researcher are culturally safe involves a Māori axiology, or set of guiding values (Kennedy & Cram, 2010). For Māori, ethics is about 'tikanga' (practice) - for tikanga reflects our values, our beliefs and the way we view the world (Te Puni Kokiri, 1994). Tikanga can be understood as guidelines around what is 'right' (Mead, 2003). It can also be described as rules, methods, approaches, custom, habits, rights, authority and control (Pere, 1988).

The tikanga used in this research were informed and guided by members of the community; including participants whānau and kaumātua, and; literary works by Bishop, (1998;2005); Cram, (2001; 2009); Cram and Pipi, (2000); Kennedy & Cram (2010), Moyle (2014); Tuhiwai-Smith (1999; 2005), and; The Pūtaiora Writing Group's (2010), Te Ara Tika. Guidelines for Māori research ethics: A framework for researchers and ethics committee members (Hudson, Milne, Reynolds, Russell & Smith, 2010).

To demonstrate an understanding of, and a commitment to these principles I provide a personal interpretation of them and how they actively guided me on my research journey. It is important to note that although these are presented in a linear fashion, they are far from linear in practice. These principles are connected in a fluid and interwoven manner.

3.5.1.1 *Whakapapa – Relationships*

Whakapapa refers to the quality of relationships and the structures or processes that have been established to support these relationships. It includes Aroha – caring love, and; Whakawhanaungatanga - whānau-like relationships that demonstrate engagement and connectedness, and therefore, an unspoken but implicit commitment to other people. Whakapapa involves respect for the people you are working with and being mindful that people are as diverse as the social constructs that make up their individual and collective world views. This principle required me to be consciously aware of and actively demonstrate respect for the participants, other students and adults this research process may affect.

As the project took place in a school and was conducted during school hours, permission was gained from the Board of Trustees and Principal. Staff were also shown respect by being made aware of the purpose and intention of this research. Giving consideration to how precious their time is, this was presented during a regular staff meeting, which also enabled them to ask any questions or concerns they may have.

In addition, focus group sessions were negotiated with teaching staff to avoid disruption to classroom routines and formal learning, each focus group was allocated approximately thirty minutes as this was considered a reasonable amount of time to hold their attention.

3.5.1.2 *Kanohi Kitea – The seen face*

Kanohi kitea is about being seen and known in your communities. It is also about meeting with people face to face or 'kanohi ki te kanohi', regarded within Māori communities as critical when one has an important 'take' or purpose. Trust is gained and strengthened. This form of consultation allows the people in the community to use all their senses as complementary sources of information for assessing and evaluating the advantages and disadvantages of becoming involved (Cram and Pipi, 2000). In this regard I made myself available to meet face-to-face with the participants, their whānau and others involved in the research project. I visited kaumātua and other community members in person at their place of residence or work.

3.5.1.3 *Titiro whakarongo kōrero - Look and listen first: Speak later*

This principle refers to the art of patience, humility and keen observation. The researcher is a learner in a privileged situation. Titiro whakarongo kōrero is about the researcher listening and observing rather than being the one doing all the talking so that nothing is missed. This includes not overlooking the quieter or silent participants. In a sense this principle is about the art of capturing truth, and inclusiveness which I felt I was successful in doing. More importantly though, participants' thoughts, feelings and ideas were listened to and contributed in some way to all stages of this research.

3.5.1.4 *Manaakitanga – Cultural and social responsibility*

The concept of manaakitanga encompasses a range of meanings in a traditional sense, including: hospitality, generosity and reciprocity. In regard to this study a central focus of manaakitanga is ensuring the mana of both parties is upheld and being accountable for the wellbeing of participants and their information is paramount (Smith, 1999). This includes involving participants in the ways in which their stories are interpreted and being generous in sharing with and involving participants in the research process, as allowed or as consented to.

Manaaki also refers to the symbiotic relationship between the researcher, the participants and the workers behind the scenes making the project possible; without whom the project would fail. In terms of this study including communications from key adults who verbally consented, acknowledged the value of their contributions and thoughts.

3.5.1.5 *Kia māhaki - Be humble*

Kia māhaki asks the researcher to be consciously aware of the dynamics of power, politics and ethics and the impact that this has on research without grandstanding. Instead of flaunting

your knowledge find ways to share it. Keeping this forefront while reviewing the literature for this thesis helped me to stay on task and be mindful of authors who promoted their expertise at the expense of silencing the marginalised.

Kia māhaki also asks the researcher to acknowledge individual diversity, and the co-construction and collective ownership of the research journey. This was realised by allowing people to learn and express their learning in their own space and time, respecting the mana and giving credit to all those involved in this project.

3.5.1.6 *Te Tiriti o Waitangi*

Te Tiriti o Waitangi is a crucial document that defines the relationship between Māori and the Crown in Aotearoa. It affirms both the tangata whenua status of whānau, hapū and iwi in Aotearoa and their rights of citizenship as equal partners in decision-making and knowledge-making. Pihama (2001) identified Te Tiriti as an ethical principle to be taken into account to provide a basis through which Māori may critically analyse relationships, challenge the status quo and affirm the rights of Kaupapa Māori. This study explores a teaching and learning approach that brings those elements of Te Tiriti to life in an English-medium mainstream school.

3.5.1.7 *Mana – Justice and equality*

Mana refers to power, dignity and pride, both individually and collectively. Mana often drives behaviour and is also closely linked to relationships. In the context of this study, mana acted as a barometer of the quality of relationships by acknowledging issues of power imbalance and authority in relation to who has rights, roles and responsibilities when considering the risks, benefits and outcomes of the project.

Mana tangata refers to individual choice. Participants in research have the right to be appropriately informed of risks to their individual or collective mana. As such, providing a clear understanding of the requirements for informed consent, and recognising the place of oral consent in some settings is integral to demonstrating respect for the mana of Māori participants. *Kaua e takahia te mana o te tangata* - take care not to trample on the mana of people. The researcher not only has to be mindful but actively responsible and ethical because of the lasting impact that research can have on individuals and communities.

Behaving ethically was particularly important in this project as it involved working with and gathering data from minors. Their informed consent and safety was paramount. I met with participants to outline the research project and their anticipated part in it. I made sure they understood participation was voluntary and, even if they consented that they could withdraw at any time without having to give a reason (Appendix B: Participant Information Sheets). Brief but clear information sheets and consent forms were provided for students to take home and share with their whānau. Getting signed consent from participants, their parents or caregivers, the school and teachers was a further safeguard that everyone's obligations of participation had been clearly discussed (Appendix C: Consent Forms).

Mana includes an element of Aro ki te ha – awareness as a protective element or Kia tūpato - being cautious. This is a basic caution relating to the risks of engaging in research. In this sense participants were made aware of how their private information would be kept secure. It is equally about the safety of the researcher and the need to follow all legal, moral and ethical obligations of the research process. This includes the researcher being reflective and open about their insider status (Smith, 2006).

Ethics approval for the Whakatipu Iwi Nui project was granted in August 2017 to collect all the data described and discussed in this thesis, including permission to use recorded images. The following steps were taken during various stages of the project to address ethical concerns in this research.

3.6 Data gathering and analysis

The methodologies and ethical considerations of this study led to choosing a qualitative enquiry approach to data collection and analysis. Denzin and Lincoln (2005) assert qualitative methods of gathering and analysing data allows the researcher to understand a social setting

or individuals from their perspective, find meaning through the eyes of participants, and; acknowledges levels of complexity and unpredictability in settings inappropriate for 'measuring' outcomes. As Denzin and Lincoln (2005) explain qualitative enquiries are inductive in their approach, the researcher is drawing meaning and understanding from the research and not testing data against pre-existing theories or notions as advocated in a quantitative approach. Moreover, Mutch (2013) states qualitative data is able to gather rich descriptions and illuminate the phenomenon of interest in ways that educators can relate to.

According to Tiakiwai (2001), qualitative inquiries are similar to a Kaupapa Māori approach in that they both investigate human behaviour, descriptions, meanings, concepts, metaphors and reflect the quality of information provided. They both also involve interactive, flexible and thematic processes (Tiakiwai, 2001) which is viewed as more empowering for research participants (Barnes, 2000).

As outlined by Cohen, Manion and Morrison (2007), the qualitative paradigm is a subjective approach to social science which favours a non-positive approach over a positivist one. Cohen, et al (2007) refer to the views of positivism as social phenomena that can be researched in the same way as physical phenomena using general laws and theories. I hold a differing view. I believe that learning as a social phenomenon cannot be based on an approach of general laws and theories that generate 'scientific fact'. I believe social organisations, such as schools, are much more complex than the positivist approach allows for.

Interpretive Approach to Data

Creswell (1994) directly links the qualitative paradigm to an interpretive approach to data which Scotland (2012) asserts does not question ideologies but accepts them. Interpretive methods, says Scotland (2012), yield insight and understandings of behaviour, explain actions from the participants' perspective, and do not dominate the participants. He also contends interpretivism aims to bring into consciousness hidden societal forces and structures.

My interest in giving emerging adolescent students a 'voice' influenced my choice to use an interpretive approach for data gathering and analysis. According to Smith (1999), Kaupapa

Māori research as a qualitative approach asserts a process of 'conversation' which creates a more equal space that, in this study, allowed the emerging adolescent participants voices to be heard from their own perspective.

However, Scotland (2012) argues that within an interpretive paradigm it is usually the researcher who decides on the final interpretation of the data and which information is made public. Given that the participants in this study are children, this was deemed appropriate and acceptable, any possible bias was mitigated by making explicit my agenda and intentions for the research.

3.7 Data collection methods

The following sections describe the methods that were used to gather the data in order to answer the research questions of this study. These include: a questionnaire, focus group interviews and personal communication; with student work, research notes and photographs being used to provide a richer description.

Questionnaire

I chose to include a questionnaire as a data collection tool because it enabled both myself and the participants to explore the initial perceptions of participants' learning during the project which could then be followed up and/or expanded on during the focus group sessions (Appendix D: Questionnaire).

The style of questionnaire chosen is referred to by Rockwell and Kohn (1989); Stevens and Lodl (1999); Howard (1980); Pratt, McGuigan and Katzev (2000); Lam and Bengo (2003) as a retrospective 'post-then-pre' evaluation questionnaire. The following sections describe how this type of questionnaire design differs from more traditional questionnaire formats and why it was chosen to address the aims and questions of this study.

3.7.1.1 Retrospective ‘Post-then-Pre’ Questionnaire

As Lam and Bengo (2003) explain, the retrospective ‘post-then-pre’ questionnaire is designed to have the participants use the same frame of reference for both their pre and post program responses. The base frame of reference should be their post program perceptions.

In traditional ‘pre-then-post’ questionnaire designs, Pratt, et al., (2000) states learners answer questions before an educational program, engage in the activity, then answer the same questions again after finishing the program. This ‘two-step’ process is separated by a period of time which can range from a few hours to days, weeks or even longer. In the retrospective ‘post-then-pre’ design, Pratt, et al., (2000) explain, both before and after information is collected at the same time: that is after the learning. This means that after completing the educational program, learners are asked to: First - rate their knowledge, skills, attitudes, or behavior as a result of the program, then to reflect back on the same question and rate the same knowledge, skill, attitude, or behavior before participating in the program (Pratt, et al., 2000). By obtaining ‘after’ then ‘before’ ratings in close proximity, it is more likely that both will be made from the same perspective.

Self-reporting is vulnerable to bias. As a self-report method, Klatt and Taylor-Powell (2005) assert the retrospective post-then-pre design is susceptible to (1) Social desirability – learners answer as they think the evaluator wants; and (2) Accuracy - everyone’s self-assessments can fluctuate greatly and may not provide a reliable measure of knowledge, skill, attitudes, or behavior. Follow up focus group interviews were used to help mitigate possible bias.

3.7.1.2 Response Shift Bias

The post-then-pre design questionnaire was proposed in the late 1970’s as a way to control response shift bias in the traditional pre-post design (Howard, 1980). Extensive research has shown that response shift bias can mask program effectiveness (Howard, 1980; Rockwell & Kohn, 1989; Pratt et al, 2000; Lam & Bengo, 2003). Rockwell & Kohn (1989) assert response shift bias occurs when a participant uses a different frame of understanding about a question between the pre and post periods. According to Rockwell and Kohn (1989), this can create problems because participants may not accurately assess their pre-program knowledge or

behaviours. Therefore, at the end of the program their new understanding of the program content may affect their response on the post self-assessment because they are actually responding from two different frames of reference (Rockwell & Kohn, 1989). The following example provides a clear illustration of what is meant by 'response shift bias':

A community educator teaching communication skills to young couples, wants to evaluate the results and administers a pre-test to each person enrolled in the program. One question reads "I share my interests with my spouse" and the respondents answer on a four-point scale (Always, Often, Seldom, Never). One respondent indicates he "Often" shares his interests with his spouse. During the course, he realises that sharing interests involves more than he originally realised and that actually, he does not share his interests very often. Thus, on the course post-test, he responds to the same item with "Seldom". It appears that the program had a negative effect on behavior whereas the participant's frame of reference on the pre-test and post-test had changed. This difference is called response shift and can cause misleading or inaccurate results (Klatt & Taylor-Powell, 2005).

The main benefits of using a retrospective 'post-then-pre' design questionnaire is that it takes less time, is less intrusive and, for self-reported change avoids pre-test sensitivity and response shift bias that result from pre-test overestimation or underestimation (Howard, 1980; Rockwell & Kohn, 1989; Pratt et al, 2000; Lam & Bengo, 2003). Compared with results from the traditional pre-then-post design questionnaires, results from the retrospective design are often more congruent with interview data collected from program participants (Howard, Millham, Slaten, & O'Donnell, 1981). Collecting responses for both measures at the same time gives you before and after data for each learner so data will only be missing if a learner skips questions or fails to complete the questionnaire (Klatt & Taylor-Powell, 2005).

3.7.1.3 Application in this Study

The participants were asked to complete a brief questionnaire that included three demographic items and eight statements regarding program content (Appendix D). The questionnaire asked participant's gender, year group, and ethnicity. Next participants were asked to complete eight questions using a 5-point likert-type or partially anchored rating scale. Each question required two responses. The first part of the question required a response related to the participants experiences 'after' their involvement in the project. The second response asked them to compare the same question in relation to their learning experiences 'before' their involvement

in this project. The questionnaire was administered by another teacher to ensure anonymity and confidentiality.

With only one opportunity to administer the questionnaire, it was important to trial it and ensure elements such as, shading, font styles, and question layouts were user friendly; questions were not confusing or leading so any amendments could be made. I trialled it with a group of non-participant students who also took part in the early stages of the project and the teacher who had volunteered to administer it. Feedback from the 'trial' suggested a few minor changes would make it easier for students to understand the process they needed to follow. Together we amended the rating scale so it used terminology the students readily identified with, and instructions were made more explicit in a way that helped the participants understand more clearly what they were being asked to do.

Focus Groups

I chose focus group interviews to collect data from the emerging adolescent participants because as suggested by Wake (2010) this is ethically less intimidating for them than individual interviews. Cohen and Crabtree (2006) espouse this method as a practical way of obtaining data from young participants in a non-threatening manner. All twenty participants who completed the questionnaire also took part in one of the two focus group sessions.

There were two main purposes of the focus groups sessions. One was to allow the students the opportunity to say, in their own words, what learnings, understandings and opportunities they experienced as a result of their participation in the project. The other was to provide detail which elaborated on the questionnaire responses.

The preliminary findings of the questionnaire were shared with the participants prior to conducting the focus groups interviews. This allowed them to consider how they might elaborate or clarify responses. As recommended by Harrell & Bradley (2009), the focus groups were structured by the use of 'starter' questions for focus followed by prompt strategies for delving into important narratives. Similar questions as those used in the questionnaire were used to enable participants to make connections, elaborate and expand on the responses. Since it was considered important to let the individual participants contribute their own stories and for the group to generate unique interactions, the questions were intended as a guide to

get the ball rolling and to enable some consistency between the two groups for analysis. These questions are included in Appendix E.

It has also been noted that children in focus groups can 'feed off each other' as they respond to each other's comments, creating more energy and thus more data (Krueger, 1988). In the opinion of Bryman (2004) this method is especially suitable when members of the focus group are related by their involvement in a particular situation, such as the Whakatipu Iwi Nui project. While focus group interviews are intended to be relatively unstructured in order not to stifle valuable contributions and to enable the evolution of interaction (Bryman, 2004), allowing this unstructured flow while maintaining the group's focus within a reasonably defined issue relies heavily on the facilitator or moderator running the sessions (Wake, 2010).

As the teacher-researcher I facilitated the focus group 'discussions'. I acknowledged the need to balance researcher bias with the advantages of garnering a depth of response due to my students' familiarity with me and my familiarity with the project. The goal of the focus groups was to ensure students were relaxed enough to discuss their perspectives and their experiences. While I wanted to allow students the space to contribute spontaneously, I found myself prompting and encouraging some boys in focus group one that I noticed had had little involvement in the discussions. Taylor (2011) contends that this is entirely appropriate as shy persons may be intimidated by more assertive persons or some may dominate the conversation to the exclusion of others.

In preparation for analysing the data the focus group interviews were video recorded. Initially, two focus group sessions were run back-to-back during the afternoon of Friday the 24th of November, 2017. Each session had 10 students of mixed genders and ethnicities and lasted between 38 and 43 minutes. Unfortunately, due to technical problems these two sessions were not recorded. The sessions were re-held the following Monday morning and by a stroke of good fortune all twenty participants were present.

Focus Group One had eleven participants, five boys and six girls of mixed ethnicities. The second group of nine participants also had a mix of ethnicities but had a more uneven gender mix of six girls and three boys. I don't believe having to repeat their group interviews influenced what they said in a significant way as the content of their discussion was of a high standard

and consistent with the initial sessions. However, I did note that the conversation was less spontaneous and comprehensive than the previous sessions. I feel this may be attributable to 'missing out' on preparation for 'fun activities' with their classmates and they didn't want to take any longer than necessary or they may have thought - "we've already done this". This is further reflected in the overall time each session took of between 16 and 22 minutes. To assist with analysis, key points were noted in chronological order as suggested by Taylor, Wilkie and Baser (2006) and Campbell, McNamara and Gilroy (2010). Note taking from the first round of unrecorded interviews provided opportunities to prompt conversations of particular areas of interest, for example; students' discussions about compost making and worm farms.

Personal Communications

A final source of data was from the personal communications of key adults connected to the research project including: the Principal of the study school, other teachers, visiting whānau, tutors and business leaders.

In the spirit of kotahitanga that this research subscribes to, it was important to acknowledge the mana of the key stakeholders connected to the project by including their korero alongside the data. 'Seeing through others' eyes', asserts Bryman (2004), allows other perspectives to provide a richer, fuller description of the data gathered. It also affords the additional benefit of providing insights into wider outcomes relevant to the research.

Including personal communications from key stakeholders to enhance and support participants' data was judged to be both prudent and appropriate. Personal communications used in this way were either emails sent to myself as the teacher-researcher or researcher notes drawn from conversations. In each case the people communicating this information personally and verbally gave permission for their comments to be included anonymously in the findings of this research. Personal conversation notes were approved by the individuals concerned.

3.8 Analysis approach

Emphasis in the findings and subsequent analysis is placed on the qualited questionnaire findings (Mutch, 2013) and participant responses during the focus group sessions.

Photographic images and personal communications are included to enhance and support the findings by providing other perspectives that add richness and depth to participants' descriptions. An analytical approach to thematic analysis, as advocated by Campbell, et al., (2010), was undertaken. Video recording allowed analysis to not only focus on what the words said but also how they were said. Campbell, et al., (2010) and Menter, et al., (2013) consider this an important aspect of analytical analysis.

The focus group recordings were transcribed and several copies printed out before analysis was undertaken. As suggested by Braun and Clarke (2013), group dynamics were also taken into consideration. Their stories were analysed using the integrated Kaupapa Māori philosophy and thematic analysis.

The questionnaire was analysed using the Delphi Technique (Mutch, 2013).

The Delphi Technique

The Delphi Technique, as described by Carol Mutch (2013) was employed to qualitate the quantitative data from the questionnaire by examining or following up outliers to understand why they fall outside the norm or trend. This technique also looks at grouping quantitative attributes together and creating a descriptive profile of the group or cluster, followed by a synergistic interpretation presenting a more holistic understanding of the research than would be gained by relying on a single paradigm or approach (Mutch, 2013, p. 207-208). The findings were then attributed to the theme or themes they had the most relevance with.

Identifying Themes

In order to identify the emerging themes from the focus groups a coding process was carried out. The video recordings were viewed and reviewed and a 'first code' (Menter, et al., 2013) process was followed. This process began by identifying concepts or themes that related

closely to the research questions. Initially, I highlighted recurring phrases, sections of text and identified word patterns that related to māra kai, service-learning and deeper learning, since this was the way the research questions were arranged.

At first, I was only seeing categories emerge that I had expected to uncover. My supervisor suggested to drill deeper than what was obviously apparent. I had to stop and check myself at this point. As Patton (1990) reminds us, qualitative researchers should not hold back, they should trust the process of analysis. This was an important learning step for me and gave me the confidence as a novice researcher to approach the data with a more open mind and be more flexible in selecting the themes to highlight.

In the second step of my coding process, links between the themes emerging from the differing data sources consolidated. The intersection of these themes became the catalyst for selecting common characteristics and properties to create sub-categories (Campbell, et al., 2010).

Organising the Themes

Finally, highlighted pieces of text and identified word patterns were 'charted' by being placed under the overall themes identified at the beginning of the coding process (Ritchie & Spencer, 1994). This was to ensure no themes or concepts were overlooked (Menter, et al., 2011). However, I struggled to form a sense of order or structure to the overlapping and interweaving emerging themes that would make sense when written up. Consequently I utilised a table developed by Sue Wake (2010, p.125). I found significant relevance with the overarching headings she used. They were broad and encompassed, with one minor adjustment (replacing the word participatory with collaborative), the themes emerging from my data. The headings helped me organise the data more coherently and offered a format that would make better sense to the readers of this thesis.

3.9 Validity

Menter, et al., (2011) state, the complexity of the data being gathered demands the researcher is aware of their own filters and bias because they can heavily affect the validity of the findings. For this reason, as the researcher I was continually mindful and reflective of my own personal values, beliefs and background, and how, at times I had to step back from them in order to stay open to the perspectives and contribution of others. Participants also had the opportunity to review and comment on the format of the questionnaire and preliminary findings.

Empathetic Validity in Practitioner Research

Empathetic validity is about the potential of the research processes and outcomes to transform the emotional dispositions of people towards each other, so that more positive feelings are created between them in the form of greater empathy (Dadds, 2008).

Empathetic validity is an important element of this research because whakawhanaungatanga or building collaborative relationships forms the heart of this study.

Marion Dadds (2008) contends that research that is high in empathetic validity brings about new personal and interpersonal understanding that touches and changes hearts as well as minds. Dadds (2008) offers two dimensions of empathetic validity by distinguishing between internal empathetic validity - which changes the practitioner researcher and research participants, and external empathetic validity - which influences audiences with whom the practitioner research is shared (p. 281).

Just as affective-socio-emotional development is important to cultural responsiveness because it enables learners to recognise how feelings, cultural values, and social behavior are connected (Saarni, 2011; Sloan, 2013), Dadds (2008) argues that research that is high in empathetic validity contributes to positive human relationships, which is especially important in research that emphasises collaboration.

3.10 Trustworthiness

Menter, et al., (2011) refer to trustworthiness as “... a combination of data from various sources” increases the credibility and trustworthiness of research findings (p. 36). In this study participants included students who were both male and female, were from a range of diverse ethnicities and academic ability, between 11 and 13 years old. Data sources also included personal communications from a range of adult perspectives from different education sectors, the business community and local whānau. Gathering data from various sources allowed the research to garner more than one point of view which, Middlewood, Coleman and Lumby (2012) assert, can create more confidence in the findings.



Figure 7. Working together is faster and easier.



Figure 8. An example of collaboration and ‘many hands make light work’.



Figure 9. Students having fun in nature

4 CHAPTER FOUR: FINDINGS AND ANALYSIS

4.1 Introduction

The project reported on in this thesis explores the implementation of a māra kai project in an English-medium Intermediate school in Aotearoa New Zealand.

Research Questions

The following questions guided this research:

1. What new understandings and learnings specific to māra kai do the students attribute to their experiences in the 'Whakatipu Iwi Nui' project?
2. What new understandings and learnings specific to service-learning do the students attribute to their experiences in the study project?
3. What 'deeper learnings' within and beyond the curriculum, do students describe from their experiences in the study project?

As outlined in the Methodology chapter, the findings of this study emerged from the analysis of data derived from a retrospective post-then-pre design questionnaire, and two focus group sessions involving twenty students. Photographic images, students' work and researcher notes garnered from communications with: a) other teachers, b) the Principal, and c) community members interested in or involved with the project, are included to enhance and support the findings, and provide richness and depth to the participants' descriptions.

4.1.1.1 Codes included in this chapter:

Quoted participant responses are identified as: participants from either focus group one (FG1), or focus group two (FG2). Codes for the locally based tertiary education provider (RSU), and; (LB) stands for the large horticulture corporation whose head office is based locally. The Chief Executive Officers of either RSU or LB are coded as (CEO). Individuals may be referred to as: tertiary level educator (tutor), (Principal), or teacher at the study school (teacher). Personal communications refer to researcher notes drawn from emails, ad hoc conversations, and phone calls. They are coded and dated, for example: (Tutor. Personal Communications. - Wed, 2 Aug, 2017). At times, individual students names are mentioned by teachers, in this case initials followed by [student's name] is used to differentiate students being discussed. For example: ME [student's name]. Actual names of any individuals have not been used.

4.2 Key themes

The analysis of the data was guided by the research questions above and informed by the literature review. The findings are presented under four overarching headings drawn from the work of Sue Wake (2010). These headings help to provide a coherent frame which supports the organisation of the findings. The four headings are:

1. Aspects attributable to the nature of the project.
2. Collaborative aspects fostered by the project.
3. Knowledge and skills-based learning fostered by the project.
4. Attitudes and Value-based learning fostered by the project (p, 125).

It is important to note that while the data has been ascribed to the overarching headings above, there is a fluidity between all these aspects of the project rather than a hierarchy.

Aspects attributable to the nature of the project

Sue Wake (2010) described this theme as ‘passive’ learning aspects that were either pre-existing or pre-determined by the project (p. 123). Similarly, I have used this heading to position findings that could be classed as pre-determined by the inherently distinctive features due to the context of the project. The interwoven elements of gardening from a Maori perspective, experiential learning and service-learning are key features that make the nature of this project distinctive.

The findings presented under this heading interweave extensively with the other theme headings. Indeed it could be argued that many, if not all, of the findings could be accredited to the unique nature of the project.

Real-life Learning

Analysis of the questionnaire showed all participants felt this project offered meaningful, real-life learning. Students from both focus group discussions reported that māra kai presented a learning context that was “*real*”, “*creative*”, “*hands-on*”, “*complex*”, and “*fun*”, in ways that were different to their normal learning environments. Independent exemplars and analysis to support each of these themes are presented later in this section.

Incorporating principles from service-learning also contributed to the authenticity of the context. As the following student response states: “*Service learning is a more ... tactile way of learning instead of sitting in front of a teacher and ... them just talk[ing] about what you are working on ... you actually go and do the thing you’re learning about*” (FG2). This points to service-learning providing relevance for students’ learning and speaks to the nature of the Whakatipu Iwi Nui project being an authentic learning context that was different in comparison to ways the students were used to learning in regular classrooms. The student’s use of the term “*tactile*” further demonstrates their understanding that part of the authenticity of the context was due to active learning.

Students also reported having a tangible goal to aim for gave their learning a sense of real-life purpose, For example, one participant stated; *“I just thought it was like really cool cos we planted the gardens...and then the cooking tech ... used the food that we planted...”*(FG2). Similarly, the following response further illustrates that having a purpose and tangible end goal to their learning was viewed positively by the students; *“I really liked the idea of being able to contribute to the community with the community garden we planned”* (FG2). The context of māra kai was perceived by the students to have a practical contribution to both their own learning and for the well-being of their community.

Active Learning

Data from focus group participants suggest, active learning involves “... a more of a tactile way of learning” (FG2), “so ... you’re doing something interactive while learning” (FG2).

Participants in focus group one discussed how the project involved: “Digging the holes [but] not going too far ... having like a line to do it down” [uses arm to show a line], “doing paving”, “building raised platforms for the flowers”, and when “you find an obstacle and you have to plan around it”.

Findings suggest active learning is closely linked to the fact that students were able to learn in ways that allowed them to fully engage all their senses. Active learning in this case was closely linked to the fact that students were able to engage with their learning in ways that allowed them to fully engage all their senses. Active learning enables students to develop an aspect of ‘action competence’, a skill that students actively build in their competencies moving forward and apply them to life beyond the classroom.

Participants viewed the tactile or active learning component as a positive attribute of the project which was not simply related to ‘hands-on’, experiential learning, but was also *“interactive”*. This points to the wider social interactions afforded which are presented under the collaborative aspects heading.

Having Fun and Wider Engagement

Having fun also emerged as an important element from the data. Several participants across both focus groups mentioned that they were also having “*fun*” doing the things they had been learning about. For example being involved in the māra kai project was referred to as “*a fun way of getting outside ... while you’re learning as well*” (FG1). Another student stated, “*I enjoyed working with [name] to plant everything ... it just made it more enjoyable to work with one of my friends*” (FG2). Responses imply students enjoyed working in an outdoor environment and sharing the experience with friends made it ‘more enjoyable’. This combination seemed to make this a special learning experience for the students suggesting the importance of the social aspect of learning.

Participants’ classroom teachers also visited the māra kai learning environment from time to time to see how the programme was going and chat about their students. With their permission I documented some of these conversations and these are included as researcher notes. In one such conversation it is suggested that the experience from the māra kai project flowed through to other areas of school work, as below:

(CD - student’s name) was often ... disruptive and uncooperative in class ... It just didn’t work for him ... though I have noticed a change since he got involved in your garden stuff... He loves it ... [and] seems more settled ... much more focused and involved in class” (Teacher - Personal Communications. Sept 5, 2017).

This korero points to the nature of the project possibly having a positive impact on student engagement outside the project. It also alludes to the unique teaching and learning approach of the project. This particular teacher suggests it was significant in developing a more positive attitude for students previously disengaged with education.

Similarly, researcher notes drawn from an email from one of the horticulture tutors mentioned “*... my colleagues talk about the fun and joy these kids bring to our [name] campus when they visit.*” (Fieldnotes, personal communication. 29 Oct, 2017). This suggests that having fun and enjoyment was not only experienced by the students but also by adults involved in the project.

Creativity

The findings suggest a large part of the students' enthusiasm stemmed from this project being firmly rooted in student learning that was real and purposeful while also being creatively engaging. Students specifically referenced the act of planning together as a creative experience, for example using *"lots of different, creative ideas"* (FG1) and having to *"compromise"* (FG2) and *"think of new ideas"* (FG2) in order to make everything work.

This suggests students actively sought to create new knowledge that would enable them to contribute to the outcomes they valued. It also points to students creatively utilising both physical and human resources in order to implement their ideas. The ability to think creatively is associated with a "can-do" attitude, and with students seeing themselves as capable learners (Te Kete Ipurangi, 2015). Challenge and novelty lent an added depth to their activities that enabled participants to create an empowering experience together.

Autonomy through responsibility

The project enabled the students to design and create garden spaces around the school environment.

Focus group comments point out: *"When designing a garden you have to make it suitable for the surroundings and other people who might go in the garden and use it, so that they would be able to ... use the garden"* (FG1); *"... we're not just making something for our school by itself but for everyone"* (FG2). Additionally other students stated, *"...when ... something goes wrong ... you have to like think of a new way to fix it."* (FG1). In order to do this, the following student suggests *"... you can't just have one person and their ideas ... different people have different ideas, they all contribute, and ... it's kinda helped me learn how to recognise ... which ones will work with the design"* (FG2).

The data suggested students recognised that they had control of the design and with it came a responsibility to ensure appropriate outcomes. Findings imply that the learners' showed they were willing to take charge of their own learning and gain confidence in their abilities as

learners. This implies that the greater autonomy and variety afforded by the Whakatipu Iwi Nui project gave students freedom of choice, and they responded positively in terms of learning, by customising their learning with references from the Māori world view of 'for the collective good' and the responsibility this brings.

The project required students to take responsibility for their work and focus group comments from students suggest they felt comfortable about contributing their ideas

Empowerment

The nature of the project not only allowed students more control over the learning process, data suggests it was also an experience of empowerment. For example, a lack of resources did not stop progress as one student said, *"...we had to compromise with the stuff that so we asked for recycled pallets and gear to make things and put our plants in"* (FG1). Students canvassed the community for resources that would be needed to begin implementing their designs. For example, wheelbarrows, spades, shovels and rakes were borrowed from RSU and whānau. Students sourced pallets and timber from local businesses and approached the school property manager to reuse old paving stones removed from the Tech Courtyard.

Leadership and Mana

Students demonstrated leadership and the data suggests this was a developmental aspect of the programme for one student in particular. A note in the researcher notes outlines how a teacher sought me out to share her thoughts about a child in her class, saying, *"you know ... since [Participant's name] has been involved in this [project] I have seen a huge growth in her social skills, she has grown in confidence and even takes on leadership roles in class. That's a biggie for her"* (fieldnotes, personal communication. Week 5, Term 3, 2017).

Having the "confidence" to make learning choices and the power to carry them out, seemed to open a space for students to develop their personal mana. Mana includes personal characteristics such as, inner strength, pride, self-assurance and confidence (Smith, 1999)

Engaging with Complexity

That students' gained a level of engaging with complexity is evident in the following reflections; *"when designing a garden you have to make it suitable for the surroundings and other people who might go in the garden and use it"* (FG2), and, *"mak[ing] the path[s] big enough for wheelchairs to go in so then everybody can go through the garden"* (FG1).

Communications from the principal of the school in which this project took place address outlines his acknowledgement of how the students managed the complexity of working within parameters and maintaining relationships. As he stated *"when designing and building their gardens these children have gone through complex processes of negotiation and compromise ... [for example] ... staying within Ministry requirements, keeping [the school's property manager] happy and working around pipes and drains and such"* (fieldnotes, personal communication. Term 2, 2017). Having to factor in the considerations of other key stakeholders and existing infrastructure required students develop an understanding of the impact their ideas could have on those affected by the planned changes to the school environment.

Taonga Tuku Iho

Taonga Tuku Iho is a finding where data indicates that by grounding the project within the cultural practice of māra kai, students' were provided a space to develop an awareness and understanding of tikanga Māori, not only as it related to gardening but also in relation to Māori philosophy and practices concerning social interactions.

Focus group data suggests that students recognised cultural practices and Māori ways of being during the project including: spiritual awareness; traditional knowledge, practical skills, and social skills. As this participant stated, *"Māra kai is a Māori food garden ... and you have to say a karakia ... before you plant things"* (FG2).

The following sub-sections present findings that relate specifically to a developing awareness or understanding of Māori philosophy and practices shown in the data.

Māra Kai

Students said, designing and constructing māra kai gave them the opportunity to “*learn more about different ways to plant a garden*” (FG1). Participants clearly articulated māra kai as being a “*Māori way of gardening*” that focuses on producing, “*any type of food ... not just vegetables*” (FG2), but a wide range of produce including “*fruit, berries, herbs and medicine*” (FG2). Students also recognised the importance of “*helping the bees*” (FG1) and “*all the different insects involved*” (FG2) in a healthy ecology and that māra kai is also about companion planting or, “*learning what plants grow good next to other plants*”.

These comments indicate students developed an expanded view of the ‘normal’ perception of ‘a vegetable garden’. Responses also point to students having an awareness of the synergistic relationship between human beings and the natural environment, understood in the learning as Papatūānuku (Royal, 2003). This suggests a simplistic consciousness of kaitiakitanga (Marsden, 1992) and the role people play in taking care of the environment. This symbiotic view of nature and mankind reflects a Māori perspective of reality (Marsden, 1993).

Additionally, questionnaire data showed twelve of the twenty questionnaire participants believed they had little to no understanding of gardening tikanga prior to taking part in this project. As this student stated, “*I had no idea before this that there were different times during the month for planting things*” (FG2). As a result of their participation in this project, all twenty participants felt they had gained significant knowledge of traditional Māori practices used when planting gardens.

Within the focus group environment this led to student discussion of some key ideas regarding specific knowledge of the Māori philosophy toward gardening. Students talked about “*learning when to plant things*” (FG2), and “*the times when you’re meant to plant things are based on the lunar calendar and the way the moon is*” (FG2) and saying “*prayers before you start doing things*”. These comments evince learning of specific practices deemed essential in the development and ongoing maintenance of māra kai such as karakia and the māramataka.

Wairuatanga

It has become a common vulgarism to translate this value as spirituality, but to do so muddles up all the Christian associations of the Pākehā with the Maori process of validating actions according to their consistency with traditional principles (Ritchie & Ritchie, 1993, p.87). Wairuatanga is the principle of cultural integration that hold all things together over time; it is as material as it is metaphysical; as contemporary as it is ancestral.

Focus group participants spoke about the '*karakia*', '*prayers*' or '*blessing*' said before and after activities in the garden, for example: "*when we're planting food gardens, we do a karakia before we start*" (FG1).

The findings suggest participants acknowledged karakia as an important practice of māra kai. This implies an awareness toward the spiritual dimension that forms the foundational principles of Māori ways of being and doing.

Due to the nature of this project students were exposed to learning metaphysical beliefs important to a Māori worldview of gardening.

Maramataka

Focus group participants went on to describe the traditional Māori method of using a māramataka to decide "*the times when you're meant to plant things*" (FG1) as being "*based on the lunar calendar and the way the moon is*" (FG2). Expanding on this concept, another student responded by saying, "*when you plant [a māra] there [are] certain times, seasons, months, and the full moon [which] can also help you*" (FG2). Another respondent states that, "*a new moon isn't good for certain things where as a full moon is good for most things*" (FG1). As these responses show there was a transfer of basic practical knowledge specific to māramataka and traditional Māori gardening practices.

Summary of aspects attributable to the nature of the project

The findings presented support the assertion that this project provided a holistic, real-life context which gave meaning and purpose to students' learning. Real-life learning is learning designed to connect what students are taught in school to real-world issues, problems, and applications (Pearce, 2016). Participants described the project as *"a fun way of getting outside ... while you're learning as well"* (FG2). Students discussed how working in an outdoor environment and sharing the experience with friends made learning 'more enjoyable' suggesting the importance of the social aspect of learning. Supporting data suggests this project was significant in developing a more positive attitude toward schooling for students previously disengaged with education.

Findings collated under this theme suggest that the task of designing and creating gardens provided opportunities for students' to experience a degree of autonomy which actively led to student learning. For example, participants reported having more control over their learning in ways that were both creative and complex. This was empowering for students and for some, led to a significant growth in leadership skills, confidence and personal mana.

The findings support the view that the context of māra kai afforded a culturally responsive approach to teaching through which educators can share Māori knowledge and learnings. Focus group discussions signify an awareness of the symbiotic view of nature and mankind which Marsden (1993) says reflects a Māori perspective of reality. Furthermore, questionnaire responses show all twenty participants believed they gained significant knowledge and important learning regarding māra kai. Responses given during the focus group interviews and supporting personal communications testify to the participants' acquisition of specific knowledge of traditional practices such as: karakia, māramataka, mauri and companion planting. This suggests that grounding the project in a Māori worldview enabled embedded learning of tikanga associated with māra kai which encouraged participants to develop an awareness and understanding of our cultural differences and similarities.

The authentic nature of this project employed active, real-life learning as outlined by Mantei and Kervin (2009), this allowed the children to research the problem, identify a range of

solutions, explore the most appropriate one, put the plan into action, reflect on the plan and identify solutions to overcome obstacles.

Findings suggest the Whakatipu Iwi Nui project allowed students to express themselves, seek solutions to their own questions, and have control over the direction of their learning. Students took responsibility for both the design plans and execution. The learning experiences attributable to the nature of this project mirrored the complexities and ambiguities of real life. By giving students the opportunity to learn through authentic, meaningful, and relevant learning experiences, Pearce (2016) states we are giving them the opportunity to apply their learning, to learn through doing, to see their abilities, to adapt and change, and to form the habits required to do this successfully in their lives beyond school.

It is important to reiterate here the overlapping and interwoven links between findings described in this section and the themes presented under the other three headings described in the following analysis.



Figure 10. Having fun potting on their tomatoes.

4.3 Collaborative aspects fostered by the project

The collective management of the Whakatipu Iwi Nui project and its authentic context meant there was considerable interaction across the school and with the wider community. This led to a number of collaborative learning outcomes as expressed in the following exemplars that emerged from the data.

Whakawhanaungatanga - Building Relationships

The data presented in this section highlights the findings related to building positive relationships with students, staff and the wider community.

Important to the notion of whakawhanaungatanga is the establishment of new relationships. When asked to describe ways their involvement in the māra kai project influenced the way they relate to other people, participants articulated that the project helped them to make new friends through meeting lots of new people and working with people they normally wouldn't work with. This is further supported in the questionnaire data.

According to focus group responses, the project facilitated *“working with people you would never normally work with”* (FG1) *“... and to interact with other kids that you didn't really know”* (FG2). This points to the project incentivizing participants to mix with different groups of students and widening their social circles.

Some of the students wanted to make gardens in underutilised, barren spaces of concrete which could not be dug up and planted in the normal sense of gardening. In order to achieve their aims relationships with a local hardware store and the carpentry department of a local tertiary were involved in building triangular beds with retaining walls on top of the concrete.

Student participated and contributed to formal and informal conversations amongst students, teachers and other adults across different disciplines at the study school. For example, a relationship was established with the teacher and students in the woodwork department and, as this participant remarked, *“we now have a connection with our school mates that are [in]*

wood work extension who were able to make some planter boxes for us” (FG2), to which another student added, “that just shows you that collaborating with other people can help you a lot” (FG2). Similarly, students developed an arrangement with the food technology department where, “... we planted the gardens...and then the cooking tech ... used the food that we planted ...” (FG2).

These responses highlight participants’ realisation that building relationships with people outside their normal social circle or school relationships contributed helped them achieve their goals. As a result of these ‘joint efforts’, findings suggest a stronger sense of community, or shared collective extending across different subject departments at the school. The findings infer this was a positive result of new relationships developed during this project.

Participants in the focus group interviews spoke positively about the project’s influence to enrich their ability to establish new relationships and relate well with others.

Manaakitanga - Inclusiveness - Belonging

Participants’ classroom teachers also visited the māra kai learning environment from time to time to see how the programme was going and chat about their students. With their permission I documented some of these conversations and these are included in researcher notes.

In the early stages of the research, some staff questioned the wisdom of certain students being a part of the project and made their concerns known to me. For example as recorded in researcher notes, one teacher expressed concern regarding the students extreme lack of literacy skills in particular and queried as to whether taking him on as part of the project would be a good move (Teacher - Personal Communications. Term 3, 2017). However, as the student had shown enough interest to attend the original garden club or horticulture classes, attend meetings in their own time and provided the necessary signed consent forms, they were included.

A discussion recorded in my field notes during a visit with a teacher who had just completed her report for the same child discussed above. She shared with me that as a ‘targeted student’ with identified learning challenges, [AB - student’s name] experienced learning success while taking part in the māra kai classes. She said he spoke of his passion for horticulture and how through the hands on activities he was able to prove to himself that he was a capable learner.

She also mentioned that his confidence and social skills had grown and he demonstrated evolving leadership skills when guiding others. (Teacher - Personal Communications. December 8, 2017).

These comments allude to the nature of the project engaging disaffected students through different ways of learning. They speak to a re-engagement with the process of learning and attest to a positive change in attitude of both the students and staff. However, if it were not for the inclusive aspect of this project, these boys and the others like them would never have had the opportunity to experience any of the benefits this project offered.

As well as the inclusiveness in terms of being able to participate in the project, data suggests that many students learnt the meaning of inclusiveness *within* the project too. As these focus group participants stated, when “... *working with people you would never normally work with*” (FG1), “... *you’re quite dependant when you’re making something or planting something on every person so you kind of need to listen to them, ... work ... things out*” (FG2). Another student added “...*even if you think they aren’t needed...you learn to have everyone help and to give them a job*” (FG2).

Findings point to a sense of belonging nurtured by the joint effort of working together during their involvement in this project. This finding implies participants recognised the value of including everyone and having them actively involved. It tacitly refers to this work helping students include others by making them feel needed and valuing their contribution. Including others helps develop a sense of belonging and collective ownership.

Focus group participants also thought the project “... *helps you make new friends ... working with people you normally don’t work with ... that can create some friendships*” (FG1), “... *and to like interact with other kids that you didn’t really know*” (FG2) and get “... *to know them from gardening and stuff*” (FG1) also enabled new friendship to develop. A teacher observation recorded in the researcher’s notes suggests students developed new friendships during their involvement in the project. It states, “[EF - student’s name] *was a quiet, socially awkward kid but she’s blossomed since she’s been doing your māra kai stuff... she’s got a tight little group of friends now, they do your classes too...*” (Teacher - Personal Communications. June 21, 2017).

This finding suggests working closely with others, sharing ideas and a common interest enabled some participants to form friendships with others in the project. Further supporting the findings that the project encouraged a sense of inclusiveness and belonging.

Community Connections through Service-Learning

The complexity of this project required the participants to interact effectively with a diverse range of people in a variety of contexts. As shown in the data, students from both focus groups articulated explicit connections between service-learning and engaging with the community. For example, focus group two responses described: *“Service-learning is when you go to school ‘aaand’ help out your community”* (FG2). With *“service learning you don’t expect anything back ... you do it for the benefit of the community and not yourself”* (FG2), and, *“... learning while doing a service is like, ... you’re learning but you’re also doing something for someone else as well”* (FG2). *“It’s also like, a fun way of getting outside and doing stuff for the community with your friends and while you’re learning as well”* (FG2).

Focus group one students reiterated that service-learning is about *“doing something just not for yourself, like doing it for everyone around you”* (FG1), and *“helping the community”* (FG1), *“... the whole community ... [explains another] ... not just the communities you’re a part of”* (FG1). This student said, *“It’s doing something and you’re not expecting something in return”* (FG1). As this participant identifies, *“Service-learning doesn’t have to be like ... a hard physical task, it can really just be anything that helps, that means you’re getting like hands-on and you’re actually doing the thing you’re learning about, so, in a way you’re doing something interactive while learning”* (FG2).

Findings show clear understandings that service-learning involves doing learning while taking your learning out into the community, for the benefit of the community. The students are clearly thinking outside of their own specific communities to incorporate the wider community. This is important because, as Bolstad, Gilbert, McDowall, Bull, Boyd and Hipkins (2012) argue, education and learning systems will not have traction to shift towards more 21st century approaches if this shift is not supported by the wider community.

One participant particularly *“liked going to [tertiary campus], it was fun hanging out in their gardens and patting the chooks...there’s always people there you can talk to ... adults, like [tutor’s name] and [tutor’s name]”* (FG2). For some, this was the first time they had ever come close to chickens *“in real life”* and the opportunity to feed and pet them was *“awesome”* and a new experience for them.

Collaborating with the community was an important part of the project. The involvement of community members with expertise in specific areas such as horticulture and Te Ao Māori exposed the children to learning new skills and knowledge in ways very different to what they would normally encounter during school. This is further illustrated in the following focus group response that says, *“We learned a karakia with Papa [kaumātua’s name] to start our work and one for when we finished”* (FG2).

The findings show the service-learning component of the study project provided an avenue for *“lots of different situations to learn from adults”* (FG1) other than teachers at school which encouraged and supported collaboration with the wider community. As the Principal commented *“these children are incredibly lucky to have access to kaumātua and horticulture experts who have helped them negotiate through complex concepts and processes that are going to be appreciated by [other] students and whānau for a long time... that’s so amazingly valuable”* (Person. Comm. Principal - Term 2, 2017).

Students also developed public speaking skills during the project in order to seek community sponsorship for materials and physical help with setting up the infrastructure. Participants spoke about visiting the headquarters and processing plant of a nationally recognised, locally based horticulture business, *“we got to talk to [name of the CEO] and [name of his personal assistant] ... and ask if they would help us with our idea to build a māra kai for our school community”* (FG2). Developing and presenting their proposal required them to not only be able to articulate their ideas clearly and confidently but to also be comfortable enough to engage in small talk and answer questions. They were successful in negotiating machinery and labour from one business and opened an avenue for the Principal to apply for significant finances for the project, which was also successful.

Teamwork

The findings of this study suggest *“teamwork”* or *“working together as a team”* was an important area of learning for participants. Comparable views were voiced by multiple students during both focus group discussions. Generally speaking, participants felt teamwork involved *“learning how to work with other people”* (FG1). Most adults understand the importance of relating well with others, because being a good team worker is important for most jobs nowadays. Many jobs are ‘knowledge work’ where people with different expertise get together to create ideas or products that none of the team members could have created on their own. Here, students acknowledge that knowing how to interact effectively with a diverse range of people is recognised as an important life-skill and a key element of collaborating as a team to achieve common goals.

When learning to work as a team, participants emphasised the importance of *“learning to know people better”* (FG1). Students felt working as a team also helped them to *“communicate better”* (FG1) with others in group situations. Moreover, as this student states: *“I’ve learned how to work with other people and listen to other people’s ideas”* (FG2). Here the students are acknowledging that in order to effectively work with other people one needs the ability to actively listen. These responses point to students taking the time to get to know people so they could appreciate different points of views (Ministry of Education, 2007) which helps develop an awareness of how words and actions affect others (Ministry of Education, 2007). The findings support the assertion that participation in the Whakatipu Iwi Nui project enabled students to make positive connections with others that in turn helped them to communicate more effectively.

As the following response articulates, building relationships through *“working with other people you can learn other ways of doing stuff, not just your own”* (FG2) acknowledges that participants recognised that there are skills within the team that go beyond the thinking of an individual to acknowledging that others have skills that can help the team move forward with the task. The student is acknowledging the skills of the individual but also acknowledging how the team benefits from the efforts of individuals within the team.

Many participants across both focus groups drew attention to having to *“learn how to work as a team”* to accomplish some of the more physical aspects of their designs because *“we have*

really big tasks" (FG2). Students discussed how teamwork makes it *"easier to do something"* (FG1) and that you can accomplish tasks *"twice as fast"* (FG2). These comments allude to manpower, or 'many hands make light work'. They show a clear understanding that working together makes the work easier. Working as a collective can also produce the desired outcomes more quickly than working individually. Students also spoke about being able to *"share the load"* and *"work[ing] together"* to achieve a common goal. *"... otherwise the tasks... [which] are quite big... will take you a long time to get ... done ... and you might not get it done as well as you could with everyone working* (FG2). This suggests students recognise that there are possibly multiple tasks that can be shared by the group, highlighting the positives of working collaboratively as a team.

These responses reveal students working through what needs doing, encouraging everyone to do their fair share, and including others in the different jobs that need to be done. It also acknowledges that by working together tasks will not only take less time they could potentially produce higher quality outcomes.

Furthermore, participants expressed how teamwork often involves learning to *"problem solve with other people"* (FG1). Rather than working on their own, as is often the case in their normal classroom environments, the project encouraged students to be *"... dependant ... on every person... and ... work things out with them cause otherwise it won't work"* (FG2). This illustrates the realisation that working as a team requires problem solving to achieve the tasks to be done. Students evince an understanding that teamwork also involved solving problems by drawing on the collective knowledge or skills of the team. It also refers to students sharing their ideas to negotiate a way forward and acknowledges that as a team that they can find solutions to potential barriers.

The teamwork experiences manifested in these findings encouraged students to work together as a collective by listening to others points of view and negotiating the best way to progress their plans. Findings speak to students getting to know each other through the mahi which helped them to contribute appropriately as a group member and work together more effectively as a team.

Ako - Reciprocal Learning

Another collaborative feature of the study project that emerged from the data relates to the concept of 'ako' or reciprocal learning. Ako is about building productive relationships where everyone is empowered to learn with and from each other (Keown, Parker, and Tiakiwai, 2005, p. 12).

As this focus group two participant explains, *"[names of adult experts] they were teaching [us] but ... you might have different things to say ... or an easier way to do it, so you kind of like, [talk it through] and both of your things [ideas] are put together then you do better"*. This conveys the impression that participants felt their ideas and suggestions were valued. It also points to participants thinking critically and having the confidence to challenge ideas thus contributing to their ako environment.

Field notes recorded by the researcher suggest reciprocal gains were also experienced by the adults involved in the project. Comments made by one of the horticulture experts (fieldnotes, personal communication. 29 Oct, 2017) spoke about how as a tutor who normally works with adults in the tertiary sector, he was used to "basing his lessons around a framework of tasks" but that he realised very early in the project that *"the students were keen to learn"* and *"they drove the lessons"*. Field notes suggest he *"learnt a great deal from the students"* (personal communication. 29 Oct, 2017), and spoke of how the students would point out observations that, as an adult, he would overlook. They asked him questions that would challenge him and make him think differently, as a tutor. He also highlighted how he and his colleagues would talk about the fun and joy the students added to their campus when they were there (fieldnotes, personal communications. 29 Oct, 2017).

Similarly, the Principal stated he learned more about the māramataka and mauri from the students than he previously knew (fieldnotes, personal communication. Wed 2 Aug 2017). This implies that learning went both ways and suggests it was not just the students doing all the learning and the adults teaching, but that the adults also learned from the students.

Supporting this finding are field notes from a conversation late in the year with the Chief Executive Officer of the tertiary institute involved in the study project. He revealed that his staff really enjoyed working with the students and that they actually learnt a lot from them,

especially with regard to the way his staff communicated their knowledge. He gave the example of the tutors having to break down some pretty complex concepts into everyday language and still use the right terminologies so the students would know what it is when they hear it later: technical language like *“topography”*, and *“propagation”*, and *“the why’s ... why we need to look after bees and use ‘grey water’*. The students asked some pretty tricky questions, according to researcher notes, one of his staff recounted how one student asked ... *“Why aren’t poisonous sprays illegal if they’re killing all the bees and polluting the water? Don’t they know we’ll probably die too if the bees die and we’ve got nothing to drink?”* (Fieldnotes. personal communications. Nov, 2017).

The data outlined above provides evidence that there were reciprocal gains for both the students and the adults involved in the project. While the participants provided another perspective for adults to view the world, having the adults genuinely consider and take on board their suggestions is viewed as very an empowering experience for the students. Tutors benefited professionally by reflecting on how they could improve the delivery and content of their teaching programme. They suggest that having to simplify concepts while still incorporating the technical ‘jargon’ improved their communicative skills. Also, the enjoyment adults gained from working alongside emerging adolescent students cannot be underestimated.

Tuakana-Teina Relationships

In a learning environment that recognises the value of ako, the Ministry of Education (2009) asserts the tuakana–teina relationship provides a model for buddy systems or peer teaching. The findings suggest that the Whakatipu Iwi Nui project encouraged and supported students to learn from each other.

Participants in both focus groups spoke of learning from more experienced participants. For example, when *“I don’t know what to do I can just ask people like [participant’s name]... who have been doing horticulture for ages as she’ll help me with whatever I need”* (FG2). This response clearly expresses the concept of tuakana-teina: where an older or more expert person (tuakana) helps and guides a younger or less expert (teina). For the teina this may be less threatening than asking an adult for help. For the tuakana, passing on their knowledge in

a comradely manner is empowering. If you already know something, the ultimate next learning step is to be able to teach it.

While there are many reasons why students are sometimes reluctant to seek support, having the confidence to ask for support or clarification is something that should not be underestimated. If students continually resort to retreating when they have a question, over time they can develop the habit of not asking when it is necessary. Knowing when, and being able to ask for and offer help, is an important skill: one that comes into play when faced with a challenging task, whether this task is a collective or individual one. By providing opportunities which enhance a learners ability to: listen actively, negotiate and share ideas, ask for and offer help when needed, this project enabled students to interact effectively with a diverse range of people in a variety of contexts.

Summary of collaborative aspects fostered by the project

These results reflect participants' interaction with a diverse range of people in a variety of contexts. The data highlights many reciprocal benefits of engaging with the wider community and collaborating with students they normally wouldn't work with.

Widening students' social sphere created a space where students felt comfortable to take risks and become more inclusive by getting to know others better. By working together effectively with both their peers and adults, participants developed their communication skills and were able to recognise and appreciate different points of view. This allowed them to negotiate and compromise with others. The findings show students developed an understanding of the benefits of consensus decision-making, collective responsibilities, and group competencies.

Teamwork was a strong finding in the data. While acknowledging how the team benefits from the efforts of individuals within the team, the findings show students also recognised and acknowledged that the skills and knowledge of others help the team achieve their goals 'quicker', 'better' and more 'easily'. As Tamati (2011) notes, everyone's skills, abilities and contributions are integral to achieving the collective aspiration (p.70). This finding highlights the positives of working collaboratively as a team.

Embracing the principle of ako, the project enabled a caring and inclusive learning community where each person felt their contribution was valued. Furthermore, students who were having a negative experience of schooling were provided with an opportunity to re-engage with learning by developing relationships through common interests and active participation. This enabled these students to demonstrate their capabilities and contribute positively to the goals of the project. Everyone was empowered to learn with and from each other.

Compatible with the principles of whakawhanaungatanga, the approach of service-learning led to reciprocal relationships with the community that encouraged students to effectively interact with adults other than their teachers in real life scenarios. The findings acknowledged the benefits of the teacher being a guide rather than the font of all knowledge. Collaborating with the wider community allowed students access to knowledge, skills and experiences outside teachers' proficiencies. Access to learning opportunities in community contexts was important as it provide participants with specific kinds of expertise which facilitated participants developing new skills and expanding their understanding of new ideas and alternative ways of thinking and being. The data also shows service-learning facilitated opportunities for participants to take on different roles in different situations (leader, negotiator, advocate, teacher and learner) and gain the confidence to step outside their comfort zones.

These findings suggest the collaborative aspects of the project helped the participants to achieve real objectives for the community while gaining a deeper understanding of horticultural practices, Te Ao Māori and life-skills for themselves. The data presented also implies that creating a friendly atmosphere characterised by low threat, positive regard for others, and respect for the ideas and opinions of others, encourages an environment focused on collaboration rather than competition.



Figure 11. Digging out the pathways and painting the planter boxes.



Figure 12. Teamwork in action.

4.4 Knowledge and skills-based learning

The focus in this theme emerged from the data relating to facts, information, and skills acquired through experience in the project. It also presents findings that suggest the learning process was different to what participants were used to.

Communication Skills

The data identified communication skills was an area of learning for participants. Students spoke about having “... *learnt a lot about like just talking in a group*” (FG2) helping them “... *communicate better [when] working with other people*” (FG1). Participants discussed effective communication as involving the “... *need to listen*” (FG2) to each other because “... *different people have different ideas and they [can] all contribute*” to figuring out “... *which ones will work*” (FG2).

The findings suggest participating in group discussions allowed students to share their ideas, synthesise the ideas of others, and build a deeper understanding of what they were learning. The findings imply discussion contributed to the increase in collaborative skills and the ability to problem solve.

These findings support the notion that discussion promotes learning because it affords students the opportunity to use language to demonstrate their independent thoughts and encourages meaning-making through consideration and negotiation with the ideas of others. This finding suggests an affinity with Maori processes for decision making which strive for consensus through the recognition of the viewpoint of each individual.

As previously mentioned, students involved in preparing and presenting the proposal for corporate sponsorship developed their research skills, communication and public speaking skills. The learnings involved in this exercise crossed many disciplines. For example, students: researched the business' history, areas of interest and vision to find commonalities they could tap into. To support their pitch they made a flipchart. To produce the flipchart they learned to: paraphrase and summarise the main points in their proposal; provide a budget outlining the

items required and the amount they were seeking, and; gave reasons why it would be beneficial for the business to endorse their proposal. Other students were afforded similar public speaking experiences during interviews for two newspaper articles and the tertiary institute's magazine.

Thinking Skills

Many participants across both focus groups discussed having to *"think differently"* when designing their gardens. Responses from the questionnaire showed most participants felt they had many opportunities to solve problems and use creative thinking skills. This finding was supported in the data from focus groups with students clearly articulating, *"When we were designing our plans we had to think about where everything goes and we had to think of lots of different, creative ideas"* (FG2). Likewise, during the garden build *"...we had to think of new ideas and how to improve it and stuff"* (FG2). In addition, students stated, *"when ... something goes wrong ... you can't really take apart the whole thing because it will damage the materials so we end up having to think of a new way to fix the problem..."* (FG1).

To make sense of the information, experiences and ideas encountered during the project the findings clearly point to participants exploring a range of thinking skills. Responses show an association between students thinking 'outside the box' in creative ways when making design decisions, shaping actions, and solving problems. Moreover, the findings infer participants used a quality of thinking that enabled them to analyse, assess, and reconstruct problems and make improvements to their designs.

Of note was the participants' use of the term 'we' rather than 'I' when generating new ideas or finding ways to fix a problem. This suggests a co-construction of knowledge drawing from a pool of ideas created as a group. This strengthens and supports the notion that this project facilitated the use of collective thinking skills.

Horticultural Skills

Focus group participants declared, *"I've learned that there's like a lot more to horticulture than ... just planting, there's ... building gardens and planning gardens and ... different times for*

planting and our responsibilities for the different insects involved in keeping the environment healthy" (FG2). More specifically, another student from focus group two stated, *"I've learned the responsibility of [growing] plants and taking care of them"* (FG2). Similarly, several participants in focus group one spoke about learning: *"how to graft different fruit plants"* (FG1, *"properly plant plants"* (FG1), and that *"different plants ... have specific needs"* (FG1).

These findings indicate a depth of information and skills relating to the science and technology learning areas as experienced by the participants. Students refer to a range of specific horticultural skills and techniques learned. Findings also point to participants' awareness and understanding of sustainable practices related to looking after the wider environment.

Different Way of Learning

The data highlighted that students felt *"... being in this project a lot of opportunities came up to meet a lot of new people in the community and learn how to do a lot of new things"* (FG2). In comparison with their regular classroom lessons, students described learning in the project as *"actually going and doing the thing you're learning about..."* (FG1). They talked about, *"Service learning is a more of a tactile way of learning instead of sitting in front of a teacher ... and getting them to just talk about what you are working on, you actually get... like it's more of a hands-on way of learning, you actually go and do the thing you're learning about"* (FG2).

Others add, *"... [it] doesn't have to be like ... a hard physical task, it can really just be anything ... that means you're getting like hands-on and you're actually doing the thing you're learning about ... you're doing something interactive while learning* (FG2). For example, during off site visits to the tertiary campus gardens the following participant animatedly recalled how they *"cooked an egg in the compost"* (FG2) and another stated *"... it's a fun way of getting outside and doing stuff for the [community] with your friends ... while you're learning as well"* (FG1).

These responses clearly indicate students felt the project opened up a way of teaching and learning that was different to the way they were used to learning. They identify the service-learning component of the project as a tactile way of learning and suggest it is more stimulating than learning in a classroom setting. Findings infer that learning takes place in a range of

contexts. They also imply learning gained through interaction with other people and the outdoors is engaging, relevant and novel.

An important feature of the project was teaching the skills students needed to implement their garden designs. Regarding this, one student said, “[Tutor’s name] came to school and taught us how to make the cobblestone path for our garden... that was pretty cool. I liked doing that” (FG2).

Engaging with community experts in hands-on activities during the project enabled students to develop knowledge and skills that were not part of regular learning routines. Findings point to the natural setting of the project enabling teaching practices that encouraged learning by actively practicing the knowledge gained directly in the context they needed to be used. The data presented suggests the authentic nature of this project provided opportunities for real-life experiential learning. As outlined by Mantei and Kervin (2009) experiential learning, as opposed to academic learning, concerns the practical application of the knowledge and skills being learned in specific contexts.

Access to tertiary level horticulture tutors during their involvement in the study project meant that although *“most students had very little knowledge or experience of growing plants at the start ... now they can confidently design outdoor spaces, sow seeds, care for plants, and generally have a better understanding of horticultural skills ”* (Tutor. Fieldnotes, personal communication. Term 4, 2017). Rather than studying topics in isolation, this implies the participants learnt a wide range of horticultural skills that covered the complete process; from start to finish. This suggests the teaching approach used in the project enabled participants to construct knowledge and make decisions which shaped the direction of their actions.

Participants spoke positively about having other adults from the community also share their knowledge with them as the following response indicates ... *“I liked listening to Koro (kaumātua’s name) stories he told us about looking after Papatūānuku cos she’s our first mother...and the stars and the moon gardening ... Māori use”* (FG2). This indicates a knowledge of mātauranga Māori gained. It also suggests a growing understanding and appreciation of the way Māori view the world. By including both conventional Western techniques and Māori practices of gardening, the data implies that the project provided

different perspectives of what constituted knowledge that was more holistically inclusive and connected for students living in Aotearoa New Zealand.

Inter-Disciplinary Learnings

Inter-disciplinary learning integrates knowledge and methods from different disciplines, using a real synthesis of approaches.

The data and my own observations as the teacher-researcher support the assertion that the Whakatipu Iwi Nui project enabled embedded learning across mātauranga Māori, horticulture and the essential learning areas in the New Zealand Curriculum.

Findings suggest the knowledge and skills required to develop and present their garden designs involved synthesising learning from a range of subject areas. As this participant from focus group two shared, “...*when we were designing our plans we had to think about where everything goes ...some plants need to go in the sun and some plants need to go in the shade*” (FG2). Other participants discussed aspects of the design process. For example, “*It was really hard to ...um.... draw our plans right...you know...like...properly*” (FG2).... “*Yeah, Mr....the Caretaker ... helped us measure heaps of times eh*” (FG2). “*...you know...getting all the parts right...the right size...and then drawing them theright size...and the right places too*” (FG2). Responses point to participants using specific skills of measurement, spatial awareness, topography and technical drawing. This suggests the task of designing a garden required learning more than just a basic understanding of science, mathematics and visual presentation skills. Because their plans had to be submitted to the Principal for approval, the students designs had to be both realistic and easily understood by others not personally involved in the actual planning and preparation. This implies students had to synthesise all this information in order to produce a representation of their plans, further attesting to the depth and breadth of the knowledge and skills learnt from the project.

Many focus group participants also spoke about recycling and repurposing materials. As the teacher-researcher, I noted environmental awareness and sustainable practices like composting and worm farming were activities understood and enjoyed by all participants.

Observations such as, *“I think that the gardens around the school have made the school a lot more better. I’ve seen more bees around”* (FG1) and *“I’ve learned the responsibility of looking after plants and taking care of them”* (FG2) *“... and to plant a flower which is helping the bees with their nectar and bringing more bees into the world”* (FG1) suggest a growing awareness of the Māori belief in kaitiakitanga and the interrelationship between people, land and living creatures.

Focus group students also described learning that involved differing degrees of complexity. Findings show learning ranged from a simple ... *“I learned how to transfer the plants into the bigger pots cos I didn’t know how to do that before”* (FG1) to more in depth and specific knowledge given in the following example. *“I learned that bees only pollinate the plants they know have nectar and are bright colours and wasps only go by stuff that are sweet like sugar but not like flowers and stuff. Different plants are effective for bees [because they] produce more nectar ... so bees go to those specific plants”* (FG2). This finding suggests the project incorporated differentiated learning tasks provided all students the opportunity to learn. It implies differentiated tasks enabled students with a range of abilities to gain learning benefits and a depth of knowledge related to scientific learnings was also gained by some.

Summary of Knowledge and Skills-based Learning

The findings indicate the project promoted and encouraged students developing a range of practical skills and knowledge needed to create a garden and an understanding of the responsibilities involved in keeping it healthy and productive.

The different way teaching and learning was approached in the Whakatipu Iwi Nui project recognises learning as active meaning-making. The findings suggest students get more out of their learning interactions when they are able to participate in planning and decision-making and can contribute positively towards the creation of shared goals. The data implies the learning process used in the research project supported students to step outside their comfort zone and take learning risks which enabled students to recognise themselves as capable learners.

The findings indicate knowledge and skills students learned were inter-disciplinary. Associated with the design aspect of the project, for example, integrated knowledge, methods and skills from different disciplines included: using algorithms for measuring the garden areas, spatial awareness, botanical and topographical knowledge, drawing to scale and mātauranga Māori, using a real synthesis of approaches.

The findings also point to the learning students gained during their involvement in the project being transportable and transferable to areas outside of the project.

The data showed how teacher's attitudes towards some students can put up barriers that inhibit learners' engagement and growth in learning. If allowed or believed, these negative attitudes can potentially prohibit these students from gaining a positive learning experience at school. The findings in this section demonstrate that for some students a new approach to teaching and learning moved them toward achieving their full potential as learners.

Ultimately, the findings support the assertion that if the learning is meaningful for the students and delivered in a way that engages their senses, students will be more engaged in and connected to their learning.



Figure 13. Students' recipe for their compost.



Figure 14. Preparing the pathways for paving.



Figure 15. Working together to lay the paving stones.



Figure 16. The Remembrance Garden Courtyard in progress.



Figure 17. Stage 1 of Remembrance Garden completed.

4.5 Attitudes and value-based learning

The collaborative act of building gardens not only provides an opportunity to develop distinct knowledge and skills but as Wake (2016) suggests, it can also have an important influence on learning by shaping affective or emotional learning. In this thesis, attitudes and values are viewed as the 'deeper learnings' supported in the data. This section also outlines the findings from the data that suggested forward thinking or thinking about future possibilities.

Confidence - Self-esteem - Positive attitude

A view shared among participants was that this project offered many opportunities to gain confidence and get used to working with new groups of people, both students and adults.

One focus group participant spoke from her experience as a new pupil:

"Last year I started this school not knowing anyone else at this school, so, when I started the horticulture programme I got used to the fact of meeting new people each week and, yeah ... it just helps boost your confidence a lot" (FG2).

Other participants gave specific examples of: *"Being able to ask for help if you need help or you're confused about what you're doing"* (FG1). *"When...we're planting and I don't know what to do, I can just ask people... like (GH - student's name) ... as she'll help me with whatever I need"* (FG2)

This data suggests getting used to meeting and working closely with new people regularly, boosts students' self-esteem giving them the confidence to ask for help when needed. While there may be many reasons why some students are reluctant to seek support, having the confidence to ask for help or clarification is a disposition that should not be underestimated. Weimer (2009) tells us that students who do not ask for help are at risk of losing valuable learning opportunities relevant to their future success and are likely to feel low self-esteem. If students continually resort to retreating when they need help, then over time they can develop the habit of not asking when it is necessary. Feeling comfortable to ask for help when needed also implies the project provided learning conditions that were non-threatening.

The findings propose that students developed increased levels of confidence in areas crucial to establishing relationships and relating well to others. They also suggest students recognised and respected the capabilities of their peers. This implies the self-esteem of the student providing assistance was enriched also.

"[CD - student's name] is a different kid since he started hort ... he's found his niche...he loves it ... and is good at it, he's like a little rooster with his head up and chest out, it's given him a confidence I hadn't seen before....hasn't been sent to the office anywhere near as much as last year..." (Teacher - Fieldnotes, personal communication. April, 2017).

The findings and supporting perspectives suggest learning through one's interests contributed to developing confidence. They imply that seeing yourself as a capable learner also builds self-esteem. It can also be inferred from the data that an environment where students felt safe to express weakness, and trusted they would get the support of others, was a contributing factor toward developing a positive attitude toward learning.

Thinking of Others - Empathy

The following discussion by focus group students demonstrates consideration was given not only to the environment but also to how their design might impact other people.

"When designing a garden you have to make it suitable for the surroundings and other people ... so that they would be able to use the garden" (FG2). A second student added, *"there's no point making something and nobody [can] use it"* (FG2). Students talked about making pathways that were practical and purposeful and *"... big enough for wheelchairs to go in so everybody can go through the garden"* (FG2).

The findings from this data indicates students were thinking outside of themselves and tailoring their design to the needs of those who may wish to use the gardens in the future. It also points to participants and how the setting might best accommodate a diverse range of people, including those with physical challenges. This shows consideration for other people and suggest students also employed forward thinking skills.

The data suggests participants acknowledged the importance of looking at things from someone else's position and decisions were made with regard to the impact of their actions. It can be inferred that participants' employed empathic abilities that enabled them to 'walk in others shoes'. In support, researcher notes reveal comments on the normally "*high achieving students*" who were "*showing more patience and tolerance towards less able students*" (Teacher – Personal Communications. Nov 24, 2017). This points to an evolving sense of empathy. The Ministry of Education states an empathetic disposition is necessary for "clear communication, for building responsive and reciprocal relationships, and for developing cross-cultural competencies" (Te Kete Ipurangi, 2014, Section 2). Empathy is also particularly desirable for students to learn given the high statistics of bullying in some schools.

Doing Good for Others - Leaving a Legacy

Focus group participants talked about "*doing good for others without expecting anything in return*". As illustrated by the student who said, "*I also really liked the idea of ... being able to contribute to the community with ... the community garden and ... not just making something for our school by itself but ... something everyone can enjoy not just the people who are here for two years then leave*" (FG2). This speaks to students willingly giving their time and energy and persevering to complete a major undertaking that has long term value. Findings point to an ongoing concern for the wellbeing of others.

Students felt they would also be "*leaving a legacy*" (FG1), "*... something to be remembered by, like what we do here lots of people will remember ... after you left*" (FG2). Webster's online dictionary defines 'legacy' as, "anything handed down from the past, as from an ancestor or predecessor", legacy is not bound by age or time served. More specifically, this participant stated, "*... after we like leave the school and go off to high school, we'll leave something here for others to enjoy. Like with our māra kai that we're building, it'll still be here even after we're gone ... for other people and it will help lots of people even after we've finished*" (FG2). This data suggests an ongoing connection to the school and the community it serves.

The following student's response indicated participants had put a lot of themselves into the project. As expressed, "*... it's sort of like a bit of you stays with the school because ... you*

have left something here that you've made and that you've put hard work into so it's kind of like you're leaving something, a part of you ... something you've worked on ... and cared for. You're leaving it here for other people to work on and care for ... to carry it on" (FG2). It points to an emotional investment and a labour of love. Also a sense of optimism can be inferred, that is, a trust in the goodness of others to continue and enhance their efforts.

This finding aligns with the Māori values of whanaungatanga and kotahitanga (Cram, 2001; Smith, 1999). Whanaungatanga emphasises the value of family-like relationships and recognises that the collective has primacy over the individual. Kotahitanga points to unity and is underpinned by the notion of 'the collective good'.

Generosity of Spirit - Manaakitanga

The following data demonstrates an attitude of manaaki and a generosity of spirit. *"When you like do stuff for the community and you aren't getting anything in return ... your helping other people"* (FG1). As this respondent said he learned, *"to be more selfless and not just care about yourself"* (FG1). *"... I learned how to not expect things back when you're doing something for the community or for a wider group of people... like not to expect like a reward ... "* (FG2)

This implies the project helped students to create another mind set - one that use to be common throughout Te Ao Māori. Manaakitanga is about feeding people and giving emotional and all other kinds of support to family, friends and the community. It speaks to giving from the heart, which is not only good for the recipients and a good thing to do, it also makes the giver happier and healthier too. The findings indicate students did not count the costs of their efforts. They expected nothing in return but willingly gave their time, ideas and energy for the benefit of the community. Giving connects us to others, creating stronger communities and helps build a happier society for everyone.

Responsibility - Self-Management – Doing a job well

Focus group participants spoke about ensuring their designs were “*suitable for the surroundings and other people*” (FG1). This suggests students felt a sense of moral obligation to ensure their plans were appropriate for the setting and other users.

Another student commented, “*I’ve learned the responsibility of looking after plants and taking care of them*” (FG2). Other students talked about planting “*bee gardens*” (FG1) and “*bringing more bees into the world*” (FG1). These responses clearly articulate students showing a sense of duty toward looking after the plants and insects in the gardens.

The following conversation with the school’s property manager, drawn from researcher notes, further supports the finding that the project afforded opportunities for students to demonstrate the development of a responsible attitude.

“Those boys are on to it...they’re my little helpers now...I don’t even have to ask anymore...[AB - student’s name] and [CD - student’s name] come over at playtime turn on the hoses and water the planters, set the watering system on those other gardens [triangles] and come back at lunch time and turn them off...they wanna help with other jobs I’m doing too, sometimes they can and I can rely on them to do it well and put my gear back, they know where it all goes now... it’s hard to recognise them as the same kids I often saw outside [the Principal’s] office ... they’re pretty frickin awesome”
(Property Manager - Personal Communications. Term 4, 2017).

The property manager speaks about no longer having to ask or remind the students to help look after the gardens. He states that he is able to ‘*rely*’ on these students to do a good job and return equipment to the appropriate place. This strongly suggests these students displayed commitment and reliability to ensuring these task were done, and done well.

These findings suggest participation in the study project facilitated opportunities for students to demonstrate their ability to act independently and make decisions without the need for constant supervision or direction. The findings indicate that doing a job thoroughly was

important to the students, and that the adults appreciated this. Findings also imply students were able to manage themselves.

Further, as this participant contributes, when...*"you learn to work with others it doesn't just help in the garden but it can also help in your household when it comes to chores and stuff. I learned how to separate all my tasks and just get it done faster"* (FG2). This suggests involvement in the project helped students learn to work with others which in turn enabled them to develop strategies in order to meet challenges in their daily life.

This data suggests students who are capable of managing themselves are able to breakdown goals into manageable and organised tasks. Findings indicate the knowledge and skills acquired during the project helped this student develop capabilities to organise her chores in order to manage her time more efficiently and effectively. The findings also infer that the self-management strategies students developed during the project are equally relevant to other areas in their lives and can be effectively applied in totally different contexts outside of the project.

Perseverance - Resilience

The skill of persistently working through and solving real problems that had hindered forward progress was a huge part of the experience.

As indicated in the focus group responses, *"...we had to make sure everyone had a job because otherwise the tasks ... [which] are quite big ... [and] ... will take you a long time to get the job done..."* (FG2), but, *"... work[ing] with others in a team is good, [if] you find an obstacle ... you can plan around it together"* (FG1). This data highlights that the 'quite big tasks' took a long time to complete. It points to students not giving up in the face of setbacks but finding new ways to reach their goals. These responses also indicate 'working as a team' was significant in helping them overcome challenges.

The findings indicate students were aware of and appreciated the positive benefits of working collectively to realise their goal of creating gardens at the study school. They also suggest this

goal was a big undertaking that, at times, presented the participants with 'obstacles'. The data suggests that students developed resilience and perseverance in order to overcome these challenges or setbacks, and achieve their goal. Photos included in this thesis provide additional support to the validity of this finding.

Potential influence on higher learning pathways and career choice

Although it is impossible to say what, if any, influence this project may have on participants' future learning choices, it is important to discuss what emerged from the data in this regard.

As recorded during the students' proposal presentation, the Chief Executive Officer of a major business in the horticulture industry is noted as saying:

"Often the common perception of horticulture is as a low-skilled job picking produce or working in pack house factories ... this view is perpetuated in high schools that present horticulture as Ag science for dummies classes and an easy option to achieve credits" (CEO/LB - Personal Communications. Nov 24, 2017). As the following data indicates the participants learned this is not an accurate perception.

Focus group participants explain in their own words: *"I learned that there are more career paths in horticulture than just planting, there's things like ... plant scientists who have to figure out what plants go with each other"* (FG2).

A future benefit of learning gardening practices while still at intermediate, according to the following student is, *"it's easier to learn at a younger age cos then you can learn even more when you're older, so you are quite educated and stuff"* (FG1). Then, *"If you decide to get some sort of degree in plants and nature and horticulture you have the foundation for that work already done"* (FG2). *"So ... in our hort extension class ... and the māra kai project, we were meeting lots of horticulture people ... all the new connections, later on in life, will come in handy"* (FG1). For instance,

"...when we saw [CEO] he was ... telling us that [his company] will fund you and you can go through university ... to do horticulture as a career path" (FG2).

Effective transitions to high school are more likely when young people can make well-informed choices in the learning pathways they pursue. As a result of their engagement with the community, participants were exposed to tertiary level tutors and business leaders in the horticulture sector who opened the students' eyes to the potential of horticulture in terms of higher learning and professional careers.

Summary of Attitudes and Value-based Learning

It is clear from the data that the project has influenced the way the students feel about themselves, other students, the school and the wider community in general. This was expressed by the students during the focus group sessions, and by their actions.

According to the findings, the study project provided a safe and supportive environment that enabled students to develop positive relationships that boosted self-esteem and increased their confidence. There was a discernible atmosphere of unity among the participants that, for some, developed further into friendships. The data indicates the collaborative and student-led elements of the project stretched participants' capabilities by requiring them to take learning risks and expose their thinking and actions for others to see and respond to. The fact students openly acknowledged that they were sometimes confused and needed help supports this finding and also signifies that participants recognised and respected the capabilities of their peers. This led to strong relationships built around mutual respect and trust. The findings also point to students acknowledging the collective power of the 'team' as an important component which enabled them to complete their mission.

The findings indicate students developed self-management strategies and a "can-do" attitude by striving for their goals. Researcher notes support the finding that participants developed an attitude of responsibility and could be relied upon to maintain high standards and do the best they could. Findings also signal that students developed self-management strategies during the project that are transferable and transportable across different life situations, meaning they are equally relevant to, and can be effectively applied in other areas in their lives both inside and outside formal education contexts.

Finally, the findings show they were generous with their time and energy even though they may not be around to reap the benefits of their work and that they did not expect a tangible reward in return. During focus group sessions students expressed strong emotions regarding thinking about others and being more 'selfless'. Many participants talked about doing things for the common good of the community and 'leaving a legacy' for others to enjoy which points to students understanding and demonstrating manaakitanga, an important value in Te Ao Māori. This suggests participants believed they were leaving their own taonga for future pupils, their whānau and the wider school community to enjoy and take care of. Although participants commented that they would be '*moving on to high school*' before the gardens matured and could be fully appreciated, it can be inferred from the findings that the students showed persistence and resilience. This was especially evident in the way they persevered through difficulties and worked together to find solutions to obstacles or setbacks.

For many students, leaving intermediate to start high school can be an exciting but scary move. For many more it is a time of uncertainty. Few students begin high school with a clear idea of what they want to do when they finish high school.

The attitudes and values evidenced through the participants' actions and focus group responses point to the creation of another mind set - one that is advocated in Te Ao Maori. This new mind set of whanaungatanga, manaakitanga, aroha and kotahitanga has enabled the participants to work together and flourish. Findings propose participants were united by a common kaupapa and an attitude that speaks to an intangible connectedness, and an implicit commitment to other people. These are the deeper learnings that could be carried forward into life beyond the classroom.



Figure 18. Lining the planters with weed-mat in preparation for planting.



Figure 19. Planted out with a mix of flowers and vegetables.



Figure 20. Same planter from a different angle, also shows the old school desks re-purposed as outdoor tables.



Figure 21. The same planter, shows the chair students designed and built into the other side.

5 CHAPTER FIVE: DISCUSSION, LIMITATIONS AND CONCLUSION

5.1 Discussion

Introduction

The aim of this study was twofold: Firstly, to gain insights into the students' experiences and perceptions of creating gardens as an opportunity for deeper learning within and beyond the curriculum, and secondly; to understand how māra kai and service-learning contribute toward a culturally responsive approach to teaching and learning.

This chapter synthesises and discusses key findings in relation to the literature review undertaken. It goes on to provide the limitations of this particular study, followed by a conclusion of the implications of the research findings.

Authentic learning through direct experience

A strong finding in this study was the relevance and authentic purpose students associated with their learning experiences during the māra kai project. Djonko-Moore, et al., (2018) discuss how purposeful experiential education is used to engage learners in direct experience and personal reflection to improve knowledge, develop skills, clarify values, and increase one's capacity to contribute to the local community. Moreover, Fusco (2001) reports students often perceive school projects that do not serve a purpose in the community as "fake" (p. 874). The context of māra kai was perceived by the students to have a practical contribution to both their own learning and for the well-being of their community. Students reported having a purpose and a tangible goal to aim for gave their learning a sense of real-life purpose.

Findings indicate that "real-life" learning was fostered by incorporating the design and creation of māra kai as the context for pedagogical practice in this outdoor classroom. In fact, the words, "you actually go and do the thing you're learning about" clearly demonstrates how this project encouraged meaningful learning by actively connecting what students were taught to a real-life application (Pearce, 2016). The ability for children to take their learning outside has a multitude of long-term benefits for physical, social, emotional and cognitive

development that, according to O’Leary (2017), fosters a sense of identity, feelings of autonomy, psychological resilience and healthy behaviours. In addition, she contends, children who experience high levels of contact with nature, in contexts such as gardening, have higher levels of self-worth and higher cognitive function (O’Leary, 2017).

Supporting this finding, Bolstad and associates (2012) put forward the idea that students do not learn well as ‘spectators’ or passive recipients of pre-packaged, bite-sized pieces of knowledge delivered to them by ‘experts’. They assert good learning requires students to be actively engaged in the ‘whole game’ (Bolstad, 2012). Williams and Brown (2012) also refer to the interconnectedness of the curriculum and how outdoor learning classrooms such as gardens foster meaningful learning by encouraging students to make connections between their own real life experiences in the environment and concepts in science, mathematics, social studies, arts and language. Moreover, they contend interdisciplinary outdoor classrooms such as this project increases students’ motivation, makes learning relevant to the real world, fosters higher order thinking and promotes metacognition by engaging students in authentic, meaningful and self-regulated learning that encourages the holistic use of all their senses (Williams & Brown, 2012).



Figure 22. One of the three raised gardens built in collaboration with the wider community.



Figure 23. Students planting out the triangle garden after filling it with their compost.



Figure 24. Several weeks later...Voila!

Transformative learning through student agency

The learning experiences provided in the study project mirrored the complexities and ambiguities of real life which was empowering for the participants and led to a significant growth in leadership skills for some, and developed confidence and personal mana for others. Findings suggest that the task of designing and creating gardens provided opportunities for students' to experience a level of autonomy and power that actively led to student agency. According to Estes (2004) when experiential educators make conscious choices to facilitate learning experiences that are more student-centred students are empowered to take control of their own learning and meaningful learning can be increased. Self-management is about students learning to recognise how they can manage themselves across different life situations, both inside and outside formal education contexts. The idea of 'action competence' holds relevance here. The Ministry of Education says action competence' means being "ready, willing, and able" to respond appropriately to an action challenge (Te Kete Ipurangi, 2015, section 9).

School gardens and other greening projects, according to environmental and community researchers Widdop and Cutter-Mackenzie (2008), are visibly 'real' projects that have the potential to transform students learning. When students genuinely participate in the planning, decision-making, implementation and maintenance of school garden projects and not just the usual token activities of planting or beautifying, Widdop and Cutter-Mackenzie (2008), assert this can lead to learning not just project-related topics but also learning more about themselves (p.11). Sue Wake (2008) argues children do not often have these opportunities because school gardens are typically designed and created by adults with students often merely visiting them for activity led experiences. She further contends that school garden programmes are typically dominated by adult agendas and discourses rather than student need or interest (Wake, 2008).

In contrast, participants reported this project allowed them more control over the direction of their learning in ways that were collaborative, creative and complex. This relates to student agency or rangatiratanga. Rangatiratanga or self-determination, as Russell Bishop (2008) explains, involves learning contexts that provide opportunities that place students in power-sharing relationships with their peers and teachers (p.154). By giving students the power to direct and take responsibility for their learning from an early age, Bishop (2008) asserts the

vital tools of planning, building and maintaining relationships; creative and critical reflection, and; communication skills are learned creating independent and self-regulating learners. According to Rainie & Anderson (2017) these skills, along with curiosity, and adaptability are some of the key 21st century competencies that learners will need in order to keep up with the rapid changes they may encounter in the workforce.

Questionnaire responses indicated all participants believed their ideas during planning and development were valued by the other students and the adults involved in the māra kai project. In order to help learners assume greater control over their own learning, Thanasoulas (2000) tells us it is important to help them become aware of and identify the strategies that they already use or could potentially use. Findings point to students developing knowledge, skills and strategies that are equally relevant to, and can be effectively applied, in other areas in their lives both inside and outside formal education contexts which the Ministry of Education asserts reinforces a sense of empowerment in their abilities as capable learners (Te Kete Ipurangi, 2015). This is also in keeping with work by Bolstad, et al. (2012) which suggests educators need to adopt a much more complex view of knowledge, one that incorporates knowing, doing and being that are transferable and transportable across different life situations.

Williams and Brown (2012) argue that learning through experience is not only about active participation but is a back-and-forth between action and reflection. This generates what Mezirow (1997) refers to as transformative learning, where learners examine their actions and assumptions through reflective dialog. Meeting the responsibilities for the planning and execution of their gardens encouraged students to collaboratively reflect upon their ideas, express themselves, and seek solutions to their own questions. This is in line with the thought that agency is embedded in learner's social relations and interdependency and that at the same time their actions affect their relationships (Bollig and Kelle, 2016).

To be engaging and motivating learning needs to feel as if it is intimate to the person (Bolstad et al., 2012). Even if much of the content has elements of standardisation the experience of learning it and showing what has been learned needs to be highly personalised. The findings support the assertion that if the learning is meaningful for the students and delivered in a way that engages their senses, students will be more engaged in and connected to their learning.

However, as Djonko-Moore, et al., (2018) explain, often cultural and social dynamics are missing from traditional conceptions of experiential learning.

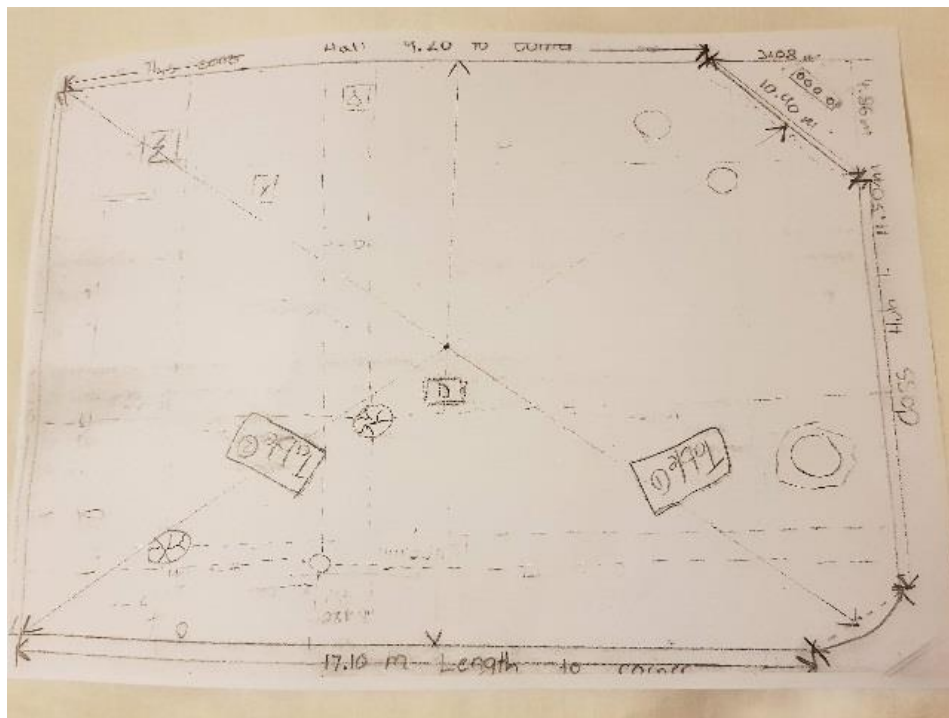


Figure 25. Initial plans for Remembrance Garden Courtyard. Shows measurements and existing infrastructures.



Figure 26. Conceptual plans for Remembrance Garden Courtyard.

The power of collaboration to extend student's capabilities

Findings speak to students getting to know each other through the mahi that helped them to contribute appropriately as a group member and work together more effectively as a team. Alongside the hands-on skills learned in connection with the creation of māra kai, participants' made many positive references to the social learnings gained through the collaborative teamwork encouraged among themselves, other students and staff across the school, as well as the interactions the project enabled with the wider community. Supporting the work of Tamati (2011), participants' highlighted how everyone's skills, abilities and contributions were essential in achieving their collective aspirations 'quicker', 'better' and more 'easily'. This aligns with Alton-Lee's (2003) research findings that teaching which includes collaborative group work with individual accountability mechanisms that allows students to demonstrate effective co-operative and social skills that enable group processes facilitates learning for all participants.

The students also spoke about the power of collaboration to develop "lots of creative ways" to overcome "obstacles" and setbacks. As Cruz & Boonchouy (n.d) contend, independently solving a real problem, not one manufactured by teachers, as empowering and leads to better problem-solving, improved critical thinking, and improved abilities to collaborate and resolve conflicts. This is also discussed by both Grennon-Brooks (2011) and Bransford, Brown and Cocking (2002). Grennon-Brooks (2011) assert authentic learning should also be based on activities where learners have to construct their own understanding of ideas and concepts based on their personal experiences. In this regard, participants explained how "listening to other people's ideas" and learning to "compromise" helped them understand issues from the perspective of others. When people understand production and creation from many sides, our world is filled with greater empathy and appreciation for the interconnectedness of disciplines (Albright, 2014).

Just as our lives are not compartmentalised or sectioned into subjects, Sarah Pearce (2016) points out how authentic learning requires a cross-curricular approach in its design and implementation that reflects the real world. Findings indicated that the knowledge and skills students learned during the project were inter-disciplinary and when discussing the knowledge gained during their involvement in the māra kai project, participants described specific tasks

involving multiple essential learning areas such as, literacy, numeracy, science, and technology.

However, education is far broader than classroom academics and the findings suggest the teaching process supported students to step outside their comfort zone and take learning risks. This shows that adapting teaching styles and having high expectations of the learning outcomes encourages students to extend themselves in order to meet new learning challenges. It also implies that the collaborative and student-led elements of the project stretched participants' capabilities and emboldens students to 'risk' exposing their thinking and actions for others to see and respond to. As the Ministry of Education (2007) asserts it is by pushing through these types of learning challenges that students are able to extend the boundaries of their capabilities to develop resilience and eventually come recognise themselves as capable learners. This is supported by the work of Pearce (2016) who describes authentic learning as essentially multi-disciplinary, skills-based learning in a real-life context that demonstrates to students that their learning is connected, relevant, and can have an impact upon the world around them, as well as their future selves.

Participants perceived this project to be meaningful and relevant to 'real-life'. The data presented also implies that creating a friendly atmosphere characterised by low threat, positive regard for others, and respect for the ideas and opinions of others, encouraged an environment focused on collaboration rather than competition. Experiencing fun and enjoyment appeared to play a vital role in the student's motivation to actively participate in the learning. The authentic nature of this project employed active, real-life learning as outlined by Mantei and Kervin (2009), this allowed the participants to research the problem, identify a range of solutions, explore the most appropriate one, put the plan into action, reflect on the plan and identify solutions to overcome obstacles.

Service-Learning, community connections and reciprocity

The interwoven elements of service-learning are a key feature that make the nature of this project distinctive. Compatible with the principles of whakawhanaungatanga, aroha and manaakitanga, the approach of service-learning led to reciprocal relationships with the community that encouraged students to effectively interact with adults other than their

teachers in real life scenarios. Participants' highlighted many reciprocal benefits of engaging with the wider community and regarded their interactions with a diverse range of people in a variety of contexts positively. Participants spoke about learning opportunities from community partners being important as it provides them with specific kinds of expertise, developed new skills and expanded their understanding of alternative ways of thinking and being. By working together effectively with both their peers and adults, participants developed their communication skills and were able to recognise and appreciate different points of view enabling them to negotiate and compromise with others. The findings show students developed understandings regarding the benefits of consensus decision-making, collective responsibilities, and group competencies. The collaborative aspects of the project helped the participants to achieve real objectives for the community while gaining a deeper understanding of horticultural practices, Te Ao Māori and life-skills for themselves.

However, for many educators a lack of confidence or knowledge can be a barrier that inhibits the inclusion of taonga tuku iho in their teaching programmes. In this regard, service-learning provides an alternative avenue for teachers, and in particular teachers of technology, to connect with expertise in their community and provide stimulating, culturally responsive and meaningful learning opportunities. Multicultural-education teacher and researcher, Christine Sleeter (2013) asserts that through service-learning, students learn from personal interactions with the wider community. This provides students with access to knowledge, skills and experiences outside teachers' proficiencies.

Participants indicated the study project embraced the principle of ako by providing a caring and inclusive learning environment where all contributions were valued and everyone was empowered to learn with and from each other. In particular, participants in the focus group interviews discussed how they felt comfortable seeking help and learning from other more knowledgeable or experienced students. Here the students are describing a tuakana–teina relationship. The Ministry of Education (2009) recognises the value of ako and asserts that tuakana–teina relationships are an integral part of traditional Māori society that subscribes to the benefits of peer teaching. In a reciprocal learning relationship adults are not expected to know everything. As Keown, Parker, and Tiakiwai (2005) suggest, ako allows each member to bring their own knowledge to the classroom or learning setting from which all are able to learn (p. 12).

Adult tutors involved in this study described how they also benefited from the input and perspectives of the students. The tutors spoke about professional development opportunities instigated by student comments and questions which required them to reflect upon how they could improve the delivery and content of their teaching. They suggest that having to simplify concepts while still incorporating technical terminology improved their communicative skills. Adults also commented on the enjoyment they got from working collaboratively alongside the students to produce the school gardens.

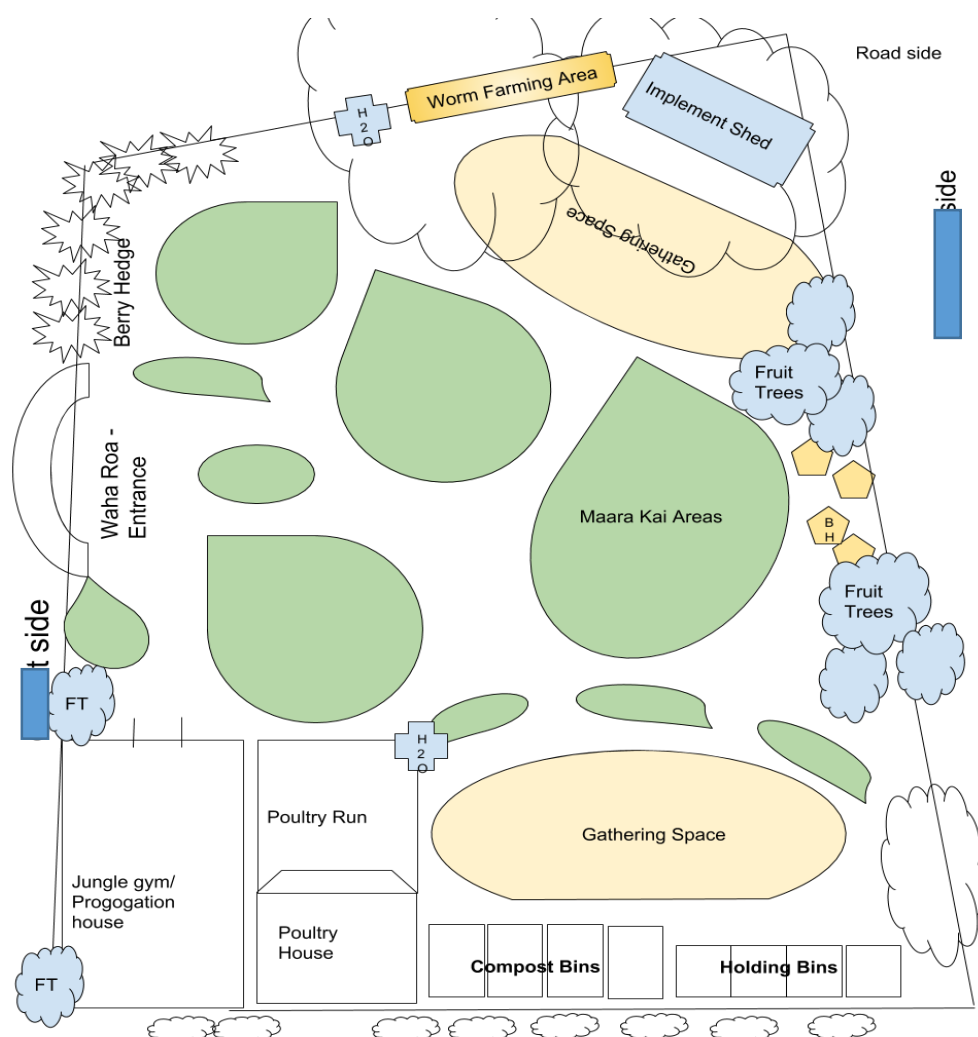


Figure 27. Students' computer generated conceptual design plan for their community



Figure 28. The early stages of the community garden showing the compost making bins and the worm bath.



Figure 29. The other side of the community garden showing the old shed that will be turned into a chicken coop and feijoa trees planted along the fence.

Cultural inclusiveness and engagement with learning

Māra kai and the tenets of service-learning in the study project offered a culturally appropriate context which modelled acceptance of cultural diversity in practice. Within the research project, processes associated with māra kai - preparing the seed-beds, planting, weeding, and harvesting were conducted with appropriate karakia to focus and guide activities; acknowledge our respect for our ancestor's wisdom, and; affirm our spiritual bond with Papatūānuku. This finding is supported by the work of Hemara (2000) who states traditional Māori values and operating standards can successfully be translated into contemporary contexts such as gardening in schools.

O'Leary (2017) argued that natural settings, such as gardens, are not only important for our primary needs but also for our emotional, psychological and spiritual needs. Supporting this view, Sloan (2013) states the lived experiences of students engaged in school gardens as learning places are interconnected with a myriad of multicultural educational opportunities that provide learners with the concepts and experiences that can potentially reach out to the greater community and transform collective consciousness and habits of living (p.26).

Findings suggest that this project provided an opportunity for students having a negative experience of schooling to re-engage with learning by enhancing their self-esteem and reducing ethnocentrism. This aligns with the literature from Russell Bishop (2008) who proposes that when the learner's own culture is central to their learning activities, they are able to make meaning of new information and ideas by building on their own prior experiences and understandings (p. 168). As evidenced by Walker (1973) and Pohatu's (2003) work, when students can relate to and see the relevance for their learning their self-esteem and engagement is enhanced.

The project employed the principles of whanaungatanga and service-learning, which enabled local kaumātua to share their intergenerational knowledge of the cultural practices regarding māra kai with participating students. The students involved in this study articulated they had been given opportunities to gain personal experience of taonga tuku iho: values, tikanga (cultural practices) and mātauranga (ancestral knowledge), associated with gardening from a

Māori perspective. Findings support the view that an awareness and understanding of values and practices important to Māori were also deemed important learnings for the participants.

Sloan (2013) discusses how educating learners about the power of shared values provides a vehicle that empowers learners to recognise and sustain a change in attitude that makes a difference to intercultural relationships. Furthermore, as Metge (1976) iterates, embracing Māori and Pākehā knowledge as complements to each other can develop shared understandings of the value mātauranga Māori can have for all students. This is in keeping with the Ministry of Education's assertion that Māori students are more likely to achieve educational success when they see themselves and their culture reflected positively in subject matter and learning contexts (Te Kete Ipurangi, n.d). Fundamental to interactive, dialogic approaches for improving Indigenous and other marginalised students' achievement is understanding the importance of drawing upon students' prior knowledge and experiences. New ideas are incorporated by being linked to prior knowledges, hence the importance of creating learning contexts where students' prior knowledge is welcome and indeed essential to allow their world views to be accepted and acceptable.

The students involved in this project indicated that they learned to 'work with students they would not normally work with' and how working towards creating māra kai enabled them to 'get to know other people better'. Widening students' social sphere created a space where students felt comfortable to take risks and become more inclusive by getting to know others better. Hoffman, Knight and Wallach (2007) assert that the benefits of working in a garden include improvements in how students communicate and relate to each other. Shinew (2004) found that when racially diverse students worked together in a community garden, ethnic tensions decreased and a significant increase in physical and verbal interaction developed among diverse student groups. Furthermore, Rice and Pollack (2013) contend that understanding cultural differences and similarities develops a degree of tolerance which helps us all get along.

In relation to gardening from a Māori worldview students demonstrated a depth and breadth of learnings gained by sharing specific knowledge regarding the role and practice of karakia, mauri, companion planting and the māramataka. Participants demonstrated an awareness of the synergistic relationship between human beings, Papatūānuku and kaitiakitanga. This

symbiotic view of nature and mankind, and the role people play in taking care of the environment reflects a Māori perspective of reality (Marsden, 1992; 1993; Royal, 2003). Stewart (2016) asserts that it is the spiritual quality of Te Ao Māori, and the characteristic 'Maori way of life' which binds up the present with the past and future, and that this in turn gives strength to the individual, and their community, and reconciles them with their environment. Both the Ministry of Education (2012) and Ford (2013) assert that this type of learning environment within the mainstream education sector could support Māori learners to achieve educational success and be proud of who they are as Māori.

The findings suggest that personal experience was also significant in developing a more positive attitude toward learning for all participants but especially for students previously disengaged with education. Hoffman, Knight and Wallach (2007) assert that the types of learning environments that are most productive in reaching out to students are those that stimulate passion and interest. Focus group participants talked about the project employing “a more tactile way of learning instead of just sitting in front of a teacher ... and talk[ing] about what you are working on”. Students described how working in the māra and sharing the experience with friends was ‘a fun way of learning’ that made learning ‘more enjoyable’. Supporting data points to the project having a positive impact on student engagement across areas of school life outside of the project.



Figure 30. Karakia before work.

Attitudes and value-based learning due to participation in the project

This theme pierces to the very heart of this study. Findings from the project indicated students were thinking outside of themselves and showing consideration for other people. Participants were generous with their time and energy and didn't expect a physical reward in return, they spoke about "doing things for the common good of the community" and "leaving a legacy" or taonga for future pupils, their whānau and the wider school community to enjoy and take care of. This points to the notion that students internalised concepts of manaakitanga which both Moon (2005) and Mead (2003) assert, embraces and stimulates a sense of social responsibility. The findings point to participants feeling valued and suggest that this contributed to them exhibiting a consciousness beyond themselves and their own immediate whanau, to thinking about the wider community. Through their expression of aroha, generosity and mutual respect the students acknowledged the mana of others as having equal or greater importance than their own. Henare (1997) asserts this describes a profound demonstration of manaakitanga which Mead (2003) states, elevates the status of all by building unity through the act of giving and humility.

The findings also propose that students developed increased levels of confidence in areas crucial to establishing relationships and relating well to others. Students talked about the importance of listening to each other, valuing others thoughts and ideas and becoming more inclusive by learning to mix with others. This aligns with the Ministry of Education's (2014) position that learning to relate well with others opens students to new learning and enables them to develop an awareness of how their words and actions affect others.



Figure 31. Whanaungatanga – brothers and sisters in gardening - from different mothers and fathers

5.2 Limitations

As this study focused on the learning experiences of a small number of students attending one particular school, the findings are specific to this school and therefore could be difficult to generalise. Another possible limitation in this study may be attributed to teacher-researcher inexperience. Technical difficulties with the initial focus group interviews was also a factor that may have limited the findings.

5.3 Conclusions

The Whakatipu Iwi Nui project has emerged from this research as a positive example of a culturally responsive teaching and learning interaction. As a pedagogical practice, māra kai reflected the principles of the Treaty of Waitangi and the eight principles expounded in The New Zealand Curriculum. It had a beneficial impact on students' educational achievement and simultaneously validated Te Ao Māori and mātauranga Māori as a normal, legitimate, relevant and valuable context for teaching and learning in this English-medium mainstream school. Supported by the literature review, the following conclusions have emerged from this research as representing significant aspects of the Whakatipu Iwi Nui project.

1) Te Ao Māori was embedded as a 'normal' part of learning.

Findings support the view that focused and embedded teaching of the values and practices important to Māori was deemed significant and valuable learning for the participants, both Māori and non- Māori. Through māra kai:

- The holistic, real-life context gave meaning and purpose to students' learning
- Māori ways of doing and being were acknowledged, practiced and validated.
- Knowledge, values and practices important and relevant to both Te Ao Maori and Western education interwove naturally.
- Direct experience of the values, tikanga (cultural practices) and mātauranga (ancestral knowledge) associated with gardening from a Māori perspective was gained.
- Greater understanding of Māori reality and their symbiotic view of nature and mankind and how this is reflected through kaitiakitanga.

- The concept of 'ako' was both normal and empowering.
- Practicing whakawhanaungatanga stimulated transdisciplinary learning.
- Manaakitanga encouraged altruistic dialogues and behaviour.
- The ways of Te Ao Māori had relevance for students from a diverse range of ethnicities.

2) Transformative learning occurred.

The research shows students experienced a level of rangatiratanga: self-determination or student agency. Having the power to shape the direction of their learning was identified in the literature as being most likely to lead to transformative learning. Findings suggest the māra kai project also provided the impetus for students to re-engage with their own learning and contribute to the learning of others within the spirit of ako. In the Whakatipu Iwi Nui project the following combination lead to students being committed and feeling empowered.

- Positive teaching and learning relationships.
- Learning tasks mirrored the complexities and ambiguities of real life
- High expectations to 'do their very best'.
- Encouragement to take ownership and responsibility.
- Belief in their capabilities and valuing their input.
- Genuine participation in the planning, decision-making, and implementation of the project.
- 'Hands-on', practical teaching and learning experiences.
- Greater control over their learning in ways that were both creative and complex.
- Guidance and support - ensuring resources were available, including the right people to work with them.
- Collaboration with others to achieve common goals.
- Coherent pathways to future learning.

3) Attitudes and value-based learning occurred

Participants internalised concepts of aroha and manaakitanga and embraced a sense of social responsibility. The project enabled the participants to feel valued, safe and supported which the findings propose influenced the way they interacted with others and contributed to them exhibiting a consciousness beyond themselves and their own immediate whanau, to thinking about the wider community. This was empowering for the participants and led to a significant

growth in leadership skills for some, and boosted confidence and personal mana for others. There was strong evidence of:

- An awareness of how their words and actions might affect others.
- The importance of listening to others.
- Valuing others thoughts and ideas.
- An empathetic disposition. Being able to see things from another's point of view.
- Giving consideration to the thoughts, feelings and limitations of others.
- Kaitiakitanga - awareness and concern for looking after the environment.
- Tolerating and even celebrating difference – different perspectives, ways of being and doing things, abilities, strengths and weaknesses.
- Negotiation and compromise.
- Embedded natural opportunities for students to strengthen their key competencies

4) Collaboration and Service-Learning

This research shows that developing personal success and competence in a carefully constructed group setting enabled the learners to develop intrinsic motivation and self-regulation. Power-sharing strategies enabled the use of effective dialogic interactions that activated the characteristics that allow students to learn with and from each other. This research has shown that collaborating effectively with both peers and adults enhanced participants' communication skills and key competencies which in turn strengthened understandings regarding the benefits of consensus decision-making, collective responsibilities, and group competencies.

For many educators a lack of confidence or knowledge can be a barrier that inhibits teachers to step outside their comfort zone and include concepts and teachings from Te Ao Māori in their programmes. In this project, service-learning provided access to knowledge, skills and experiences outside teachers' proficiencies that enabled stimulating, culturally responsive and meaningful learning opportunities.

Service-learning also contributed to building a bridge between students' prior knowledge and value concepts held in Te Ao Māori. Through service-learning and māra kai, students experienced the power of collaboration and made connections to the wider community while improving their local environment and learning about horticultural practices that included a Māori worldview of gardening.

However, by employing the inherent principles of whakawhanaungatanga, aroha, kaitiakitanga and manaakitanga, a strong case is presented for māra kai to supersede service-learning, at least in Aotearoa New Zealand.

5) Māori Achievement

As Bishop (2017) asserts, fundamental to an interactive, collaborative and dialogic approach to improve Indigenous and other marginalised students' achievement is understanding the importance of drawing upon students' prior knowledge and experiences. New ideas are incorporated by being linked to prior knowledges. The Whakatipu Iwi Nui project acknowledged the importance of creating a learning context where Māori students' prior knowledge and experiences were welcome and indeed essential to allow their world view to be accepted and acceptable.

Utilising a context of māra kai and service-learning, the Whakatipu Iwi Nui project provided an example of an authentic way to incorporate mātauranga Māori into English-medium mainstream schools. It has shown that embracing Māori and Pākehā knowledge as complementary to each other, both Māori and non-Māori students can experience a range of educational achievements within and beyond the curriculum. As supported in the literature, by consciously placing positive relationship-forming practices at the very centre of whatever we do in education, shared understandings develop which can lead to social and academic achievement.



Figure 32. Student made garden sign – “We are all different flowers from the same garden”.



Figure 33. Just chilling out in the gardens during an off-site visit to tertiary campus.

5.4 Whakamutunga - Last Words

In completing this research, a personal goal was not only to improve my own practice but to also stimulate discussion. In this study sharing is seen as a responsibility of research because it is assumed that the knowledge is for the collective benefit and it is hoped that others may find value in the research findings.

Furthermore, I believe our mental health and overall well-being is co-created through the relationships we develop, so I conclude this thesis with the whakatauki:

Kia mau ki te pai, kia atawhai ki te tangata, kia marae, kia mahi kai hei waewae mō te atawhai, ka tupu koe hei tangata.

Hold to that which is good, be kind to people, be generous, prepare food to express your kindness, and you will grow to be a person of consequence. (Williams, 1971, p. 180).

6 References

- Alton-Lee, A. (2003). *Quality Teaching for Diverse Students in Schooling: Best Evidence Synthesis*. Wellington, New Zealand: Ministry of Education. Available at: www.educationcounts.govt.nz/publications/series/2515/5959
- Applebee, A. (1996). *Curriculum as conversation*. Chicago and London: University of Chicago Press.
- Bandy, J. (n.d). What is service-learning or community engagement? Vanderbilt University website: Centre for teaching. Accessed from: <https://cft.vanderbilt.edu/guides-sub-pages/teaching-through-community-engagement/>
- Barlow, C. (1991). *Tikanga whakaaro: Key concepts in Māori culture*. Auckland: Oxford University Press.
- Barnes, H. M. (2000). Kaupapa Maori: explaining the ordinary. *Pacific Health Dialogue*, 7: 13–16.
- Bean, K. (2017). *Student agency: Creating an integrated and authentic K-12 approach*. Accessed from: <https://www.gettingsmart.com/2017/04/student-agency-creating-an-integrated-and-authentic-k-12-approach/>
- Biddulph, F., Biddulph J., and Biddulph, C. (2003). The complexity of community and family influences on children's achievement in Aotearoa New Zealand: Best evidence synthesis. Wellington, New Zealand: Ministry of Education. Available at: www.educationcounts.govt.nz/publications/series/2515/5947
- Billig, S. (2000). Research on K-12 School-Based Service-Learning: The Evidence Builds. School K-12. Paper 3. <http://digitalcommons.unomaha.edu/slcek12/3>
- Billig, S. H. (2010) "Why Service Learning is Such a Good Idea," *Colleagues*, 5(1), Article 6. Retrieved from: <https://scholarworks.gvsu.edu/colleagues/vol5/iss1/6>
- Bishop, R. (1996). *Whakawhanaungatanga: Collaborative research stories*. Palmerston North, New Zealand: Dunmore Press.
- Bishop, R. (1998). Freeing ourselves from neo-colonial domination in research: A Maori approach to creating knowledge. *International Journal of Qualitative Studies in Education*, 11(2), 199-219.
- Bishop, R. (2003). Changing power relations in education: Kaupapa Māori messages for 'mainstream' education in Aotearoa/New Zealand. *Comparative Education*, 39(2), 221-238.
- Bishop, R. (2005). A Kaupapa Māori approach. In N. K. Denzin & Y. L. Lincoln (Eds.). *The handbook of qualitative research* (3rd Ed). London: Sage.
- Bishop, R. (2008). Te kotahitanga: Kaupapa Māori in mainstream classrooms. In Denzin, N. K., Lincoln, Y. S., & Smith, L. T. *Handbook of critical and indigenous methodologies* (pp. 439-458). Thousand Oaks, CA: SAGE Publications, Inc. doi: 10.4135/9781483385686
- Bishop, R. (2010). Effective teaching for indigenous and minoritized students. International Conference on Learner diversity 2010. *Procedia Social and Behavioural Sciences*, 7(c), 57-62. Doi: 10.1016/j.sbspro.2010.10.009
- Bishop, R. (2012). Pretty difficult: Implementing kaupapa Māori theory in English-medium secondary schools. *New Zealand Journal of Educational Studies*, 47(2), 38-50.

- Bishop, R. (2019). *Teaching to the North-East: Relationship-based learning in practice*. Wellington, New Zealand: New Zealand Council for Educational Research.
- Bishop, R. & Berryman, M. (2006). *Culture speaks: Cultural relationships & classroom learning*. Wellington, New Zealand: Huia.
- Bishop, R., Berryman, M., Cavanagh, T., & Teddy, L. (2008). A culturally responsive pedagogy of relations: Effective teaching for Māori students. In A. S. George, S. Brown, & J. O'Neill (Eds.), *Facing the big questions in teaching: Purpose, power and learning* (pp. 165-172). Cengage Learning.
- Bishop, R., Ladwig, J., & Berryman, M. (2014). The centrality of relationships for pedagogy: The whanaungatanga thesis. *American Educational Research Journal*, 51(1), 184-214.
- Blair, D. (2009). The child in the garden: An evaluative review of the benefits of school gardening. *The Journal of Environmental Education*, 40(2), 15-38.
doi:10.3200/JOEE.40.2.15-38
- Bolig, S., & Kelle, H. (2016). Children as participants in practices: the challenges of practice theories to an actor-centred sociology of childhood. In: Esser, F., Baader, M. S., Betz, T., & Hungerland, B. (Eds.). *Reconceptualising Agency and Childhood: New Perspectives in Childhood Studies* (pp. 34-47). Abingdon: Routledge.
- Bolstad, R & Whatman, J. (2016). Sharing our gifts with the community. Wellington, New Zealand: New Zealand Council for Educational Research. Retrieved from <http://www.nzcer.org.nz/research/publications/sharing-our-gifts-community>
- Bolstad, R., Gilbert, J., McDowall, S., Bull, A., Boyd, S., & Hipkins, R. (2012). *Supporting future-oriented learning and teaching: A New Zealand perspective*. Wellington, New Zealand: Ministry of Education. Retrieved from http://thehub.superu.govt.nz/sites/default/files/41015_Future-oriented-07062012_0.pdf
- Bolton, S. (2017). *Educational equity in New Zealand: Successes, challenges, and opportunities*. Wellington, New Zealand: Fulbright. Accessed from: <https://www.fulbright.org.nz/wp-content/uploads/2017/08/BOLTON-Educational-Equity-in-New-Zealand-Successes-Challenges-and-Opportunities-.pdf>
- Boud, D. (1988). *Autonomy in learning*. (2nd Ed). (Online). Taylor and Francis Group. Retrieved from: file:///C:/Users/tinas/Downloads/9780203059036_googlepreview.pdf
- Bracken, S. (2010). Discussing the importance of ontology and epistemology awareness in practitioner research. *Worcester Journal of Learning and Teaching*, (4).
- Bringle, R. G. (1997). Service-Learning in Higher Education: Concepts and Practices. *Journal of Higher Education*, 68(6), 715-717.
- Bruner, J. S. (1999). *The process of education*. (Revised Ed). Cambridge, MA: Harvard University.
- Bryman, A. (2012). *Social research methods* (4th Ed). New York: Oxford University Press.
- Bull, A., & Gilbert, J. (2012). Swimming out of our depth: Leading learning in 21st century schools. Wellington, New Zealand: NZ Council for Educational Research. Retrieved from: <http://www.nzcer.org.nz/research/publications/swimming-out-our-depth-leading-learning-21st-century-schools>
- Cajete, G. (2004). Look to the mountain: An ecology of indigenous education. Accessed from: <https://files.eric.ed.gov/fulltext/ED375993.pdf>

- Champion, F. (1999). Service learning. *Educational Psychology Interactive*. Valdosta, GA: Valdosta State University.
- Chilesa, B. (2012). *Indigenous Research Methodologies*. California, USA: Sage.
- Chong, C.S. (2014). Service-learning: Definitional challenges and complexities. *Asia-Pacific Journal of Cooperative Education*, 15(4), 347-358.
- Clayton, P. (2000). Environmental Education and Service-Learning. *On the Horizon*, 8(6), 8-11. Retrieved from: <https://doi.org/10.1108/10748120010803609>
- Coffey, H. (n.d). Culturally relevant teaching. Retrieved from: <http://www.learnnc.org/lp/pages/4474>
- Cohen D., & Crabtree B. (2006). Qualitative Research Guidelines Project. Retrieved from, <http://www.qualres.org/Cont-3440.html>
- Cooper, G. (2012). Kaupapa Maori research: Epistemic wilderness as freedom? *New Zealand Journal of Educational Studies*, 47(2), 64-73. Accessed from: <https://search-informit.com.au/libproxy.unitec.ac.nz/documentSummary;dn=447305664039225;res=IELHSS>ISSN:0028-8276>
- CORE Education. (2017). *Ten trends for 2017*. Accessed from: <http://core-ed.org/research-and-innovation/ten-trends/>
- Cram, F. (2009). Maintaining indigenous voices. In Mertens, D. M., & Ginsberg, P. E. *The handbook of social research ethics* (pp. 308-322). Thousand Oaks, CA: SAGE Publications, Inc. doi: 10.4135/9781483348971
- Creswell, J. W. (1994). *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks. CA: Sage.
- Crump, J. (2002). Learning by doing: Implementing community service-based learning. *Journal of Geography*, 101, p144-152. National Council for Geographic Education.
- Cutter-Mackenzie, A. (2009). Multicultural School Gardens: Creating Engaging Garden Spaces in Learning about Language, Culture, and Environment. *Canadian Journal of Environmental Education*, 14.
- Dadds, M (2008) Empathetic validity in practitioner research. *Educational Action Research*, 16(2), 279-290. Retrieved from: <http://insight.cumbria.ac.uk/2798/>
- Delgado, M. (2006). *Designs and methods for youth-led research* (pp. 29-73). Thousand Oaks, CA: SAGE Publications Ltd. doi: 10.4135/9781412983884
- Densmore, K. (2013). In O'Grady, C. R (Ed). *Integrating Service Learning and Multicultural education in Colleges and Universities*. New York: Routledge.
- Denzin, N.K., & Lincoln, Y.S. (Eds.). (2005). *The Sage Handbook of Qualitative Research*. (3rd Ed). Thousand Oaks, CA: Sage, 695-728.
- Dewey, J. (1899/1959). The school and society. In M. Dworkin (Ed.), *Dewey on Education: Selections*, (33-90). New York: Teachers College Press.
- Djonko-Moore, C. M., Leonard, J., Holifield, Q., Bailey, E. B., & Almughyirah, S. M. (2018). Using culturally relevant experiential education to enhance urban children's knowledge and engagement in science. *Journal of Experiential Education*, 41(2), 137–153. <https://doi.org/10.1177/1053825917742164>
- Dornsife, D., & Dornsife, D. (2017). Service-Learning history, theory and practice. Retrieved from <https://dornsife.usc.edu/joint-educational-project/service-learning-theory/>

- Durie, M. (2006), Māori Education 2026, Post Primary Teachers Association Conference 2006, April 20 2006, Wellington.
- Eby, J. (1998). Why service-learning is bad. Retrieved from <https://www1.villanova.edu/content/dam/villanova/artsci/servicelearning/WhyServiceLearningIsBad.pdf>
- Education Review Office. (2010). Promoting Success for Māori Students: Schools' Progress. Ko te Tamaiti te Pūtake o te Kaupapa: The Child - the Heart of the Matter. Available at: www.ero.govt.nz/National-Reports/Promoting-Successfor-Maori-Students-Schools-Progress-June-2010
- Education Review Office. (2011). *Directions for Learning: The New Zealand Curriculum Principles, and Teaching as Inquiry*. Wellington, New Zealand: Ministry of Education.
- Education Review Office. (2012). *The New Zealand Curriculum Principles: Foundations for curriculum decision-making*. Wellington, New Zealand: Ministry of Education.
- Education Review Office. (2016a). Food, nutrition and physical activity in New Zealand schools and early learning services: Key findings report. Wellington, New Zealand: Ministry of Education. Retrieved from <https://www.ero.govt.nz/assets/Uploads/Key-findings-report-food-nutrition-and-physical-activity.pdf>
- Education Review Office. (2016b). *Wellbeing for success: A resources for schools* [PDF]. Wellington, New Zealand: Ministry of Education. Retrieved from: <https://www.ero.govt.nz/assets/Uploads/Wellbeing-resource-WEB.pdf>
- Education Review Office. (2016c). *Education on the East Coast: Schools and Kura Kaupapa Māori*. Wellington, New Zealand: Ministry of Education. Retrieved from <http://www.ero.govt.nz/publications/education-on-the-east-coast-schools-and-kura-kaupapa-maori/kura-kaupapa-maori/>
- Education Review Office. (2016d). Key Competencies. Ministry of Education, NZ. Retrieved from: <http://nzcurriculum.tki.org.nz/Key-competencies>
- Edutopia. (2015). Service Learning: Real-Life Applications for Learning. George Lucas Educational Foundation. Website. Retrieved from: <https://www.edutopia.org/practice/service-learning-real-life-applications-learning>
- Egan, K. (2008). *The Future of Schooling: Reimagining Our Schools from the Ground Up*. New Haven: Yale University Press.
- Eketone, A. (2008). Theoretical underpinnings of Kaupapa Māori directed practice. *MAI Review* (1). Retrieved from: <http://www.review.mai.ac.nz/index.php/MR/article/view/98/106>
- Estes, C. A. (2004). Promoting student-centered learning in experiential education. *Journal of Experiential Education*, 27(2), 141–160.
- Eyler, J., Giles D. E. Jr., (1999). *Where's the Learning in Service-Learning* (1st Ed.). San Francisco, CA: Jossey-Bass. ISBN 978-0-470-90746-7.
- Falloon, G. (2010). Learning objects and the development of students' key competencies: A New Zealand school experience. *Australasian Journal of Educational Technology* 26(5), 626-642. <http://web.a.ebscohost.com.libproxy.unitec.ac.nz/ehost/pdfviewer/pdfviewer?sid=e3d89132-9bc0-4ff0-949a-391f45cbfacc%40sessionmgr4006&vid=1&hid=4106>
- Ford, T. (2013). Applying culturally responsive practices: Implications for mainstream education. *Waikato Journal of Education*, 18(2), 25–36. <https://doi-org.libproxy.unitec.ac.nz/10.15663/wje.v18i2.159>

- Fox, M., Martin, P., & Green, G. (2007). *Doing practitioner research*. London, United Kingdom: Sage.
- Freese, J. (1998). Service-learning as social education. *Children's Social and Economics Education*, 3(3)
- Furco, A. (2011). Service-Learning: A Balanced Approach to Experiential Education (PDF). *The International Journal for Global and Development Education Research*. (0): 71–76. Retrieved 4 September 2017.
- Furco, A., and Billig, S.H. (Eds.). (2001). *Service-Learning: The essence of the pedagogy*. U.S.A.: Information Age Publishing Inc.
- Furco, Andrew (2011). ["Service-Learning": A Balanced Approach to Experiential Education](#) (PDF). The INTERNATIONAL JOURNAL for GLOBAL and DEVELOPMENT EDUCATION RESEARCH (0): 71–76. Retrieved 4 September 2014.
- Garner, R. (1990). When Children and Adults Do Not Use Learning Strategies: Toward a Theory of Settings. *Journals.sagepub.com*. Retrieved from <http://journals.sagepub.com/doi/pdf/10.3102/00346543060004517>
- Gay, G. (2000). *Culturally responsive teaching*. New York: Teachers College Press.
- Goren, P. D. (July 2009). How Policy Travels: Making Sense of Ka Hikitia – Managing for Success: The Māori Education Strategy 2008-2012. Fulbright New Zealand
- Groennings, S. (1997). Reconciling Agendas: Agencies and colleges face service-learning. An unpublished paper presented at a conference sponsored by the Association of Episcopal Colleges and Universities at Montreat North Carolina, October 31-Nov.2, 1997.
- Guadarrama, I. (2013). The empowering role of service learning in the preparation of teachers. In O'Grady, C (Ed). *Integrating service learning and multicultural education*. (p. 241). Routledge. New York, NY.
- Hemara, W. (2000). *Maori Pedagogies*. Wellington. New Zealand: New Zealand Council for Educational Research
- Henry, E. & Pene, H. (2001). Kaupapa Māori: Locating indigenous ontology, epistemology and methodology in the academy. *Organization*, 8(2): 234-242. Retrieved from: <http://org.sagepub.com/content/8/2/234>
- Higgins, J. & Nairn, K. (2014). "Out of sight out of mind?" - Education provision for learners disengaged from school. In V. Carpenter & S. Osborne (Eds.), *Twelve thousand hours: Education and poverty in Aotearoa New Zealand*. (pp. 145-165). Auckland, New Zealand: Dunmore Press.
- Hinds, D. (2000). Research instruments. In D. Wilkinson (Ed.). *The researcher's toolkit: The complete guide to practitioner research*, (pp. 41-51). Retrieved from <http://ebookcentral.proquest.com/lib/unitec/detail.action?docID=166019>
- Hipkins, R. (2007). *Assessing key competencies: Why would we? How could we?* Wellington, New Zealand: Learning Media
- Hirsch, W. (1990). A report on issues and factors relating to Māori achievement in the education system. Wellington, New Zealand: Ministry of Education.
- Howard, G. S. (1980). Response-shift bias a problem in evaluating interventions with pre/post self-reports. *Evaluation Review*, 4(1), 93-106.

- Howard, G. S., Millham, J., Slaten, S., & O'Donnell, L. (1981). Influence of subject response-style effects on retrospective measures. *Applied Psychological Measurement*, 5, 144-150.
- Howard, J. (2001). Academic service-learning: Myths, challenges and recommendations. *Essays on Teaching Excellence*. Retrieved from http://ucat.osu.edu/OSU_users/essays/v12n3.html
- Hunn, J. K. (1960). Report on Department of Maori Affairs with statistical supplement. Wellington, New Zealand: Government Printer. (pp. 15-16)
- Hynds, A., Sleeter, C., Hindle, R., Savage, C., Penetito, W. & Meyer, L.H. (2011) Te Kotahitanga: a case study of a repositioning approach to teacher professional development for culturally responsive pedagogies. *Asia-Pacific Journal of Teacher Education*, 39(4), 339-351, <https://doi.org/10.1080/1359866X.2011.614684>
- Itin, C. M. (1999). Reasserting the Philosophy of Experiential Education as a Vehicle for Change in the 21st Century. *The Journal of Physical Education* 22(2), 91-98.
- Jacoby, B. (1996). *Service-Learning in Higher Education: Concepts and Practices*. San Francisco, USA: Jossey-Bass.
- Jacoby, B. (2003). *Building partnerships for service-learning*. San Francisco, USA: Jossey-Bass.
- Jaramillo, J. A. (1996). Vygotsky's Sociocultural Theory and Contributions to the Development of Constructivist Curricula. *Education*, 117(1), 133.
- Jones, A. (2012). Dangerous liaisons: Pākehā, kaupapa Māori, and educational research. *New Zealand Journal of Educational Studies*, 47(2), 100-112. Retrieved from <https://search.proquest.com/docview/1316203650?accountid=44427>
- Jones, A., McCulloch, G., Marshall, J., Smith, G., & Smith, L. (1995). *Myths and Realities: schooling in New Zealand*. Palmerston North, New Zealand: Dunmore Press, pp.34-37.
- Joplin, L. (1995). On defining experiential education. In K. Warren, M. Sakofs, & J. S. Hunt (Eds.). *The theory of experiential education* (3rd ed., pp. 17–22). Dubuque, IA: Kendall/Hunt.
- Ka'ai, T. (2004). Te mana o te reo me ngā tikanga Power and politics of the language. In Ka'ai T et al., *Ki Te Whaiao – An Introduction to Māori Culture and Society*. (pp. 202-204, 208). Auckland, New Zealand: Pearson.
- Kara, H. (2012). *Research and evaluation for busy practitioners: a time-saving guide*. Bristol, UK: The Policy Press.
- Kaye, C. B. (2012). Greening the Curriculum. *Education Digest*, 78(2), 10-15.
- Kendall, J. C. (1990). Combining service and learning: An introduction. In J. C. Kendall (Ed.), *Combining service and learning: A resource book for community and public service*, (Vols. 1-2, pp. 1-36). Raleigh, NC: National Society for Internships and Experiential Education.
- Kincheloe, J. & Steinberg, S. (2008). Indigenous knowledges in education: complexities, dangers, and profound benefits. In Denzin, N. K., Lincoln, Y. S., & Smith, L. T. *Handbook of critical and indigenous methodologies* (pp. 135-156). Thousand Oaks, CA: SAGE Publications, Inc. doi: 10.4135/9781483385686
- King, M. (2004). *The Penguin history of New Zealand*. Auckland, New Zealand: Penguin.

- King, M. (2006). *Māori: A photographic and social history* (Revised Ed). Auckland, New Zealand: Reed.
- King, P., Hodgetts, D., Rua, M., & Te Whetu, T. (2015). Older men gardening on the marae: Everyday practices for being Maori [online]. *AlterNative: An International Journal of Indigenous Peoples*, 11(1), 14-28. Accessed from: <https://search.informit-com.au.libproxy.unitec.ac.nz/documentSummary;dn=980383598890397;res=IELNZC> > ISSN: 1177-1801
- Kirkbride, R. (2012). A guide to practitioner research in education. *Educational Research and Evaluation*. 18:5, 512-513. Doi: 10.1080/13803611.2011.643361
- Klatt and Taylor-Powell. (2005). Retrospective Pre Test.
- Kolb, D. (1984). *Experiential learning: Experiences as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall, Inc.
- Krueger, R. A. (1988). Focus groups: A practical guide for applied research. In Gall, M. D., Borg, W. R., & Gall, J. P. (1996). *Educational Research*. White Plains, NY: Longman Publishers.
- Kuh, G. (2003). How are we doing at engaging students? *About Campus*, 8(1), 9-16.
- Kuh, G., Kinzie, J., Schuh, J., Whitt, E., & Associates (2005). *Student success in college: Creating conditions that matter*. San Francisco: Jossey-Bass.
- Kuh, G. (2008). *High-impact practices: What they are, who has access to them, and why they matter*. Washington DC: Association of American Colleges and Universities.
- Ladson-Billings, G. (1992). Culturally relevant teaching: the key to making multicultural education work. In Grant, C. A. (Ed.). *Research and Multicultural Education*, 106-121. London: Falmer Press.
- Ladson-Billings, G. (1995). But that's just good teaching! The case for culturally relevant pedagogy. *Theory into practice* 34(3), 159-165.
- Lam, T. C. & Bengo, P. (2003). A comparison of three retrospective self-reporting methods of measuring change in instructional practice. *American Journal of Evaluation*, 24(1), 65-80.
- Lee, K., Narayan, E., Birdsall, S., & Davies, D. (2015). Garden to Table in the New Zealand setting: Explanations, perceptions and delivery. In *The National Conference of Technology Education New Zealand*. Hamilton, New Zealand. Retrieved from: www.researchgate.net/publication/288004749_Garden_to_Table_in_the_New_Zealand_setting_Explanations_perceptions_and_delivery
- Lingard, B. & Mills, M. (2007). Pedagogies making a difference: Issues of social justice and inclusion. *International Journal of Inclusive Education*, 11(3), 233-244.
- Lombardi, M. (2007). Authentic Learning for the 21st Century: An Overview. ELI Paper 1:2007 *Educause Learning Initiative - Authentic Learning for the 21st Century*.
- Mahuika, R., Berryman, M., & Bishop, R. (2011). Issues of culture and assessment in New Zealand education pertaining to Māori students. *Assessment Matters* 3, 186.
- Mane, J. (2009). Kaupapa Māori: A community approach. *MAI Review*, 3(1). Retrieved from: <http://review.mai.ac.nz/MR/article/download/243/243-1710-1-PB.pdf>
- Mantei, J & Kervin, L. K. (2009). "Authentic" learning experiences: What does this mean and where is the literacy learning? In Moul, A. (Ed.). *Bridging Divides: National Conference for Teachers of English and Literacy*, pp. 1-16. Hobart, Australia:

Australian Association for Teaching of English/Australian Literacy Education Association.

Marsden, Rev. M. (1992). *Kaitiakitanga: A Definitive Introduction to the Holistic World View of the Maori*. Accessed at:

http://www.marinenz.org.nz/documents/Marsden_1992_Kaitiakitanga.pdf

Mazarno, R. J., Waters, T. & McNulty, B. A. (2005). *School leadership that works: From research to results*. Alexandria, VA: Association for Supervision and Curriculum Development.

McCarroll, J. (2017). Gardening: does it make kids smarter? <https://www.stuff.co.nz/life-style/home-property/89224828/gardening-does-it-make-kids-smarter>

McGee, C., & Fraser, D. 2008. *The Professional Practice of Teaching* (3rd Ed). Cengage Learning

Mead, H. M. (2003). *Tikanga Maori: Living by Maori Values*. Wellington: Huia Publishers.

Menter, I., Elliot, D., Hulme, M., Lewin, J., & Lowden, K. (2011). *A guide to practitioner research*. Sage. London.

Metge, J. (1976). *The Māori of New Zealand: Rautahi*. (Revised Ed.). Great Britain: Redwood Burn Ltd.

Metge, J. (1990), In, Berryman, M. (2014). Evaluation indicators for school reviews: A commentary on engaging parents, whanau and communities. Background paper prepared for the review of the Education Review Office's Evaluation Indicators for School Reviews.

Mezirow, J. (1991). *Transformative dimensions of adult learning*. JosseyBass. San Francisco: USA.

Ministry of Education. (2000). *Better Relationships for Better Learning*. Wellington, New Zealand: Learning Media. Retrieved from:
www.minedu.govt.nz/NZEducation/EducationPolicies/MaoriEducation/AboutMaoriEducation/WhoWeAre/EngagementWithMaori/HuiTaumataMatauranga/BetterRelationshipsForBetterLearning.aspx

Ministry of Education (2007). *The New Zealand Curriculum for English-medium Teaching and Learning in Years 1–13*. Wellington: Learning Media. Available at:
<http://nzcurriculum.tki.org.nz/Curriculum-documents/TheNew-Zealand-Curriculum>

Ministry of Education (2008). *Ka Hikitia – Managing for Success: The Māori Education Strategy 2008–12*. Wellington, New Zealand. Retrieved from:
<http://kahikitia.minedu.govt.nz/kahikitia/default.htm>

Ministry of Education (2009a). *Ka Hikitia – Whakapumautia, Papakowhaitia, Tau ana: Grasp, Embrace, and Realise – Strengthening relationships between Iwi and the Ministry of Education*. Wellington, Ministry of Education.

Ministry of Education (2009b). *Te aho Arataki Marau mō te Ako i Te Reo Māori – Kura Auraki: Curriculum guidelines for teaching and learning Te Reo Māori in English-medium schools: Years 1–13*. Wellington: Learning Media.

Ministry of Education. (2010). *Effective Governance: Working in partnership*. Wellington: Ministry of Education. Accessed from:
www.minedu.govt.nz/Boards/EffectiveGovernance/PublicationsAndResources/EffectiveGovernance.aspx

- Ministry of Education. (2011). *Tātaiako: Cultural Competencies for Teachers of Māori Learners*. Wellington, New Zealand: Ministry of Education.
- Ministry of Education. (2012). *Me Kōrero - Let's Talk*. Wellington, New Zealand: Ministry of Education.
- Ministry of Education. (2013). *The Māori Education Strategy: Ka Hikitia – Accelerating Success 2013–2017*. Wellington, New Zealand: Ministry of Education.
- Ministry of Education. (2014). *Ministry of Education Statement of Intent*. Wellington, New Zealand. (pp. 17-23).
- Ministry of Education. (2017a). Technology in the New Zealand Curriculum 2017. (PDF). Retrieved from:
[file:https://nzcurriculum.tki.org.nz/content/download/167461/1235900/file/Technology%20in%20the%20New%20Zealand%20Curriculum%202017%20.pdf](https://nzcurriculum.tki.org.nz/content/download/167461/1235900/file/Technology%20in%20the%20New%20Zealand%20Curriculum%202017%20.pdf)
- Ministry of Education. (2017b). Garden to Table at Haumoana School. *Education Gazette*, 96(20). Reference #: 1H9g7S. Wellington, New Zealand: Ministry of Education.
- Ministry of Education (2017c). *Attendance in New Zealand schools, Term 2, 2016*. Wellington, New Zealand. Retrieved from:
<https://www.educationcounts.govt.nz/publication/series/2503>
- Moorfield, J. C. (2005). *Te aka: Māori-English, English-Māori dictionary and index*. Auckland, N.Z: Pearson Longman.
- Moss, M, Holmes R, Boyd, S and King, J (2011). *Guidelines, tips and suggestions to ensure sustainable edible gardens in education settings*. Christchurch, New Zealand: South Island District Health Board.
- Nakata, Y. (2014). Self-regulation: Why is it important for promoting learner autonomy in the school context? *Studies in Self-Access Learning Journal*, 5(4), 342-356.
- National Youth Leadership Council. (2016). Project-Based Learning vs. Service-Learning. Retrieved from <https://nylc.org/2016/12/02/project-based-learning-vs-service-learning/>
- OECD. (2012). *Equity and quality in education: Supporting disadvantaged students and schools*. Wellington, New Zealand: OECD Publishing.
- O'Grady, C. (Ed). (2013). *Integrating service learning and multicultural education*. New York, USA: Routledge.
- O'Leary, E. (2017, April). Ecotherapy. *Mindfood*. Retrieved from:
<http://www.mindfood.com/article/inside-the-april-2017-special-new-zealand-issue/>
- O'Sullivan, D., Berryman, M., & Bishop, R. (2010). *Scaling up education reform: Addressing the politics of disparity*. Wellington, New Zealand: NZCER Press.
- Okojie, M. (2011). The changing roles of teachers in a technology learning setting. *International Journal of Instructional Media*, 38(1).
- Osteen, B., Perry, L., Cammock, P., Kingham, S., Pawson, E., Stowell, R., & Perry, D. (2011). *Engaging teachers and learners through service-learning: The connection between student engagement and service-learning*. AKO: Aotearoa National Centre for Tertiary Teaching Excellence. Retrieved from
<https://ako.aotearoa.ac.nz/download/ng/file/group-3300/engaging-teachers-and-learners-through-service-learning.pdf>

- Packer, M. J. & Goicoechea, J. (2010). Sociocultural and Constructivist Theories of Learning: Ontology, Not Just Epistemology. *Educational Psychologist*, 35(4), 227-241, doi: 10.1207/S15326985EP3504_02
- Pearce, S. (2016). Authentic learning: What, why, and how? *e-Teaching. Management strategies for the classroom*, 10. ACEL.
- Penetito, W. (2015). Decolonizing education: Nourishing the learning spirit. *AlterNative: An International Journal of Indigenous Peoples*, 11(1), 78-79. Accessed from: <<https://search.informit-com-au.libproxy.unitec.ac.nz/documentSummary;dn=980476763746688;res=IELNZC>> ISSN: 1177-1801
- Pere, R. (1982) Concepts and learning in the Māori tradition. Te Kohanga Reo Trust 1994. Wellington: NZ.
- Perry, A., & Perry, L. (2015). Final-Year transition and service-learning: Working together as a vehicle for student engagement, development, and life. Western Carolina University. *International Journal of Research on Service-Learning and Community Engagement*, 3(1). 2015.
- Perry, L. (2011). A naturalistic inquiry of service-learning in New Zealand classrooms: Determining and illuminating the influence on student engagement. Unpublished Doctor of Education thesis. University of Canterbury, New Zealand.
- Perusek, J. (2008). Student epistemology/teacher epistemology: Different dichotomies. Center for Teaching Excellence. United States Military Academy, West Point, NY. http://www.usma.edu/cfe/Literature/Peruske_08.pdf
- Pihama, L. (2010). Kaupapa Maori Theory: Transforming Theory in Aotearoa. *He Pukenga Korero*, 9(2), 5-14. Retrieved from <http://www.hepukengakorero.com/>
- Pihama, L., Smith, K., Taki, M., & Lee, J. (2004). *A literature review on kaupapa Maori and Maori education pedagogy*. Auckland, NZ: The International Research Institute for Maori and Indigenous Education (IRI).
- Pinnegar, S., & Daynes, J. G. (2007). Locating Narrative Inquiry Historically. In, *Handbook of narrative inquiry*. Retrieved from <https://au.sagepub.com/en-gb/oc/handbook-of-narrative-inquiry/book227281>
- Pohatu, T. W. (2004). Āta: Growing respectful relationships. *He Pukenga Korero*, 8(1), 1-8.
- Pohatu, T. (2003). Maori World-views: Source of innovative social work choices. Retrieved from: http://www.rangahau.co.nz/assets/Pohatu/Pohatu%20T_maori_worldviews.pdf
- Pounders, S. & Beliveau, V. (Eds.). (2010). Western growers foundation and the California school garden network. (2nd ed.). Irvine, CA: School Garden Network. Accessed from: www.csgn.org
- Pratt, C. C., McGuigan, W. M., & Katzev, A. R. (2000). Measuring program outcomes: Using retrospective pretest methodology. *American Journal of Evaluation*, 21(3), 341 – 349.
- Provost, L. (2012). *Education for Māori: Context for our proposed audit work until 2017*. Office of Auditor General. New Zealand Government. Accessed from: <https://www.oag.govt.nz/2012/education-for-maori>
- Hogue, R. (2015). Developing an Appreciative Understanding of Epistemologies in Educational Research. Retrieved from: https://www.academia.edu/12235888/Developing_an_Appreciative_Understanding_of_Epistemologies_in_Educational_Research_One_Bloggers_Journey

- Reti, H. (2012). Bicultural perspectives of education outdoors. In D. Irwin, J. Straker, & A. Hill (Eds.), *Outdoor Education in Aotearoa New Zealand: A New Vision for the Twenty First Century* (pp. 146-150). Christchurch: CPIT.
- Rice, K., & Pollack, S. (2000). Developing a critical pedagogy of service learning: Preparing self-reflective, culturally aware, and responsive community participants. In C. R. O'Grady (Ed.), *Integrating service learning and multicultural education in colleges and universities* (pp. 115-134). Mahwah, NJ: Lawrence Erlbaum Associates
- Riedy, C., Fam, D., Ross, K., & Mitchell, C. 2018. Transdisciplinarity at the Crossroads: Nurturing Individual and Collective Learning. *Technology Innovation Management Review*, 8(8): 41-49. <http://doi.org/10.22215/timreview/1177>
- Ritchie, J. (2013). Indigenous Onto-epistemologies and pedagogies of care and affect in Aotearoa. *Global Studies of Childhood*, 3(4), Retrieved from: www.worlds.co.uk/GSCH
- Robinson, V., & Lai, M. K. (2006). Practitioner research for educators: A guide to improving classrooms and schools. Sage. London: UK.
- Rockwell, S. K., & Kohn, H. (1989). Post-then-pre evaluation. *Journal of Extension*, 27(2). Available at: <http://www.joe.org/joe/1989summer/a5.html>
- Royal, T. C. (2003). The woven universe: Selected readings of Rev. Māori Marsden. Wellington, New Zealand: Estate of Rev. Māori Marsden.
- Royal, T. C. (2007). Kaitiakitanga – guardianship and conservation. Te Ara - the Encyclopedia of New Zealand [online], <http://www.TeAra.govt.nz/en/kaitiakitanga-guardianship-and-conservation>
- Royal, T.C., with Simpson, T., & Tepania, S. (2009a). Mātauranga Māori: An Introduction. Mauriora-ki-te-Ao/Living Universe Ltd: NZ. ISBN: 978-0-9582955-0-5
- Royal, T.C., with Simpson, T., & Tepania, S. (2009b). Mātauranga Māori: Perspectives. Mauriora-ki-te-Ao/Living Universe Ltd: NZ. ISBN: 978-0-9582955-4-3
- Rychen, D., & Salganik, L. (2003). Key Competencies for a Successful Life and Well-Functioning Society. Hogrefe Publishing.
- Saltmarsh, J. (1996). Education for critical citizenship: John Dewey's contribution to the pedagogy of community service learning. *Michigan Journal of Community Service Learning*, 3(1). 13-21. Retrieved from <http://hdl.handle.net/2027/spo.3239521.0003.102>
- Sankara, S., Dick, B. and Passfield, R. (Eds.). (2001) Effective Change Management through Action Research and Action Learning: Concepts, Perspectives, Processes and Applications. Southern Cross University Press, Lismore, Australia, pp. 1-20.
- Scardamalia, M. & Bereiter, C. (1991). Higher Levels of Agency for Children in Knowledge Building: A Challenge for the Design of New Knowledge Media: *Journal of the Learning Sciences* 1(1). (2017). Retrieved from http://www.tandfonline.com/doi/abs/10.1207/s15327809jls0101_3
- Scardamalia, M. & Bereiter, C. (2006). Knowledge Building: Theory, pedagogy and technology. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences* (pp. 97-118). New York: Cambridge University Press. Retrieved from http://ikit.org/fulltext/2006_KBTheory.pdf
- Schaaf, J., Klatt, J., Boyd, H., & Taylor-Powell, E. (2005). Analysis of Retrospective Post-then-Pre Data, Quick Tips #30. Program Development and Evaluation. University of

- Wisconsin-Extension, Madison, WI. Retrieved from:
<http://www.uwex.edu/ces/pdande/resources/index.html>
- Sigmon, R. (1979). Service-Learning: Three principles (PDF). *Synergist*, 9-11. Retrieved from:
<https://nsee.memberclicks.net/assets/docs/KnowledgeCenter/IntegratingExpEduc/BooksReports/55.%20service%20learning%20three%20principles.pdf>
- Simons, L., & Cleary, B. (2006). The influence of service learning on students' personal and social development. *Journal of College Teaching*, 54(4). Heldref Publications.
 Accessed from: <https://www.tandfonline.com/doi/abs/10.3200/CTCH.54.4.307-319>
- Skelly, S. & Zajicek, J. (1998). The effect of an interdisciplinary garden program on the environmental attitudes of elementary school students. *HortTechnology October-December*, 8(4), 579-583.
- Skogh, I. & de Vries, M. J. (Eds.). (2013). Technology teachers as researchers: Philosophical and empirical technology education studies in the Swedish TUFF research school. International Technology Education Services. Rotterdam, The Netherlands: Sense Publishers.
- Sleeter, C. E. (2011). An agenda to strengthen culturally responsive pedagogy. *English Teaching: Practice & Critique (University of Waikato)*, 10(2), 7–23. Retrieved from
<http://libproxy.unitec.ac.nz:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=anh&AN=65794052&site=ehost-live&scope=site>
- Smith, G.H., (1997). *Kaupapa Maori: Theory and Praxis*. Ph.D. Thesis, Education Department; University of Auckland. Monograph, published by The International Research Institute for Maori and Indigenous Education; 1997.
- Smith, G. H. (2003, December). Kaupapa Māori theory: Theorizing indigenous transformation of education & schooling. Paper presented at the 'Kaupapa Māori Symposium' New Zealand Association for Research/Australia Association for Research in Education joint conference. New Zealand: Auckland.
- Smith, L. T. (2005). On tricky ground: Researching the native in the age of uncertainty. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 85–108). Thousand Oaks, CA: Sage.
- Smith, L. T. (2006). Researching in the margins: Issues for Māori researchers—A discussion paper. *Alternative: An International Journal of Indigenous Scholarship* (Special Suppl. 2, Marginalisation), 4–27.
- Smith, L. T. (2012). *Decolonizing methodologies: Research and indigenous peoples* (2nd ed.). Dunedin, New Zealand: University of Otago Press.
- Snook, I., & O'Neill, J. (2014). Poverty and inequality of educational achievement. In V. Carpenter, & Sue Osborne (Eds.), *Twelve thousand hours: education and poverty in Aotearoa New Zealand* (pp. 19-43). Auckland, New Zealand: Dunmore Publishing.
- Sobel, D. (2005). *Place-based education: Connecting classrooms & communities*. Great Barrington, MA: The Orion Society.
- Spallino, J. (2017). Why is service learning important in education? Accessed from:
<https://www.methodschoools.org/blog/the-importance-of-service-learning-in-education>
- Speck, B. W., & Hoppe, S. L. (Eds.). (2004). *Service-learning: History, Theory, and Issues*. Westport, CT: Greenwood Publishing Group Inc.

- Stanton, T. K., Giles, D. E. Jr., & Cruz, N. I. (1999). *Service-Learning: A movement's pioneers reflect on its origins, practice, and future*. San Francisco, USA: Jossey-Bass Inc.
- Statistics New Zealand. (2013). Census map of Maori by region. Retrieved from: <http://archive.stats.govt.nz/StatsMaps/Home/Maori%20ethnicity/2013-Census-map-Maori-ethnic-group.aspx>
- Stevens, G. L., & Lodl, K. A. (1999). Community coalitions: Identifying changes in coalition members as a result of training. *Journal of Extension*, 37(2). Retrieved from: <http://www.joe.org/joe/1999april/rb2.html>
- Strand, K., Marullo, S., Cutforth, N., Stoecker, R., & Donohue, P. (2003). Principles of best practice for community-based research. *Journal of Community Service Learning*, 9, 5-15. Michigan, USA. Retrieved from: <http://hdl.handle.net/2027/spo.3239521.0009.301>
- Streubert, H. J., & Carpenter, D. R. (2002). *Qualitative research in nursing: Advancing the humanistic imperative* (3rd ed.). Philadelphia: Lippincott Williams & Wilkins.
- Stucki, P. (2010). Maori Pedagogy: Pedagogical beliefs and practices in a Māori tertiary institution. Palmerston North, New Zealand: Massey University.
- Tamati, A. (2011). Te Mana tangata - Leadership stories. *Journal of Educational Leadership, Policy and Practice*, 26(2), 69-74.
- Taonui, R. (2010). Mana tamariki: Cultural alienation. *AlterNative: An International Journal of Indigenous Peoples*, 6(3), 187-202. Accessed from: <https://search.informit-com.au.libproxy.unitec.ac.nz/documentSummary;dn=570300332913748;res=IELNZC> > ISSN: 1177-1801.
- Tau, S. (2005, July). *Mataitai*. Presentation to New Zealand recreational fishing council AGM. Wellington, New Zealand
- Taylor, C. (2006). Introducing action research. In Taylor, C., Wilkie, M. & Baser, J. *Supporting Learning Professionally: Doing action research* (pp. 1-15). Doi: 10.4135/9780857024398.d3
- Taylor, C., Wilkie, M. & Baser, J. (2006). Analysing the data. In Taylor, C., Wilkie, M. & Baser, J. *Supporting Learning Professionally: Doing action research* (pp. 44-60). Doi: 10.4135/9780857024398.d6
- Te Kete Ipurangi. (2015). *Capable kids: Working with the key competencies* [online]. Accessed from: <http://nzcurriculum.tki.org.nz/Key-competencies/Capable-kids-Working-with-the-key-competencies#collapsible1>
- Te Kete Ipurangi. (n.d.). *Technology Online*. Accessed from: <http://technology.tki.org.nz/Technology-in-the-NZC/Technology-and-the-key-competencies>
- Te Waka Kai Ora. (2011). *Nga kaupapa o hua parakore*. Kaikohe, New Zealand: Te Waka Kai Ora
- Thanasoulas, D. (2000). What Is Learner Autonomy And How Can It Be Fostered? *The Internet TESL Journal*, 1(1).
- The Treaty of Waitangi Information Programme. (2005). Wellington, New Zealand: State Services Commission.

- Thomas, J. W. (2000). A Review of Research on Project-Based Learning. Retrieved from http://www.ri.net/middletown/mef/linksresources/documents/researchreviewPBL_070226.pdf
- Trickett, E. J. (1991). Paradigms and the research report: Making what actually happens a heuristic for theory. *American Journal of Community Psychology*, 19(3), 365–370.
- Trier, U. (2003). Key Competencies for a Successful Life and Well-Functioning Society.
- Tuuta, M., Bradnam, L., Hynds, A., and, Higgins, J., with Broughton, R. (2004). Evaluation of the Te Kauhua Māori Mainstream Pilot Project. Wellington, New Zealand: Ministry of Education. Retrieved from https://www.educationcounts.govt.nz/publications/maori/english-medium-education/evaluation_te_kauhua_pilot_project
- Vaughn, M. (2018). Making sense of student agency in the early grades. *Phi Delta Kappa*, 99(7), 62–66. <https://doi.org/10.1177/0031721718767864>
- Vega, V. (2012). *Research-Based Practices for Engaging Students in STEM Learning*. Edutopia. Retrieved 21 January 2017, from <https://www.edutopia.org/stw-college-career-stem-research>
- Violas, P.C., Tozer, S., & Senese, G. B. (2002). *School and Society: Historical and Contemporary Perspectives*. McGraw-Hill Humanities/Social Sciences/Languages. p. 121. ISBN 0-07-298556-9.
- Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University.
- Wake, S. (2008). 'In the best interests of the child': Juggling the geography of childrens' gardens (between adult agendas and childrens' needs). *Children's Geographies*, 64, 423-435.
- Wake, S. J. (2010). *The Eco-classroom project: Fostering student participation through education for sustainability*. Unpublished Master of Education thesis. University of Waikato, Hamilton, New Zealand. Retrieved from <https://hdl.handle.net/10289/5298>
- Wake, S.J. (2015). Same, same, but different: A comparison of rationales between historic and contemporary school garden development. In M. Ignatieva, Proceedings of the 52nd World Congress of the International Federation of Landscape Architects: History of the Future. <https://hdl.handle.net/10652/33>
- Wake, S. J., & Birdsall, S. (2016). Can school gardens deepen children's connection to nature? In K. Nairn, K., Kraftl, P., & Skelton, T (Eds.). *Space, Place and Environment: Geographies of children and young people*, Vol. 3. (1st ed., pp.89-114). Singapore: Springer.
- Walker, R. (1990). *Ka whawhai tonu matou: Struggle without end*. Auckland, New Zealand: Penguin.
- Walker, R. (2016). Reclaiming Maori education. In Hutchings, J., & Lee-Morgan, J (Eds.), *Decolonisation in Aotearoa: Education, Research and Practice* (pp. 25-41). Wellington, New Zealand: NZCER Press.
- Wall, K. & Hall, E. (2017). The teacher in teacher-practitioner research: Three principles of inquiry. In Krakow, W (Ed). *Teachers and teacher educators learning through inquiry: International perspectives*. (pp. 35-62). This version was downloaded from North Umbria Research Link: <http://nrl.northumbria.ac.uk/31299/>
- Ward, A. (1999). An unsettled history: treaty claims in New Zealand today. Wellington: Bridget Williams Books.

- Watanabe-Crockett, L. (2016). Global Digital Citizen. Retrieved from: <https://globaldigitalcitizen.org/21st-century-skills-every-student-needs>
- Wenmoth, D. (2014). *Ten trends 2014: Agency*. Accessed at: <https://edtalks.org/#/video/ten-trends-2014-agency>
- Weimer, M. (2009). *Why students don't ask for help, and what you can do about it*. Retrieved from: <https://www.facultyfocus.com/articles/edtech-news-and-trends/why-students-dont-ask-for-help-and-what-you-can-do-about-it/>
- Whitinui, P. (2011). *Kia tangi te tīti*. Wellington, New Zealand: NZCER Press.
- Wilkie, M. (2006). Analysing the data. In Taylor, C., Wilkie, M., & Baser, J. *Supporting Learning Professionally: Doing action research* (pp. 44-60). Sage Publications Ltd. doi: 10.4135/9780857024398.d6
- Wilkinson, D. (2000). *The researcher's toolkit: The complete guide to practitioner research*. Abingdon: Routledge.
- Williams, H. W. (1971) *Dictionary of the Māori language*. (7th Ed). Auckland, New Zealand: Pearson Education.
- Wingate, L. (2015). 2 for 1: The retrospective pretest method for evaluating training. EvaluATE [online]. Retrieved from <http://www.evaluate.org/webinars/2015-dec/>
- Wiri, R. (2013). *Mātauranga Māori: The traditional origins of Māori knowledge*. Whakatāne, New Zealand: Te Whare Wānanga o Awanuiārangī.
- Wolpert-Gawron. 2016. What the heck is service learning? Edutopia. Retrieved from: <https://www.edutopia.org/blog/what-heck-service-learning-heather-wolpert-gawron>
- Woodard, E. W. (2018). Soft skills, in turn: An exploratory qualitative study of soft skill development through individual internship experiences in a workplace setting. Unpublished Doctor of Education thesis. The George Washington University, Washington DC, USA. Retrieved from <https://search.proquest.com/docview/2030074165?accountid=44427>
- Wynd, D. (2014). Food in schools: Reflections on the new social space. In, Carpenter, V., & Osborne, S. (Eds). *Twelve thousand hours: Education and poverty in Aotearoa New Zealand*. Auckland, New Zealand: Dunmore Press.
- Zealand, E. (2015). Strategy approach. Education in New Zealand. Retrieved from <http://www.education.govt.nz/ministry-of-education/overall-strategies-and-policies/the-maori-education-strategy-ka-hikitia-accelerating-success-20132017/history/ka-hikitia-managing-for-success-2008-2012/strategy-approach/>

7 Appendices

7.1 Appendix A: Māra Kai Resource

Māra Kai Resource Supplement

Gardening in Schools

An authentic real-world context can provide the opportunity for meaningful integration of subject disciplines. However finding such a context is not always easy. Although not generally seen as an avenue for technology education, a school garden can provide an opportunity for rich diverse integrated learning (Lee, Birdsall, Davies and Narayan, 2015) and the positive benefits for student's developing and maintaining garden spaces in schools is moving from assumption to supported fact (Wake, 2015). According to Lee, et al. (2015), international programmes which use gardens for interdisciplinary educational purposes are diverse and, to name just a few, include: the "Kitchen Garden Project", "Garden-based learning", "Nutrition Program", "Sprouting Healthy Kids", "Edible Schoolyard", the "School Garden Program", "Junior Master Gardener", and "Gardens for Life". Here in Aotearoa New Zealand "Garden to Table" is a similar programme run in primary and intermediate schools that Morgan (2015) says, aims to educate children about how to grow, harvest, prepare and share fresh, healthy, seasonal produce and fulfils a school's vision of applying an innovative learning environment in a unique way with their community. Moreover, Clare Browning (2009) tells us that a school garden at Ilminster Intermediate School in Kaiti, Gisborne, has become the focus of excitement for the pupils and that the excitement is spreading through the community as the children take their fresh vegetables home. She goes on to explain how the garden has become a focus of learning about horticulture, nutrition, food preparation and cooking and has created the impetus for science projects and a weather station has been set up to help study the effect of weather on soil and plant growth.

A further scan of literature suggests that edible gardens in schools have the potential to be connected to a wide range of benefits (Moss, Holmes, King, Boyd and Pipi, 2011). More

specifically, as Lee, et al., (2015) tell us, the benefits of such programmes are reflected in: nutrition, exercise, school bonding and attachment, conservation and ecological commitment, parental and community involvement, peer interactions and relationships, attitudinal, behavioural and school attendance.

Critical of the integration of food gardens in schools, Caitlin Flanagan (2010) believes, school gardens are cheating our most vulnerable students by robbing them of hours they might otherwise spend reading important books or learning higher math. However, Williams and Dixon (2013) assert academic outcomes have also been linked with school gardens and disciplines such as science (Blair, 2009), maths, writing, language, art, social studies and environmental education have incorporated learning in the context of a garden (Lee, et al., 2015; Williams & Dixon, 2013). Although, as Blair (2009) and Lee, et al. (2015) tell us, research into the effectiveness of these programmes is proving inconclusive and more research is needed.

Technology Education

Technology education is generally regarded as a practical and hands-on subject (Jones, Bunting, & de Vries, 2013) which encourages lateral thinking and multiple solutions (Ministry of Education, 1995). According to Dakers (2005) and Turnbull (2002), authenticity is seen as an essential aspect of technology and generally refers to an action or activity being 'real' to students and their lives, whilst also including the use of real tools and information (Turnbull, 2002). Literature says the setting and/or the tasks are expected to be meaningful to the students (Dakers, 2005; Hill & Smith, 2005), and learning should involve communities of practice (Dakers, 2005; Hill & Smith, 2005). In this way, say Lee, et al. (2015), teachers are not seen as distributors of knowledge but rather facilitators of learning, whose role is to support and guide students. Dakers (2005) tells us that technology is socially constructed and, according to Conway (1994), values are naturally imbedded within it. For this reason exploring values has been a key part of the New Zealand technology curriculum since its inception in 1995 (Ministry of Education, 1995; 2007). As Klemmer, Waliczek, and Zajicek (2005) explain, technology is also interdisciplinary by nature and many teachers are easily able to weave science, art, language and maths into classroom programmes. Not only can subjects be taught

through technology, technology itself has many disciplines, including horticulture, food technology, cooking, woodwork and home economics which is, or has been a part of many nations' technology curriculum (Klemmer, et al, 2005; Lee, et al, 2015; Ministry of Education, 2000).

Gardening as a Context for Technology Education

Technology education in The New Zealand Curriculum (Ministry of Education, 2007) requires students to learn about, through and with technology. In order for students to become technologically literate they must learn practical skills, consider the impact of technology on and from society as well as managing themselves and resources. Although gardens are rarely considered a context for technology, according to Lee, et al. (2015), gardens provide an excellent vehicle loaded with potential for learning. Krasny & Tidball (2009) tell us, gardening also provides an opportunity to link with other communities of practice.

Food gardens are multifaceted and, as Lee et al. (2015) assert, can engage students with a wide range of community experts to support learning about garden design, construction, windbreaks, climbing frames, fencing, soil, composting, worm-farming, sourcing seeds and seedlings and pest control. Furthermore, as explained by Lee, et al. (2015), all manner of links with food technology are possible after harvesting the produce, such as: societal issues, healthy eating, recipe designs, cooking, food presentation and preservation to name a few. Not only do edible gardens provide the potential to improve access to and increase knowledge and consumption of healthy food (e.g., vegetables, herbs and fruit), Moss, et al. (2011) tell us they also tend to be community oriented which allows behaviour, skills, attitudes and knowledge as well as the produce to transfer from the children to their parents and whānau.

Literature says gardens have also been shown to: keep participants physically active promote students' motivation to learn, enhance psychosocial development (e.g., responsibility, self-esteem), improve cooperation with peers, create a sense of pride in, and ownership of the education setting (Blair, 2009; Moss, et al. 2011; Wake, 2010;2015; Wake and Birdsall, 2016). In this way gardening and the subsequent cooking are interdisciplinary (Skelly & Zajicek, 1998) and students are able to learn about resource management (Krasny & Tidball, 2009) whilst integrating social values, and the knowledge of whānau and other local adults (Fakudze, 2006; Krasny & Tidball, 2009). Blair (2009) attests that learning in a school food garden is authentic

and purposeful and provides practical, hands-on interaction. All of which are key requirements for quality technology programme (Ministry of Education, 1995).

From an environmental perspective, school gardens may seem to researchers to be a limited substitute for redesigning the whole schoolyard or for interacting more closely with nearby landscapes (Blair, 2009). However, Moore (1995) reports that the most feasible pedagogical vehicle for promoting daily environmental learning is the school vegetable garden. For example, students could be full participants each year in re-designing the garden and the regenerative act of embedding tiny seeds in student-made compost, then nurturing those seeds during their transformation into flowers or vegetables. Researchers have frequently commented on how excited children were to put their hands in dirt (Blair, 2009). The act of growing food from seeds is exciting, even miraculous; the product is something special to be taken home to share.

In recent times, more and more studies have been focused on the relationship between nature and our mental health and wellbeing (Seymour, V. 2016). An article by psychologist Dr. Emily O'Leary (2017), argues that natural settings are not only important for our primary needs but also for our emotional, psychological and spiritual needs. According to her research, for children, the ability to take their learning outside has a multitude of long-term benefits for physical, social, emotional and cognitive development, and fosters a sense of identity, feelings of autonomy, psychological resilience and healthy behaviours. In addition, she contends, children who experience high levels of contact with nature have higher levels of self-worth and higher cognitive function (O'Leary, 2017).

The childhood obesity debate and the converse situation of children going to school hungry are discussed in many health, educational and social science circles today. As asserted by Morris, Koumjian, Briggs and Zidenberg-Cherr (2013), few children know the origins of their food or appreciate the importance of local agriculture to food production. As Blair (2009) contends, in order to decrease the rise of the obesity epidemic, children need to broaden their perspective on what is healthy food and to re-personalise food. This sentiment is expressed by Thorp and Townsend (2001) in the following statement: Gardening changes the status of food for all involved. When one gardens, food can no longer be viewed as a mere commodity for consumption; we are brought into the ritual of communal goodness that is found at the intersection of people and plants. Food that we grow with our own hands becomes a portal for

personal transformation (p. 357). Supporting this sentiment, Blair (2009) says, producing one's own food connects students to sensual pleasures, sustenance, and the agri-systems of daily life in and beyond the school and McCarroll (2017) found growing their own food improved students attitudes toward fruit and vegetables and their consumption of them increased. Fortunately, as Morris et al. (2013) assert, educators are in a position to make a difference, and school gardens have become recognized as a possible solution. Gardens not only teach children where their food comes from, they also, as Blair (2009), Lee, et al. (2015) and Moss, et al. (2013) contend, expose children to a variety of fresh fruits and vegetables.

Aotearoa New Zealand used to be a 'grow your own food nation', we had to be according to Michael King (2006). However, as Kereopa reminds us, the advent of supermarkets, two worker families and itinerant living practices has seen many of our home and marae gardens today taken over by grass, flower beds, commercial crops of maize, or car parking (Moon, 2005). Today, like most city dwellers, many people, including many Māori rely on imported and processed foods bought from the supermarket (Tanzcos, 2009). According to Blair (2009) it is the norm today for families to purchase anonymous pre-packaged food which arrives at supermarkets from energy-intensive, polluting, and often obesity-promoting industrial food-manufacturing systems. Given these trends, it is surprising that more schools aren't planting gardens to allow students the opportunity to gain first-hand knowledge of growing their own food.

Unfortunately, Māori are overly represented in a large portion of negative health statistics. For example, the New Zealand Health Survey 2012/2013 shows that Māori adults report high rates of most adverse health conditions and that vegetable consumption is shown to be lower in Māori than non-Māori. According to Statistics NZ (2013b) most Māori live in urban areas, away from their ancestral marae and no longer grow their own kai (food). Gardens in schools may help address some of the health issues that exist today and promote cultural well-being by reconnecting Māori with traditions that have faded as Māori have adapted to living in the city. A national initiative that can involve gardening and Māori knowledge and cultural practices is the Enviroschools programme (Enviroschools Foundation, 2010). However, Browning (2009) asserts enviroschools is a more amorphous concept than Māra Kai. Although Enviroschools is the umbrella beneath which many schools have established food gardens and used them as a gateway into teaching other skills, its primary focus is generally more about sustainability. Māra Kai is undoubtedly part of a wider sustainability picture because it explicitly contributes

to social and physical health, and in this regard has some links with the Ministry of Health's "healthy eating healthy action" obesity-focused programme (Browning, 2009).

Māra Kai - Māori Food Gardens

Food gardens or *Māra kai* are part of the rich cultural heritage of New Zealand that long predates European settlement (Earle, 2011). Before widespread settlement of Aotearoa, having a food garden was integral to daily Māori life and seen as a necessity alongside hunting, fishing and collecting wild foods, essential for their survival (King, 2006). Traditionally, the success of Māori gardens was not only measured in instrumental advances in feeding people, but also in terms of social advances and nurturing human connectedness; gardening was a collective responsibility and provided for the collective (Kawharu, 1975; Moon, 2005). Relationships between people, and the physical and metaphysical realms were central in precolonial Māori gardening practices (Moon, 2005). Within the Māori world, the sharing of food fulfilled "social obligations to the gods and manuhiri" (Royal, 2003, p. 9), no expense was spared in extending hospitality or manaaki to guests (manuhiri). However, as Hohepa Kereopa explains, the sharing of food was secondary to the strengthening of relationships: Manaakitanga is about more than just providing food for our guests ... the joining together is more important than the food ... sharing a meal together is one of the ways we connect with each other (Moon, 2005, pp. 24–25).

Being underpinned by ancient values, concepts and knowledge that express cultural identity and regulate cultural activity, King, Hodgetts, Rua, and Te Whetu (2015) explain that Māori gardens are able to provide spaces that connect and reconnect with the very essence of what it means to be Māori by manifesting emplaced memories, histories, heritage, group identities and ways of being. Therefore, gardening, for Māori, is an expression of their values system and cultural identity and when gardening, the constant togetherness of iwi, hapū and whānau members reinforces kinship bonds (Moon, 2005).

Moon (2005), Kawharu (2000) and Marsden (2003) assert, the philosophically holistic motivations underpinning how Māori interpret their environment and gardening connects Māori with Papatūānuku (earth mother) as the eternal caregiver, and in caring for the whenua, people care for Papatūānuku, themselves and others (King, et al., 2015). This interconnectedness refers to the concept of mauri (life force), which Marsden (2003) describes as the bonding element that holds the fabric of the universe together (p. 44). From a Maori worldview, the spiritual and physical health of the environment and the people is of utmost importance (Te Waka Kai Ora, 2010) and as described in the previous chapter, is understood in terms of the quality of mauri ora, or the energy and life-force of all things.

Hirini Moko Mead (2003) explains, tikanga comes from the accumulated knowledge of generations of Māori and includes concepts of principles, values, spirituality and practice. Te Ahukaramū Charles Royal (2007) tells us, tikanga governed all Māori cultivation activities, from planting to harvesting and storage. Additionally, he says, tikanga in regard to gardening is a matter of having both the right intention to honour holistic Maori cultural practices as well as following specific protocols and procedures (Royal, 2007). As kaitiaki (guardians) of our whenua (land) Māori are guided by tikanga (cultural practices) to ensure our practise of māra kai are working with the values of our ancestors. One aspect of tikanga Maori dictates that we should show gratitude and give thanks for all we have (Moon, 2005). For example, Maori believe that through karakia, ritual or prayer, they are able to maintain and strengthen their relationship with the atua (elemental forces) that support the growth and change of our natural environment (Marsden, 2003; Moon, 2005; Royal, 2003). Marsden (2003) reminds us we owe thanks to Papatūānuku for providing us with life, food and all the other things that sustain us. Kereopa (Moon, 2005, p.18) says, this is because Māori believe all life came from the soil of Papatūānuku, and during our mortal lives she nourishes and sustains us until, eventually, we are returned to her earthy bosom. Other spiritual rituals and ceremonies were also part of māra kai (Mead, 2003). For instance, Mead (2003) says, offering the first fruits grown back to the gods is generally acknowledged tikanga, as is the practice of beginning and finishing each day, or important events and activities with a karakia. Also when gardening, the practice of karakia helps direct a person's thinking using the principle Māori call *Turuki Whakataha* (Moon, 2005). A *turuki*, Kereopa tells us, is something that causes an upset, and *whakataha* simply means to set aside. Therefore *turuki whakataha* means to set aside any upsets, stresses or negativities to enable an opening through which one is able to regain a calm, good feeling that will allow your plants to grow to their full potential so you can gain the most benefit from the energy of the plants (Moon, 2005).

The practice of Māra kai also promotes the retention and growth of heritage seeds and cultigens. The importance of traditional knowledge and the retention of taonga species through seed saving was highlighted in the WAI 262 claim (Park, 2001). As Jordan (2010) and Hutchings et al (2010) observe, the practice of māra kai can promote the retention and longevity of heritage seed lines and genetic vegetable heritage. Expanding on the importance of restoring indigenous seeds as a valuable heritage, Earle (2011) says, taonga tuku iho in māra kai includes people saving their seeds or using seed someone has passed down, then you can be eating the same thing that your great-great-grandfather may have eaten. Pākehā do this all the time with their livestock and if we are not prudent there may well come a time when the only way one can plant a garden is by buying seed from corporative seed merchants. Te Waka Kai Ora (2010) encourage whānau to save and share seed and to grow their own māra kai as a way of practising kaitiakitanga on your whenua as well as a way of taking care of whānau.

By growing one's own kai you know what you are eating: healthy kai free of pesticides, toxins and genetic modification which contributes to mauri ora (well-being). Developing a māra kai can also support whānau to become more resilient and self-reliant which in turn could lead to economic benefits for whānau and communities. The Ministry of Māori Development, Te Puni Kōkiri express the following aspirations for Māra Kai:

- A way for Māori communities to feed themselves, and promote self-sufficiency.
- A way of improving Māori health, through better nutrition and fitness.
- A useful way to develop private or community land.
- An opportunity to grow kai the Māori way and know how to do that, which will help preserve and protect Māori kai.
- An educational opportunity to gain horticultural skills.

Unfortunately, a consequence of urbanisation is that many Māori have lost connection with cultural traditions such as those associated with growing their own food gardens. And, as Tāwhai (2013) suggests, the hectic urban existence of modern Māori whānau, may mean they less inclined to seek out the few remaining kaumātua to gain the traditional indigenous knowledge associated with gardening, and traditional Māori gardening knowledge is at risk of being lost if it is not written down or transmitted orally by kaumātua.

An underlying intention of this study is to provide an opportunity that will allow the traditional practices of māra kai to be transmitted to school children in the hope that their enthusiasm and knowledge gained will also filter through to their friends, whānau and the wider community. The following section outlines the traditional role of Matariki and Maramataka and explains their tikanga as central elements of māra kai.

Tikanga - Traditional practices of māra kai

Within a Maori world view, having an understanding of what is happening in our gardens requires having a continuous relationship with the environment (Te Waka Kai Ora, 2010).

In Te Ao Māori (Māori worldview) the term tohunga is used to describe someone recognised as an expert practitioner and teacher in a particular field of cultural practices. It was the role of tōhunga, and in more contemporary times, local kaumatua (tribal elders) to ensure tikanga (customs) were observed (Keane, 2011).

Mead (2003) tells us that Māori believe the natural world is able to 'speak' to humans and give them knowledge and understanding. Much of the tikanga associated with gardening is founded upon accumulated knowledge which stems from observations of cause and effect (Mead, 2003). As Kereopa (Moon, 2005) says, this is done through observation of the natural environment, seasons, celestial occurrences and wildlife behaviour. Within a Maori world view seasons are not dictated by the Western, Gregorian calendar system using in most 'civilised' countries today. Maori interpret signs of the seasons by the appearance of specific birds, insects and native trees or plants in flower or fruit (Moon, 2005; Tāwhai, 2013; Te Waka Kai Ora, 2010). Gardening tohunga, Hohepa Kereopa, recounts how the old people used to listen to things like insects and birds, and from the particular sounds they made, they could tell if heavy rain was coming, or if it was going to be dry for a long time (Moon, 2005). Similarly my kaumātua taught me that the sound of the Pīpīwharau (shining cuckoo) heralds the time to start planting your garden.

In the Maori world all things have a celestial origin (Marsden, 1992; Royal, 2003). While tribal accounts may differ, according to Roberts, Weko and Clarke (2006) there is still a generic consistency in their cosmological accounts. Māori also used astronomical occurrences as time

indicators, for instance: Matariki and the Maramataka or Māori Lunar Calendar (Moon, 2005; Tāwhai, 2013; Te Waka Kai Ora, 2010).

Matariki

The stars have always been a large part of Māori life. Planting, hunting, harvesting, gathering and navigation were all guided by the stars (Mātāmua, 2017). Matariki is a system of understanding and living with the natural world that has been passed down from generation to generation, and is still applicable and used to this day (Moon, 2005; Tāwhai, 2013; Te Waka Kai Ora, 2010).

Matariki is seen as a time of renewal and celebration in Aotearoa New Zealand and signals the completion of one year and the approach of another in the Maori Calendar (Royal, 2007). Following the harvesting of crops, when the pātaka (food storehouses) were full, festivities were traditionally conducted to celebrate Matariki. Matariki is also referred to as a time for reflection on the past year and plan for the future, as well as a time of renewal for nature, and for the wairua (spirit) of the people (Royal, 2007). Matariki provides the space for people to learn from successes and failures and think about how things can be improved for the year to come, and as such is an opportune time for innovation.

According to Dr Rangi Mātāmua (2017), Matariki, also known as Pleiades, is a star cluster that appears just before dawn on the north-eastern horizon during the winter months, usually between mid-May to early July. Mātāmua (2017) tells us that each year Matariki's arrival is foretold three days earlier by the appearance of Puanga (Rigel) and commences with the new moon following the dawn rising of Matariki (Mātāmua, 2017). However, as noted by other researchers in this field, there can be slight variations between tribes of differing geographical locations (Roberts, et al. 2006). For example, as noted by Roberts, et al (2006), on the east coast of the North Island it is the appearance of the first moon after the rising of Matariki (Pleiades) above the eastern horizon which marked the arrival of the New Year. However, in the far north, the South Island and the Chatham Islands it is the appearance of the star Puanga or Rigel which marks the onset of the new year. The length of the Matariki year is determined by the completion of twelve lunar cycles forecasting the imminent return of Puanga, and a lunar cycle consists of 30 or 31 moon nights/days (Meredith, 2006; Te Waka Kai Ora, 2010).

Matariki is sometimes referred to as the 'season of food'. It is a time when the crops have been harvested, preserved food is plentiful, the fish are migrating and the kūmara (sweet potato) seedbed is readied (Te Papa, 2016). The Matariki cluster played a significant role in determining when to plant kūmara. Clear, bright stars indicated a good season. But if the stars are hazy and bunched together, a cold winter was predicted, and planting was delayed. For Māori living on the coast, Matariki marked a good time to dive for kina (sea egg) and to gather mussels and other kaimoana (seafood).

Mātāmua (2017) explains that when a star like Rigel rises, a certain series of plants should be blooming at that stage and likewise, when Mars is in the sky at a particular time, we know that the spring tides should be arriving and there are animal species that should be migrating then. Along with the presence or absence of stars and the flowering times of plants, Roberts, et al. (2006) state, the phases of the moon were (and still are) used by Maori to indicate the seasons of the year.

Maramataka

Of utmost importance to Maori was the role of the moon as a timekeeper. This importance is demonstrated by the presence of a monthly calendar (maramataka) based on the number of nights taken by the moon to complete a revolution of the earth. It was also used to mark the onset of the New Year. Our tupuna were keen observers of their environment, they needed to be to survive. They spent years observing their natural environment and passing on their knowledge of the maramataka to the next generation. Traditionally, Maramataka guided many activities in the lives of iwi communities, such as fishing, planting, harvesting and gathering. As Roberts, et al. (2006) explain, the maramataka formed the basis of cultural life of the community, acting as an indicator of appropriate times for the onset or cessation of various activities. Foremost among these was their ability to foretell appropriate and inappropriate times for food gathering such as the planting and harvesting of crops and the catching of fish. The four seasons – raumati (summer), ngahuru (autumn), kōanga (spring) and takurua (winter) – called forth a series of activities to do with procuring food. The most important function of the Māori lunar calendar according to Meredith (2006) was to regulate planting and harvesting, fishing and hunting. These tended to vary among tribes, depending on where they lived, local climate, and the availability of edible plants, birds and seafood.

The Maramataka, or monthly calendar based on the phases of the moon were common practice throughout Polynesia. Roberts, et al (2006) tell us that there are several reasons why some societies adopted the moon rather than the sun as the primary time keeper and basis for a monthly calendar. Most obvious is the fact that the phases of the moon are readily seen from earth by the naked eye.

Paul Meredith (2006) explains that the maramataka divided the traditional Māori year into 12 lunar months and that the phases of the moon marked the passage of time through the year. The word marama means both the moon and the lunar month – a lunar month is the 29 and a half days between successive new moons, and normally straddles two Gregorian calendar months.

‘Maramataka’, however, translates as ‘moon rotating’ (Roberts, et al., 2006). A rotating moon appears as different shapes when orbiting the Earth. These shapes are called ‘phases’. There are eight phases of the moon and each phase is named after how much of the moon we can see, and whether the amount visible is increasing, or decreasing each day (Barrow, 2013). Mandy Barrow (2013) explains that when the bright part is getting bigger, the Moon is said to be waxing, when it is getting smaller, the Moon is waning. It is called a gibbous Moon if it is more than half-lit and a crescent Moon when it is less than half-lit (Barrow, 2013). Because the thirty or thirty-one divisions of the lunar month are dependent on viewing the moon at night, the old people called these divisions ‘the nights of the month’ but in reality, one division includes a night and a day: 24 hours, and the next division begins on the next night (Tāwhai, 2013).

Monthly moon calendars, or maramataka, are more specific than Matariki or Gregorian calendars in that they specify the actual days on which certain food related activities are or are not advised (Moon, 2005; Roberts, et al., 2006; Tāwhai, 2013; Te Waka Kai Ora, 2010, p. 18). As literature explains, each night of the Maramataka was given a name. For example, Whiro is the first night of the new moon and Rākaunui is when the moon is at its fullest (Moon, 2005; Roberts, et al., 2006; Tāwhai, 2013; Te Waka Kai Ora, 2010, p. 18). While these names may differ from tribe to tribe, or even whānau to whānau, they are mainly congruent in their explanation or interpretation (Roberts, et al. 2006). Ropiha (2000) postulates that the names and meanings of the moon nights had ecological knowledge encoded in them which described the influence of the moon cycle on fishing and planting activities. Over time each day/night was accompanied by information guiding fishing, gardening, and other activities in the natural

world (Moon, 2005; Meredith, 2006; Roberts, et al., 2006; Tāwhai, 2013; Te Waka Kai Ora, 2010, p. 18).

As part of Lincoln University's Mātauranga Māori and Bio Protection Research Team, Roberts, Weko and Clarke (2006) compiled a report on traditional and modern horticultural practices of Māori from 43 published and unpublished maramataka from various tribal sources. They noted similarities as well as differences between tribal and/or geographical areas. For example, horticultural activities feature strongly among the northern tribes, sea fishing among coastal tribes, forest foods (birds and rats) among inland peoples, and freshwater fishes particularly tuna (eels) among others (Roberts, et al., 2006). Another example of difference is how some tribes start their lunar month with Whiro as day one, and Mutuwhenua as day thirty, but others may begin with Rākaunui or the full moon as day one. Due to the specificity of the knowledge contained in tribal or regional maramataka, it is recommended you seek the guidance and advice of local kaumātua in the area you live.

The specific maramataka used in this research project is from Te Whānau-ā-Āpanui on the east coast of the North Island. There were three reasons for choosing this particular maramataka. Firstly, some of the students involved in the project descended from Te Whānau-ā-Āpanui, and I also can whakapapa there. Secondly, Te Whānau-ā-Āpanui is geographically close to Gisborne where this study is located, and thirdly: as some whānau, hapū, iwi view their maramataka as sacred knowledge and therefore not for public consumption. This version was deemed appropriate as it had been made widely available through the recently published work of esteemed kaumātua Wiremu Tāwhai (2013). In his book, *Living by the Moon*, Tāwhai (2013) explains how the nights of the lunar calendar fall into a natural pattern, he provides detailed descriptions of the localised practices of his own iwi drawing upon the knowledge handed down across countless generations. For each phase and moon night, Tāwhai (2013) describes appropriate activities to be undertaken, such as planting, fishing or reflecting, alongside their accompanying kōrero or tribal narrative. He also writes of his aspiration that this book would facilitate the crossing of knowledge over tribal boundaries and encourage a pan-tribal awareness among Māori of ancient and traditional tribal experiences. Thus providing a unique and rich source of material for the learning programmes of our schools: programmes which would heighten and advance a New Zealand indigenous point of view into the mainstream educational systems of this country (Tāwhai, 2013, p.74).

Te Maramataka a Te Whānau-ā-Āpanui - The Māori calendar of Te Whānau-ā-Āpanui

In Te Whānau-ā-Āpanui the lunar month starts with the fullest moon, Rākaunui, as day one, and the first phase wanes to end with Mutuwhenua as day fifteen. The second phase begins with Whiro; the new moon waxes its own course across the sky to rendezvous with Turu again on the thirtieth or thirty-first night (Tāwhai, 2013).

Following is a list of the names of the nights in the lunar month and the English interpretations of the Māori names as given by Wiremu Tāwhai (2013). Included in the middle are notes which explain the role of Takatakapūtea (an extra night).

Te Maramataka a Te Whānau-ā-Āpanui

Sourced from: The Living Moon by Wiremu Tāwhai (2013, p. 16)

<i>Māori names</i>	<i>English interpretation</i>
Te Rākaunui	The transcendent apex (Fullest Moon)
Rākaumatohi	The evergreen spiritual acknowledgement
Takirau	Multitudinous but miniature
Oike	Obstructiveness (unproductive)
Korekore Tuatahi	Nothingness, emptiness
Korekore Rawea	Nature is closed up
Korekore Whakapiri	Insubstantial (merging into the meagre fertility of Tangaroa-ā-mua)
Tangaroa-ā-mua	Improving with the evening
Tangaroa-ā-roto	Productiveness from within
Tangaroa Whakapau	Widespread peak productiveness
Tangaroa Whāriki Kiokio	Complete fulfilled productiveness
Ōtāne	Blessings from Tane (god of creation)
Ōrongonui	All-pervading positiveness, empowered by Rongo (god of growth)

Ōmutu	Closure approaching
Mutuwhenua	Land's end. The termination

At this point, if there are thirty-one days in a lunar month, Te Whānau-ā-Apanui adds an extra night called Takatakapūtea as number thirty-one. It is noted here that other tribes may have other ways of dealing with the months that have thirty-one days. Te Whānau-ā-Apanui uses this simple method of holding an extra night in reserve to use as required.

Whiro	Be aware Whiro lurks, peering over the horizon
Tirea	Expanding radiance from the horizon
Hoata	Reaching, rising upwards
Ōuenuku	Rainbow bright
Okoro	Intentions defined (pathways ahead are clear). Take heed of nature's unpredictable moods
Tamatea Āio	Tamatea is unsettled
Tamatea a Ngana	Tamatea is threatening, dangerous
Tamatea Kai-Ariki	Tamatea is in a devouring mood
Tamatea Tuhāhā	Tamatea is in a destructive mood
Ariroa	Nature wears a disguise
Huna	All is hidden away
Mawharu	Everything is exposed, plentiful; take at will
Ōhua	Time of pronouncement
Atua Whakahaehae	The gods are in a fearsome mood
Turu	Calm and beauty approaches

An explanation of each day in relation to gardening

Drawing from Tāwhai (2013) and Roberts, et al's (2006) work on the maramataka, an overview of each day is given in relation to working in the garden.

Rākaunui

Rākaunui is when the moon is full. However, the naked eye will see the moon as seemingly full over a period of four to five nights (Tāwhai, 2013). The question arises: which of the seemingly full moon nights is Rākaunui? In order to correctly calibrate their maramataka Te Whānau-ā-Apanui had to ascertain when the moon was full, at its zenith or apex.

Calibrating Rākaunui

Traditionally, Tāwhai (2013) explains the procedure used to determine Rākaunui absolutely, involved going to the foreshore at sunset on the first night of these seemingly full moons. There one would watch and wait, when the sun touched the horizon and the moon appeared above the hill-line they would observe the waves running up the beach. When the tide turned they would plant a peg in the sand at the highest wet mark. The next evening they would return to the peg, watch the sun touch the horizon and the moon peep over the hills and plant a second peg where the tide left a new wet mark higher up in the sand. This would be repeated on the third, fourth and maybe even the fifth evening. On one of these evenings an interesting happening will take place, the waves will only lap to the farthest peg and no further. They will recede with the turning tide. The tide is at its fullest, the under edge of the sun will be sinking below the horizon and the moon will be almost fully in view above the hills. That is: *the filling tides of Rākaunui*. The pegs are removed and the maramataka starts and all the rest of the nights are put into place (Tāwhai, 2013, pp. 17-18).

In relation to planting, Tāwhai (2013) tells us that the full moon or Rākaunui is a good period for crops above the land as growth is profuse and luxuriant. During this phase Tāwhai (2013) explains that the full moon is exerting a powerful force on Mother Earth and the water table of the land is at its highest level at this time, a phenomenon which shows in roots crops having many and large produce. Supporting this, Catterall (2017) says, the Earth is in a large gravitational field, influenced by both the sun and moon. The tides are highest at the time of the new and the full moon, when sun and moon are lined up with earth. Just as the moon pulls the tides in the oceans, it also pulls upon the subtle bodies of water, causing moisture to rise in the earth, which encourages growth. A single plant *kumara* plant, for example, planted during Rākaunui would yield at least four or five large tubers and, interestingly, little else. But, he warns, these tubers do not store long (usually up to eight weeks) due to their high water content inherited from their Rākaunui planting. However, traditionally several rows of *kumara* were planted during Rākaunui for immediate use and for sharing through the community or

taking to the marae. Thus the Rākaunui produce indirectly re-strengthened and prioritised positive relationships and hospitality.

In the book, *Olive Branches* (McConnell & McConnell, 1980), Rangitukia kaumātua, Hori Waikari is noted as saying:

“When planting things in the garden, all things that bear above ground are to be planted during the new moon period and all those things that bear underground are to be planted during the moon’s waning period He said that things above ground rise with the moon and those underground will flourish as the moon wanes. Kia whakaheke te marama” (p.55)

For most tribal maramataka, Roberts, et al. (2006) tell us that Rakau-nui occurs most commonly on nights 16, 17 or 18 followed by Rakau-matohi.

4. *Rākaumatohi*

Tāwhai (2013) tells us that Rākaumatohi is much like Rākaunui, usually calm, bright moonlit nights. On a Rakau-matohi night, marks the commencement of the waning of the moon; the word ‘tohi’ denotes the waning of the moon (Roberts, et al. 2006, p. 10). The moon’s waning passage commences, ending at Mutuwhenua, thirteen nights away. Roberts, et al’s (2006) research supports this and says, Rakaumatohi is when the moon begins to wane and it continues to do so during Takirau and Oike/Ohika.

For crops underground, Tāwhai (2013) says, produce are sizable and plenteous, but again, due to high water content, these do not last in storage. Like Rākaunui, says Tāwhai, they are grown for immediate use, and for giving away and taking to the marae.

5. *Takirau*

According to an Atiawa source, during a Takirau night “the moon is losing its brightness” (Roberts, et al. 2006, p.10). There is one outstanding statement Tāwhai (2013) makes about planting during a Takirau day: prolific crop, but small. Therefore, he says, major plantings do

not take place during Takirau because the maramataka is beginning to dive into an unproductive period. .

6. Oike

According to Roberts, et al. (2006) On the Ohika/Oike night “the moon begins to wane”. Te Whānau-ā-Apanui elders say to stay home and weed, tend to the earth as there is nothing positive to be gained by planting during this night/day (Tāwhai, 2013).

7. Korekore Tuatahi - 8. Korekore Rawea - 9. Korekore Whakapiri

The very names of the three Korekore tell clearly what sort of period this is. It is wasteful of energy, time and effort to go to the sea, rivers or to plant anything. It is a time to rely on gathered and stored resources, to repair or maintain equipment and spend time in other pursuits. Any undertaking during Korekore days Tāwhai (2013) says will bear no fruit. However, after 12 midday, as the sun rested, Kore-kore whakapiri could be very good for fishing, planting, and the gathering of most food resources. That night it was also good for eeling, setting nets, hinaki or craypots.

10. Tangaroa-ā-mua - 11. Tangaroa-ā-roto - 12. Tangaroa Whakapau 13. Tangaroa Whāriki Kiokio - 14. Ōtāne - 15. Ōrongonui - 16. Ōmutu

These seven nights of the lunar month have been grouped here because this is the peak of the fertile period, the most productive quarter of the month. This is the time when people become energised and move with vigor and purpose into planting programmes and gathering what is on offer in the sea and rivers - everything associated with gathering food is on the upswing.

In all the 43 versions of maramataka Roberts, et al. (2006) analysed they say there was only one report on the appearance of the moon at this time which noted that Tangaroa-ā-roto is the night when the moon “sinks into the sea”.

17. Mutuwhenua

Thus in the Whanganui maramataka Ōrongonui/Mauri is when the moon sinks into the underworld followed by the moonless nights of: Omutu, Mutuwhenua/Nonihape, and Whiro/Takatakāpūtea. On the Tīrea/Witikiraua night the moon begins to ascend from the underworld.

It is not a good time for gardening or the sea, says Tāwhai (2013), rather it is a time for home chores, for contemplation, for strengthening relationships or relaxing. Just as the moon has gone into recess so too is our work finished for now. The moon passes out of sight at Mutuwhenua to appear again at the arrival of Whiro (Tāwhai, 2013).

*****Takatakāpūtea*****

If the new moon is not observed peeping above the horizon at dawn on the morning after Mutuwhenua then it is known that this month has thirty-one days instead of thirty. On the other hand, if the new moon is seen, Takatakāpūtea is suspended. If Takatakāpūtea is required it is part of the closing down time and exhibits features similar to those of Mutuwhenua.

We now come to another phase of the lunar month

16. Whiro

This night is named after the god Whiro: god of dubious intentions, sometimes of sinister purpose, sometimes the obnoxious one. Tāwhai (2013) advises caution and care in whatever one does during this time. He was also intrigued at the way his elders recognised a dual personality in Whiro's character: admiration for exposing the action of Tāne when he separated their parents despite the potential of Whiro for trouble and pestilence (Tāwhai, 2013). Whiro was special too because the new moon is such a beautiful sight in itself. This is the beginning of the new lunar cycle according to many other tribes. It is regarded by Te Whānau-ā-Apanui as a quiet time, a time for introspection, togetherness and embrace. No planting, food-gathering or fishing is encouraged during the period of Whiro, even though it is an averagely good night for these activities.

For many tribal maramataka, Whiro is regarded as the first night. However, differences of opinion exist in the literature as to whether Whiro is the night on which the moon remains invisible, or first becomes visible (Roberts, et al. 2006). They note that Whiro in the Tuhoe calendar says "new moon, but not seen" yet others, such as their Ngati Raukawa and

Kahungunu sources, say Whiro is the “first appearance of the new moon” (Roberts, et al. 2006). It is interesting to note that according to the research undertaken by Roberts, et al. (2006), the first moon night in the Tahitian calendar is *Tireo* and the second is called *Hiro-hiti*.

When “the moon has risen, she has revealed her form. This is the night when *Hiro* was born. The name itself comes from *hiro*, a sphere, globe, and *hiti*, to rise- of astral bodies” (Roberts, et al. 2006).

Roberts, et al. (2006, p. 8) cite Williams (1928:356) as providing two other Polynesian maramataka (one from Rarotonga, and one from Tahiti) both of which also begin with *Tireo*. If *Tireo* in these Polynesian calendars is *Tirea* in Aotearoa, and *Hiro* (Iro) is *Whiro*, Roberts, et al. (2006) say, this may provide an explanation for the differences of opinion that exist between maramataka concerning whether *Whiro* is the night when the moon remains in the underworld or is the night when it is first seen. A second possible explanation given by Roberts, et al. (2006) for the differences of opinion as to whether the moon is first seen on a *Whiro* or a *Tirea* night is that in certain geographical areas such as Whanganui, observations of the moon’s rise above the earth’s horizon may be difficult or impossible, so that in these areas it is only on the *Tirea* (Witikiraua) night that it can be seen.

17. *Tirea* - 18. *Hoata* - 19. *Ōuenuku* - 20. *Okoro*

According to Tāwhai (2013) these four nights of the moon calendar are grouped together because they were regarded as much of a muchness, with only tiny differences occurring here and there. All of them are average to slightly above average nights for replenishment of food stores of the people. For *Tirea* and *Hoata* Tāwhai states they are good days for collecting and gathering seafood, fishing and planting, and *Ōuenuku* and *Okoro* have the added statement that these are good days for putting down seedbeds if early seedlings are required. Tāwhai (2013) goes on to explain that the old people did not really enthuse about the productiveness of this five night period (including *Whiro*) as they did the *Tangaroa-Ōmutu* period. They treated it as a kind of ‘ho hum’ average period for food-growing compared with the rest of the maramataka. If it needs to be done at that time, go ahead, there won’t be any spectacular results, nor abject failures. It is a safe period to do most things.

21. *Tamatea Āio* - 22. *Tamatea a Ngana* - 23. *Tamatea Kai-Ariki* - 24. *Tamatea Tuhāhā*

There are four Tamatea nights in this block; all are named Tamatea and each is defined and differentiated by the addition of an explanatory phrase. Like the five previous nights the four Tamatea nights are regarded as average for productivity, but planting is not a priority activity at this time. Horticulturalists would rather wait for the ultimate peak planting times, during Turu, Rākaunui and Rākaumatohi, and during the Tangaroa to Ōrongonui stretch. The Tamatea nights after Tamatea Āio are regarded as one of the most hazardous periods of the lunar month to be on or near the sea or river mouths due to the deceptive surface calm masking the underlying turbulence and outward pull of the waters. People, especially children are strongly advised or even prohibited from playing or working on, in or near the sea during the remaining Tamatea period.

Tamatea Āio or Tamatea is unsettled, is a good time to fish or gather seafood and if there is weeding to be done, this is the optimum time to do it. As Tāwhai (2013, p.53) says *Kia paenga ngā taru i ēnei rā*: Tidy heaps of weeding should be seen at the edge of the garden during these days. Their theory was that as the water table was low, weeds were at their lowest resistance to disturbance when dislodged by the weeder, the heat from the sun would dry the rootlets and the extermination process would be complete and final (Tāwhai, 2013, p. 54).

According to Roberts, et al. (2006), there is a paucity of information concerning the appearance of the moon on Tamatea nights. If however, the last three Tamatea nights correspond to the nights in several of the lists from Whanganui as is suggested by Roberts, et al. (2006, p. 9), these are nights on which “it rises higher still” and “it grows larger”. Of note, Roberts, et al (2006) comment that in Tahiti on the night that corresponds with Tamatea-Tuhāhā, “the moon has begun to shine brightly”.

25. Ariroa - 26. Huna - 27. Mawharu - 28. Ōhua - 29. Atua Whakahaehae - 30. Turu

Ariroa is not a productive day. It is a day of recovery for the earth and the waters after the turbulence of the Tamatea period.

Huna means hidden out of sight. Tāwhai (2013) says you will find nothing to take out of the sea, or rivers and plantings will not survive.

Mawharu, translated as - everything is exposed, plentiful, take at will - is one of the richest nights of the maramataka. Traditionally, a distinguishing feature of Mawharu was the ease with which one could gather an abundance of crayfish. Sadly that era has passed, with heavy

commercialism and the huge traps that ring-fence traditional crayfish grounds drastically reducing the numbers of crayfish. However, the Mawharu period's generosity extended beyond crayfish. Fish and eel bite with fervour and plantings take root quickly and well.

It is interesting to note that Mawharu sits between Huna and Ōhua, both unproductive days and Tāwhai explains that the calibration from Rākaunui has to be exact to pinpoint this one bonanza day. Should the placement be one day early or one day late, eager anticipation will turn to empty disappointment.

Ōhua is a time for contemplating the past twenty-seven days of the maramataka and assessing the successes and areas that could be further refined. No food gathering or planting is attempted. Tāwhai (2013) calls Ōhua a 'nothing' day.

Atua Whakahaehae is regarded as the day of the gods and traditionally people remained quiet and did not attempt anything on the food-production or food-gathering fronts.

Turu is often said and written in most lunar calendars as a 'good day'. In Te Whānau-ā-Apanui tradition, Turu is a good day in every sense. Life is on the move again and it is a productive day for the sea, rivers and land. It is also the time to speculate and contemplate the realities and abstractions of the closing lunar cycle. Tomorrow Rākaunui arrives again with the promise of the next exciting thirty or thirty-one days.

Conclusion

The maramataka is a complex system that utilises the sun, moon, stars, environment and ecology to track time and occurrences (Clarke and Harris, n.d). As shown it requires a broad understanding of many facets from the world around us and above us. In addition, Clarke and Harris (n.d) tell us computer programmes have been developed to calculate and validate celestial indicators during the year and to identify phases of the moon at particular times of the month. Today, many, if not most people rely on the internet, commercial calendars or Māori television and radio to tell us which day of the maramataka we are in.

However, one questions whether the same maramataka was used continuously throughout the year, with some minor adjustments or was there more than one maramataka for a particular area, each of which incorporated the different activities appropriate for that month/season?

Alternatively if only one maramataka was used in a particular area, common sense dictates that certain activities prescribed for particular moon nights would not have been repeated each month of the year but only carried out during the appropriate season of the year, for example, the planting or harvesting of the kumara. This question Roberts, et al (2006) also addressed and to the best of their knowledge no record exists of a list of twelve or thirteen different monthly maramataka pertaining to one tribe or location. This suggests that only one maramataka was used by a local group throughout the entire year, with adjustments being made to ensure seasonal synchronization and adaptation to the various changes in the availability of local resources. However, Roberts, et al. (2006) state that this conclusion needs to be tested with more research and evidence from published and unpublished sources, including interviews with living exponents of this ancient tradition based on the phases of the moon.

Phases of the moon image

Day 1 shows Rākaunui, the full moon



Source: Mandy Barrows. <http://www.primaryhomeworkhelp.co.uk/moon/hemispheres.html>

References

- Blair, D. (2009). The child in the garden: An evaluative review of the benefits of school gardening. *The Journal of Environmental Education*, 40(2), 15-38.
doi:10.3200/JOEE.40.2.15-38
- Browning, C. (2009). Māra Kai Māori? Retrieved from: www.pundit.co.nz/content/māra-kai-māori-kai
- Catterall, C. (2017). *Gardening by the moon*. Accessed from: <https://www.gardeningbythemoon.com/>
- Earle, M. D. (2011). *Cultivating health: community gardening as a public health intervention*. Unpublished Master of Public Health thesis. University of Otago. Retrieved from: <http://hdl.handle.net/10523/2078>
- Enviroschools Foundation. (2010). About Enviroschools. Retrieved from: <https://www.enviroschools.org.nz/about-enviroschools>
- Flanagan, C. (2010, Jan/Feb). How school gardens are cheating our most vulnerable students. *The Atlantic*. Retrieved from: <https://www.theatlantic.com/magazine/archive/2010/01/cultivating-failure/307819/>
- Jones, A., Bunting, C., & de Vries, M. (2013). The developing field of technology education: A review to look forward. *International Journal of Technology and Design Education*, 23(2), 191-212. Doi:10.1007/s10798-011-9174-4
- Kawharu, M. (2000). Kaitiakitanga: A Māori anthropological perspective of the Māori socio-environmental ethic in resource management. *The Journal of the Polynesian Society*, 110(4), 349-370.
- Keane, B. (2010). Te Māori i te ohanga – Māori in the economy - The alienation of Māori land. Te Ara - the Encyclopedia of New Zealand, <http://www.TeAra.govt.nz/en/te-maori-i-te-ohanga-maori-in-the-economy/page-4>
- King, M. (2006). *Māori: A photographic and social history* (Revised Ed). Auckland, New Zealand: Reed.
- Krasny, M., & Tidball, K. (2009). Community gardens as contexts for science, stewardship, and civic action learning. *Cities and the Environment*, 2(1), p. 18. Doi: <http://escholarship.bc.edu/cate/vol2/iss1/8>
- Lee, K., Narayan, E., Birdsall, S., & Davies, D. (2015). *Garden to Table in the New Zealand setting: Explanations, perceptions and delivery*. Paper presented at the National Conference of Technology Education New Zealand, Hamilton, New Zealand.
- Marsden, Rev. M. (1992). Kaitiakitanga: A Definitive Introduction to the Holistic World View of the Maori. [online]. URL: http://www.marinenz.org.nz/documents/Marsden_1992_Kaitiakitanga.pdf
- Mātāmua, R. -A. L. (2017). Matariki: Te whetū tapu o te tau (Matariki: The star of the year). Wellington, New Zealand: Huia.
- McConnell, R. N. & McConnell, V. M. (1980). Olive Branches: A record of the descendants of Manuel Josef. Whaler and trader of Port Awanui. East Coast, NZ. National Library of New Zealand. ISBN 0-473-01429-7.
- Meredith, P. (2006). Maramataka: the lunar calendar. *Te Ara - the Encyclopedia of New Zealand*. <http://www.TeAra.govt.nz/en/maramataka-the-lunar-calendar>
- Ministry of Education. (1995). Technology in the New Zealand Curriculum. Wellington: Learning Media.
- Moon, Paul. (2005). *A tohunga's natural world: plants, gardening and food*. Auckland, New Zealand: David Ling Publishing.
- Morris, J. L., Koumjian, K. L., Briggs, M., & Zidenberg-Cherr, S. (2002). Nutrition to grow on: a garden-enhanced nutrition education curriculum for upper- elementary school children. *Journal of Nutrition Education and Behavior*, 34(3), 175-176.
Doi: 10.1016/S1499-4046(06)60088-2

- Moss, M, Holmes R, Boyd, S and King, J (2011). *Guidelines, tips and suggestions to ensure sustainable edible gardens in education settings*. Christchurch, New Zealand: South Island District Health Board.
- O'Leary, E. (2017, April). Ecotherapy. *Mindfood*. Retrieved from: <http://www.mindfood.com/article/inside-the-april-2017-special-new-zealand-issue/>
- Roberts, M., Weko, F., & Clarke, L. (2006). Maramataka: the Maori Moon Calendar. Research Report No. 283. Christchurch, New Zealand: Lincoln University.
- Royal, T.C. (Ed). 2003. *The Woven Universe: Selected writings of Rev. Māori Marsden*. Wellington, New Zealand: The Estate of Rev. Māori Marsden.
- Seymour, V. (2016). The Human–Nature Relationship and Its Impact on Health: A Critical Review. *Frontiers in Public Health*, 4, 260. <http://doi.org/10.3389/fpubh.2016.00260>
- Skelly, S. and Zajicek, J. (1998). The effect of an interdisciplinary garden program on the environmental attitudes of elementary school students. *HortTechnology*, 8(4), 579-583.
- Statistics New Zealand (2016). New Zealand literature review of Māori groupings. Retrieved from www.stats.govt.nz.
- Tanczos, N. (2009, May/June). Marae gardens taking off. *Organic NZ*, 40-41.
- Tāwhai, Wiremu. (2013). *Living by the moon: Te maramataka a Te Whānau-ā-Apanui*. Wellington, New Zealand: Huia Publishers.
- Te Puni Kokiri (1994). Health sector ethics: Nga tikanga pono wahanga hauora: Mechanisms for Māori into ethical review. Wellington, New Zealand: Ministry of Māori Development.
- Te Waka Kai Ora. (2010). *Te Papawhairiki mo hua parakore*. Kaikohe, New Zealand: Te Waka Kai Ora.
- Wake, S. (2008). 'In the best interests of the child': Juggling the geography of childrens' gardens (between adult agendas and childrens' needs). *Children's Geographies*, 64, 423-435.
- Wake, S. J. (2010). *The Eco-classroom project: Fostering student participation through education for sustainability*. Unpublished Master of Education thesis. University of Waikato, Hamilton, New Zealand. Retrieved from <https://hdl.handle.net/10289/5298>
- Wake, S. J., & Birdsall, S. (2016). Can school gardens deepen children's connection to nature? In K. Nairn, K., Kraftl, P., & Skelton, T (Eds.). *Space, Place and Environment: Geographies of children and young people*, Vol. 3. (1st ed., pp.89-114). Singapore: Springer.
- Williams, D., & Dixon, S. (2013). Impact of garden-based learning on academic outcomes in schools synthesis of research between 1990 and 2010. *Review of Educational Research*. Doi:10.3102/0034654313475824

7.2 Appendix B: Research Project Information Sheet



Information about the research project

Research Project Title: **Te Whakatipu Iwi Nui - Growing Great People:** Evaluating teaching and learning through the practice of māra kai and service-learning.

Tena kotou katoa,

My name is Tina-Maree Swann. I am the Food Technology teacher and also the principal facilitator of the horticulture extension classes at our school. This year I am enrolled in the Master of Applied Practice in Digital and Collaborative Education, Te Miro Postgraduate Studies Department at the Unitec Institute of Technology. This requires me to conduct research on an issue or innovation that may have consequences for the teaching and learning at our school. The research will be undertaken in conjunction with the horticulture project which has been developed as a technology extension class in response to student interest in gardening at school.

Synopsis of Project

Students will design and create gardens to enhance the school environment which may also provide supplementary food sources for the school and its community. Some teaching sessions will be held off the school grounds at the tertiary campus, local nature reserves and other Department of Conservation sites.

This project incorporates aspects of mātauranga Māori (traditional knowledge) and tikanga Māori (cultural practices) in relation to designing and creating garden spaces and a community māra kai (food garden) at school.

The project also involves a teaching approach called service-learning. Service-learning is about participating through meaningful, real-life experiences; and how these experiences may relate to other curriculum areas. Connecting to the expertise and knowledge held within the wider community is integral to service-learning. In this regard the project will involve horticulture tutors from the tertiary sector, local kaumātua and businesses. Whānau of participants are also very welcome to be involved at any time.

The aim of this project is to appraise the impact of this innovative teaching and learning approach from the students' own perceptions. Findings from this study will focus on the benefits the teaching approach used in this project may have on students' learning, both within and beyond the curriculum. This may produce areas that myself and other teachers can use to improve learning for students.

It is my hope that, like a drop of water into a pond, this project may also create a positive ripple effect that will enhance relationships between our students, families, school, neighbourhood, and the wider community.

What this means for your child

As a research participant, your child will be asked to complete a questionnaire and take part in a focus group discussion.

The Questionnaire

The questionnaire used is known as a Retrospective evaluation format. It begins by asking students to identify their gender, year group and ethnicity. This is followed by eight before and after questions which focus on the learning opportunities they believe this project has allowed in relation to the way they learn in their normal classroom. The questions are focused around: communication, collaboration and thinking skills; Māori culture in relation to gardening, and; service-learning. The questionnaire uses a type of rating scale where students tick the responses they feel is most appropriate for them.

It will be administered at the end of the research project during school hours and will be administered by another teacher at our school.

Focus group session

To allow each participant the best opportunity to have their voice heard, participants will be split into two groups and there will be two one-off, semi-structured interviews with myself, during which time I will pose open ended questions similar to those asked in the questionnaire. This will allow students the opportunity to clarify and/or elaborate on their questionnaire responses, and also add any other information, insights or comments.

The focus group discussion will take approximately 30 minutes and be held during school hours.

To aid accuracy during writing out, they will be recorded. Recordings of the focus group session will remain private and lodged with my supervisor for five years, after which they will be destroyed.

Privacy concerns and withdrawal

No names of participants will be used in any of the research outputs including my thesis or any academic publications.

Photographic images will be taken throughout the project and, with your consent, may be used in my thesis and any subsequent academic publications.

Participants will also be given the opportunity to approve any quotes attributed to them in my thesis and a summary of findings from the research will be available if requested.

If you and your child agree to participate you will be asked to sign the consent form. This does not stop you from changing your mind and withdrawing your child. However due to the project's schedule, any withdrawals must be done before December 5th, 2017.

If you require more information or clarification please contact me. I will also make myself available after school next week if you prefer to meet personally. If at any time you have any concerns about the research project you can contact my supervisor.

My supervisor is Dr Jo Mane, phone (09) 815 4321 ext 8936 or email: jmane@unitec.ac.nz

Unitec Registration Number: 2017-1056

This study has been approved by the Unitec Research Ethics Committee from 10 August 2017 to 10 August 2018. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (Ph: 09 815 4321 ext.7254). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome

7.4 Appendix D: Questionnaire



Te Whakatipu Iwi Nui Project Questionnaire

Demographic Information

Are you:

1. ☐ a) Male ☐ b) Female

2. ☐ a) Year 7 ☐ b) Year 8

3. Choose **ONE** ethnicity you **MOST** identify with:

☐ a) NZ Maori ☐ b) NZ European ☐ c) Pacific Islander ☐ d) Asian ☐ e) Indian

☐ f) Other _____

1st - For each question Choose a response from the LEFT column that best describes how you think taking part in this project has impacted your learning					Facilitator INSTRUCTIONS Questions	2nd - For each question Choose a response from the RIGHT column that best describes how you think you were BEFORE the project				
AFTER During this project I had learning opportunities which allowed me to ...						BEFORE Looking back on my learning experiences <i>before this project</i> I had opportunities which allowed me to ...				
1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>	1. Strengthen my communication skills by allowing me to work with new groups of students and adults.	1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>
1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>	2. Enrich my ability to listen and consider others point of view with an open mind	1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>
1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>	3. Improve my ability to collaborate with other people	1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>

1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>	4. <i>Develop an understanding that it can be personally rewarding to help others</i>	1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>
1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>	5. Understand traditional Māori ways used when planting food gardens	1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>
1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>	6. <i>Develop better relationships with others outside my normal social circle</i>	1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>
1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>	7. Use creative thinking skills to help solve a problem	1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>
1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>	8. <i>Have my ideas considered and input valued during learning tasks</i>	1 Not at all <input type="checkbox"/>	2 Not much <input type="checkbox"/>	3 Sort of <input type="checkbox"/>	4 Quite a bit <input type="checkbox"/>	5 Heaps <input type="checkbox"/>

7.5 Appendix E: Focus Group Questions



Focus group questions

Research Project Title: **Te Whakatipu Iwi Nui - Growing Great People:** Evaluating teaching and learning through the practice of māra kai and service-learning.

1. What can you tell me about Service-Learning?
2. What can you tell me about Māra kai?
3. Can you describe some ways your involvement in the māra kai project has influenced the way you relate to people?
4. Has your involvement in this project made a difference to the way you work in group situations? If so, how? If not, why?
5. Has your involvement in this project had any influence on the way you approach challenging tasks? If so, how? If not, why?
6. Is there anything more you would like to add?