

Connected Classes

A Case Study of One High School's Journey from a Traditional to a Future- Focused Curriculum

Tamara Yuill Proctor

**Submitted in partial fulfilment of the requirements for the degree
of Doctor of Education
University of Canterbury**

June 2022

Contents

Acknowledgements	6
List of Figures	7
List of Tables	8
Abstract	9
Glossary of Terms.....	11
Chapter 1: Introduction	13
1.1 Rationale for the research.....	13
1.2 Background to the research	18
1.3 Motivation for and contribution of the study	19
1.4 Research questions.....	20
1.5 Summary	21
Chapter 2: Literature Review.....	23
2.1 Introduction.....	23
2.2 Organisation of knowledge	27
2.2.1 Knowledge-Building.....	30
2.3 Curriculum integration.....	34
2.4 Features of curriculum integration.....	45
2.4.1 Concept-based learning.....	45
2.4.2 The learning process	47
2.5 Creating change within a school	53
2.6 Teacher professional development	56
2.7 Teacher Community of Practice	58
2.8 Summary	60
Chapter 3: Methodology and Method.....	64
3.1 Introduction.....	64

3.2	Methodology paradigm	66
3.2.1	Action research	67
3.2.2	Case study	69
3.3	Approach and data collection methods	70
3.4	Ethical considerations.....	71
3.4.1	Confidentiality for participants.....	71
3.4.2	Issues of power and coercion	72
3.5	The School	73
3.5.1	School Character and Culture	73
3.5.2	The participants.....	74
3.6	Data collection methods.....	75
3.6.1	Weekly planning meetings	75
3.6.2	Online communication.....	76
3.6.3	Questionnaires.....	77
3.6.4	Interviews	78
3.6.5	Role of the coordinator for the Connected curriculum	80
3.7	Summary	80
	Chapter 4: Findings – Creating an Environment for Change.....	82
4.1	Introduction.....	82
4.2	Character and Culture	87
4.2.1	Senior Leadership Team and the use of pilot programs to create and drive change ...	88
4.2.2	Considerations for schools implementing and responding to change.....	91
4.2.3	The role of Middle Leadership	91
4.2.4	Systems.....	93
4.2.5	Pedagogy	95
4.2.6	Curriculum delivery at the school involved in this research	96
4.3	Fostering initiative to create change	99

4.4	Summary.....	100
Chapter 5: Findings – The Connected Curriculum Learning Design Framework		101
5.1	Introduction.....	101
5.2	New pedagogical framework and learning design.....	101
5.2.1	Development of the pedagogical framework.....	102
5.2.2	Subject-Specialist Teacher-Directed Learning Hexagon	104
5.2.3	Concept-based knowledge	107
5.2.4	The Connected classes’ classroom curriculum	109
5.2.5	Learning Phases 1 and 2: student-led inquiries.....	111
5.2.6	Learning Phase 3: projects and learning artifacts	115
5.2.7	Goal setting and reflection	119
5.2.8	Evaluating student learning.....	120
5.2.9	Value added	123
5.2.10	Curriculum achievement objectives.....	124
5.3	Summary.....	125
Chapter 6: Findings – Implementation and Teacher Collaboration with the Connected Class		127
6.1	Introduction.....	127
6.2	Community of Practice	127
6.2.1	Structure and roles of the Community of Practice.....	127
6.2.2	Community of Practice	128
6.2.3	Leading the Community of Practice	130
6.2.4	Planning the learning	131
6.2.5	Synchronous planning and communication	132
6.2.6	Asynchronous planning and communication	132
6.2.7	Unit planning	134
6.2.8	Learning sequences.....	136

6.3	Enablers and constraints	137
6.3.1	Enablers.....	137
6.3.2	Time	138
6.3.3	Recognising the similarities between subject areas	140
6.3.4	Partnership: student agency and teacher autonomy	141
6.3.5	Communication.....	142
6.3.6	Strong Community of Practice.....	144
6.3.7	Coordinator for the Connected classes	146
6.3.8	Form teacher involvement	146
6.3.9	Student transferable skills	147
6.4	Constraints	147
6.4.1	Subjects not identifiable.....	148
6.4.2	Staff capabilities.....	148
6.5	Summary	149
	Chapter 7: Discussion.....	151
7.1	Introduction.....	151
7.2	Character and Culture	151
7.2.1	Pilot programs	152
7.2.2	Relational trust.....	153
7.2.3	Character and Culture enablers	154
7.3	Systems	155
7.3.1	Timetable	156
7.3.2	Staffing.....	156
7.3.3	Technology	157
7.3.4	System enablers and constraints	159
7.4	Pedagogy.....	160
7.4.2	Connected Curriculum Learning Design Framework.....	162

7.6 Summary.....	166
Chapter 8: Conclusion.....	168
8.1 Introduction.....	168
8.2 Creating a future-focused school	168
8.3 Design and implementation of a Connected class	170
8.4 Implications.....	171
8.4.1 Character and Culture	171
8.4.2 Education Brief	172
8.4.3 Connected Curriculum Learning Design Framework.....	173
8.4.4 Teacher Community of Practice	174
8.5 Limitations of the study	175
8.6 Recommendations for future research	176
8.7 Summary.....	177
References.....	180
Appendices.....	195
Appendix A: UC Ethics Committee approval letter	196
Appendix B: Participants' information letters and consent forms.....	197
Appendix C: Interview questions for Senior Leadership.....	207
Appendix D: Interview questions for Board of Trustees	208
Appendix E: Interview questions and two questionnaires for Connected teacher participants.....	209
Appendix F: Connected class, unit plan and lesson sequence	212

Acknowledgements

I have been very fortunate to have two amazing supervisors, Sandra Williamson-Leadley, and Alison Arrow. Sandra - your support and guidance from the start of my journey has been above and beyond. Alison - I was incredibly fortunate to have you join my doctoral journey. Thank you both for your insightful guidance and for your continued support. To express my gratitude fully, there are no words.

To the Senior Leadership Team and Board of Trustees involved in this research, I have developed a true appreciation of the efforts you put in to creating change within a school; it is not an easy task. I am thankful for your willingness to allow me to design and implement a new program, and the support you have provided along the way. To the teachers involved in this research I owe a huge debt of gratitude for your willingness to be part of this research. Thank you for being part of this journey with me. Your time and dedication to your students and this research is something I truly appreciate. I would also like to thank the students who chose to be in these classes and the teachers at this school who have been part of the Connected program over the past four years.

To my family, firstly my three children, Autumn, Amber and Jade, I am grateful for you believing in me. The three of you have been a constant source of support, even when I have found moments a little tricky. Thank you for putting up with a slightly distracted mum over the past few years. To my parents, Stuart and Elizabeth, who have supported my educational journey from a youngster, I thank you sincerely. The path has not been an easy one, but your unwavering love and support has provided me with the energy and motivation to keep going. To my brother Jason, sister Kirsty and their partners, Kath and Will, you have been a constant source of support, looking after the girls when I needed to study, taking an interest and cheering me on. I really appreciate all you have done for me.

Finally, there are a number of teachers who have mentored me over my teaching career to date. I would like to thank you for making me the teacher I am today and for your support in my educational journey.

List of Figures

- Figure 1 Schematic view of the New Zealand Curriculum
- Figure 2 Fogarty's model of curriculum integration
- Figure 3 Drakes model of curriculum integration
- Figure 4 Overlay of both Fogarty's (1991) and Drake's (1993) frameworks (part 1 of 3)
- Figure 5 Types of integration prior to multidisciplinary
- Figure 6 Overlay of Fogarty's (1991), Drake's (1993) and Beane's (1997) frameworks (part 2 of 3)
- Figure 7 Completed model integrating Fogarty, Drake and Beane (part 3 of 4)
- Figure 8 Four components of a school
- Figure 9 Timetables for 2020
- Figure 10 Learning Phases
- Figure 11 Connected Curriculum Learning Design Framework
- Figure 12 Specialist-Subject Teacher-Directed Learning Hexagon based on teacher knowledge
- Figure 13 Student-led inquiries 1 and 2
- Figure 14 Project-based learning process for Connected Curriculum Learning Design Framework
- Figure 15 Microsoft teams and posts
- Figure 16 Microsoft teams and files
- Figure 17 Collaborative planning for Connected class
- Figure 18 Collaborative planning: lesson sequence exemplar from Connected class

List of Tables

- | | |
|---------|--|
| Table 1 | Twelve Knowledge-Building principles |
| Table 2 | Ten models of curriculum integration |
| Table 3 | Beane's four dimensions to design an integrated program |
| Table 4 | Five dimensions to build relational trust |
| Table 5 | Profiles of teacher participants in the Connected class |
| Table 6 | Timeline of overview of significant points by the Senior Leadership Team and coordinator |
| Table 7 | Research Gathering and Interpretation Skills |
| Table 8 | Collaborative unit plan template for the Connected class |

Abstract

Today, we live in a knowledge-based economy and educators need to design learning which focuses on the ‘knowledge and skills necessary for the knowledge age and where innovation is a valued commodity (Bolstad & Gilbert, 2012). Using action research with a participatory component and presented as a case study, this research examined one high school’s journey as they moved from a traditionally structured school, based on the factory model of education, to one that is future-focused. Future-focused learning takes into consideration a changing understanding of what knowledge is valued by society and the skills necessary for dealing with uncertainty and change. The New Zealand high school involved in this research provided the opportunity for teachers to change the delivery of curriculum from a traditional single-subject mode of delivery to one that connects the curriculum using a concept-based curriculum, with a focus on 21st-century skills. The three subject areas connected were Science, Social Studies, and English at Year 9 and Year 10 (students aged approximately 13–15). A challenge for the school involved in this research was how to shift to a future-focused institution and support teachers in changing the design of the curriculum and pedagogy. There is a range of literature on curriculum integration but there are limited resources for teachers on how to implement curriculum integration. This research focused on examining the processes the school’s Senior Leadership Team undertook to create a learning institution that is future-focused, which would enable teachers to change their curriculum design and delivery

The school involved in this research designed and implemented change by having a clear understanding of the school’s ‘Character and Culture’, which then informed the school’s systems, pedagogy, and curriculum. Understanding the Character and Culture of the school was about knowing the people currently within the institution, who they are as individuals, the strengths and weaknesses, the diversity of the student population, and the needs of the students and staff. Each school has its own character, such as the history of the school, location, and people within the school, which can change over time. Established schools need to work with the people within the school community to drive change. Before embarking on changes that affect curriculum, pedagogy, and systems, the findings of this research indicate that schools should take the time to understand fully the Character and Culture of the school.

This research not only examined how the Senior Leadership Team created an environment for change but also how teachers at the school, involved in this research, plan, and implement a future-focused Connected curriculum for the subjects of Science, Social Studies, and English. As part of this research, based on the literature and working with the teachers, the researcher designed a new pedagogical framework called the Connected-Curriculum Learning Design Framework. This new Connected Curriculum Learning Design Framework considers 21st-century skills, concept-based curriculum, and specialist-subject pedagogical content knowledge. It is based on students developing and creating knowledge by moving students from surface-to-deep to transference of learning while concurrently developing 21st-century skills by using innovative pedagogical strategies and a concept-based curriculum. This research captured the experiences of three teachers involved with the planning and implementation of the curriculum with a Connected learning class at Year 9 and Year 10.

The two most significant outcomes of this research are the Connected Curriculum Learning Design Framework and an understanding of Character and Culture. The Connected Curriculum Learning Design Framework used in conjunction with practical planning documents provides a method for moving students through three phases of learning: surface-to-deep-to-transference of learning using innovative pedagogies. However, before teachers can redesign a curriculum that is future-focused, it is necessary for a Senior Leadership Team to create an environment for change, and the teachers involved have a coherent understanding of the purpose. The understanding of the Character and Culture of the school is a significant outcome of this research as it provided the ability for the teachers and the researcher, as the coordinator of the Connected classroom, to shift from a traditional form of teaching to one that is future-focused. Schools wanting to make significant change, from a traditional mode of instruction to one that is future-focused, first need to consider the Culture and Character of the school undergoing change prior to implementing new pedagogical approaches. The Connected Curriculum Learning Design framework provides a pedagogical approach for teachers to design and deliver agentic learning programs for students, which include subject-specialist learning, curriculum integration and a focus on 21st century skills.

Glossary of Terms

21st-century skills	Skills that have been identified as necessary for the workforce in the 21st century include creativity, collaboration, communication, critical thinking, and citizenship.
AO	Achievement Objectives. The New Zealand Curriculum 'achievement objectives' for each subject that teaching and learning programs must include
Asynchronous	To learn/work on a project independently of others at time convenient to the individual
CK	Content Knowledge
Connected curriculum	Integration of two or more subject areas where different subject-specialists collaborate to design an integrated learning program
KAMAR	Student management system, providing real-time access to student and teacher information. The user can access student information, photos, caregiver details, attendance, calendars, timetable and more.
Key Competencies	Key competencies as defined by the New Zealand Curriculum (2007) are the skills and capabilities for students to success in the future. These are thinking, relating to others, using language, symbols, and texts, managing self, participating and contributing.
Middle Leadership	Management role between the senior leadership team and the classroom teacher for example, Head of Department, Head of Faculty or Head of Learning Area.
NCEA	National Certificate in Educational Achievement, New Zealand secondary school qualification
NELP	National Education and Learning Priorities

Non-contact	Non-teaching period. In New Zealand, high school teachers have four non-contacts in a 20-hour contact week. This is to spend time marking, planning, moderating and preparing.
NZC	New Zealand Curriculum
PCK	Pedagogical Content Knowledge
Senior Leadership Team	Team comprising the school Principal and the two Deputy Principals (Deputy Principal of Curriculum and Deputy Principal of Wellbeing)
Siloed	Specialist-subjects (curriculum learning areas) taught individually.
Synchronous	People learning/working in real-time on the same piece of work, either face-to-face or online
Transferable skills	Transferable skills as used in this thesis is the schools in this research term for 21st-century skills
Unit of learning	Used in this research study to indicate a body of learning approximately 10 weeks in duration.
Year 9	New Zealand high school is five years starting in Year 9; students are approximately 13–14 years old.
Year 10	The second year of high school in New Zealand. Students are approximately 14–15 years old.

Chapter 1: Introduction

1.1 Rationale for the research

The desire for educators and educational institutions to prepare students for success once they leave high school is not new. However, the exponential growth in technology in recent years, and how humans of any age can access knowledge and information, has necessitated significant change in the skills students need to succeed in a future where change is the norm (OECD, 2018a). The world has become an increasingly interconnected where value is placed on knowledge for the further advancement of the community. As educators, we need to equip students with the skills to

...understand different perspectives and worldviews, interact respectfully with others, and to take responsible action toward sustainability and collective well-being.... Students need support in developing not only knowledge and skills but also attitudes and values, which can guide them towards ethical and responsible actions. At the same time, they need opportunities to develop their creative ingenuity to help propel humanity towards a bright future. (OECD, 2019, p. 5)

The knowledge and skills valued in today's society is quite different from that of schools during the nineteenth into the twentieth century. Schools traditionally focused on knowledge and skills that could be transferred from the teacher to the students in preparation to enter a world where the economy was based on primary industries and the exploitation of natural resources (Bolstad & Gilbert, 2012). It is now necessary to provide students with the ability to gain and create knowledge, and to equip students with the skills necessary to thrive in a knowledge-based economy (Bolstad & Gilbert, 2012). The New Zealand Curriculum supports a future-focused approach by providing a clear vision where:

Young people who will be confident, connected, actively involved, lifelong learners ... who will seize the opportunities offered by new knowledge and technologies to secure a sustainable social, cultural, economic, and environmental future for our country. (Ministry of Education, 2007, p. 8)

The future-focused principle is one of eight principles in the New Zealand Curriculum which requires students to make connections within and across learning areas in relation to thinking

about future issues such as sustainability, citizenship, enterprise and globalisation (Ministry of Education, 2007).

As a result, schools in New Zealand are striving to become ‘future-focused’. In this thesis, I define future-focused as an approach where learning is connected and coherent between subjects. A range of innovative pedagogical approaches, such as student-led inquiry, projects and evaluating learning over time, are utilised and focused on real-world issues, such as sustainability. The New Zealand Curriculum (2007) has a future-focused principle. That principle encourages schools and teachers to design a curriculum which “explores future-focused issues and encourages students to recognise that they have a stake in the future and a role and responsibility to help shape it” (Ministry of Education, 2020a, para1). Methods that focus on 21st-century skills enable students to succeed in a knowledge-based economy in a world that is experiencing exponential change in a variety of areas. Twenty-first-century pedagogy is about developing the knowledge and skills necessary for students to succeed in work, life and citizenship (Dumont et al., 2010). The 21st-century skills include collaboration, digital fluency, problem-solving and critical skills. These skills are necessary due to the changing nature of work and the need for a workforce where success is measured in the ability to communicate, develop new knowledge, and be innovative to solve complex problems (Binkley et al., 2019). This exponential change has been a result of advances in technology and knowledge and has influenced all areas of life from business to protecting the environment. A knowledge-based economy can be defined as “trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors” (OECD, 2005). The 21st-century skills are articulated as the ‘key competencies’ in the New Zealand Curriculum (2007, pp. 12–13) and should be integrated into teaching and learning programs. The world is an increasingly complex and interconnected place, and it will be necessary for students in a knowledge-based economy to understand their roles and responsibilities, to make ethical judgements to ensure a bright future for humanity (OECD, 2018a).

It has become necessary to redesign our curriculum from one where students received information, to a curriculum where the student is an active participant in the learning process. Being a part of the learning process means that students not only build but also create knowledge and develop 21st-century skills, such as creativity, collaboration, and communication (Alismail & McGuire, 2015). Educators today, for the most part, understand

that there is a science to how the brain learns and that the brain is not just a vessel to be filled (Bransford et.al, 2000). Teaching needs to be reinterpreted as more than just the transmission of information but as a “highly evolved meta-cognitive skill specific to humans” (Rodriguez, 2012, p. 117). Most educational institutions have been designed and use systems for the mass transmission of information with one teacher in front of the class with lessons taught as individual subjects, for example, students moving through a day broken into six 50-minute periods that are specialist-subjects, such as English or mathematics, Secondary schools have been and are exploring how they can change systems in order to build new and/or more relevant systems that facilitate a mode of learning that is future-focused (Bolstad & Gilbert, 2012). One way some secondary schools in New Zealand have been trying to create a future-focused curriculum is by connecting the curriculum through some form of curriculum integration (McDowall & Hipkins, 2019). This Connected curriculum provides students with not only knowledge, but also the ability to build and create new knowledge and develop both specialist-subject and 21st-century skills.

The New Zealand Curriculum (2007) provided a mandate for schools within New Zealand to make connections within and between the nine essential learning areas (Ministry of Education, 2019). These nine essential learning areas are Mathematics, Science, Technology, Social Sciences, the Arts, Health and Wellbeing, Māori Language and Literature, English Language and Learning Languages. The intention of the New Zealand Curriculum is to provide students with a broad education and explicitly states that learning should be within and across learning areas to provide students with the opportunity to become lifelong learners (Ministry of Education, 2007). Currently, the Ministry of Education is almost two years into a five-year plan to refresh the 2007 New Zealand Curriculum by 2025. The rationale for this curriculum refresh is to ensure the education system in New Zealand is responsive and continues to “evolve and remain focused on delivering equitable and excellent outcomes for all” (Ministry of Education, 2022a). The curriculum refresh recognises the need for the national curriculum to evolve as New Zealand evolves. The goal of the refreshed curriculum is to ensure all students experience teaching that is coherent, rich and responsive to the needs of all students (Ministry of Education, 2022b). Included in the curriculum refresh is a new emphasis for Aotearoa Histories to ensure all students learn “how our histories have shaped our present day lives” (Ministry of Education, 2022c) The essence of the 2007 New Zealand Curriculum including the nine essential learning areas can still be seen in the curriculum refresh. New Zealand schools can choose, will be able to continue to under the curriculum refresh, to structure the

school curriculum based around the values, key competencies, or essential learning areas of the New Zealand Curriculum. However, “all learning should make use of the natural connections that exist between learning areas and that link learning areas to the values and key competencies” (The Ministry of Education, 2007, p. 16). What such a connected curriculum looks like will vary within and between schools and is increasingly being used to refer to the organisation of learning which is organised around concepts that are relevant to the students ((Ministry of Education, 2019).

Through using action research with a participatory component and presented as a case study, this research examines one urban high school’s journey as it moves from a traditionally curriculum to one that is future-focused. More specifically, this research explores how one high school in New Zealand is changing the delivery of curriculum from a single-subject mode of delivery to one that integrates and connects the curriculum across three subject areas: Science, Social Studies, and English at Year 9 (students aged approximately 13 years old). This research focuses on the processes the Senior Leadership Team undertook to create an environment where teachers could design and implement a future-focused curriculum. This has seen a shift from the traditional transmission style of teaching, with subjects taught independently of each other, and replaced with a future-focused approach. As part of this research, I created a new Connected Curriculum Learning Design Framework. Chapter 5 will examine this framework in detail. The experiences of three teachers using the Connected Curriculum Learning Design Framework, and who were involved with the planning and implementation of the curriculum with an integrated class at Year 9 and Year 10, are captured, highlighting the enablers and constraints of delivering a connected curriculum.

The rapid development and advances in technology, combined with a shift to a knowledge-based economy, has led to educationalists, internationally and in New Zealand, to “rethink what is being taught, how it is being taught, and how learning is assessed” (Dumont et al., 2016, p. 2). Through the 19th century, and up to the mid/late 20th century, schools focused on knowledge as something to transfer from a person or book, much like a product. A neoliberal approach to education in the twentieth century saw the commodifying of learning where schools provide services and essentially students become the products. This resulted in an increase in competition and accountable with the implementation of performances goals. “Education was one of the central means by which the ‘quality of capital and labour’ was to be improve” (Davies & Bansel, 2007, p. 254). This style of teaching and learning, where

knowledge is transferred from the teacher to the student, is often termed as transmission teaching where the student brain is empty and is to be filled by the teacher. Learning in this way is viewed as a passive activity where the student just needs to memorise and regurgitate the information gained (King, 1993). Commodifying learning in this way equates to better teachers as those who can fill the brain the highest and the better students are those who can memorise and retell the most correct information (Friere, 2005). A transmission style of teaching where the teacher tells the students the knowledge is a teacher-centred approach and often referred to as 'traditional' teaching. Traditional teaching during the industrial age can be likened to the teacher being the 'sage on the stage'. Freire (2005) refers to this style of teaching as a banking concept which aligns to the neoliberal view of education, where knowledge is deposited into the student like a receptacle. Teaching from the mid-20th century shifted from the 'sage on the stage' to one that is student-centred and the role of the teacher shifted to the 'guide on the side' (King, 1993). A student-centred approach to teaching and learning can be seen as humanising the learning experience and one where students can be active participants in the learning process (Friere, 2005). The question of what knowledge is and what pedagogy is further addressed in Chapter 2.

Teachers at the school involved in this research were trained and taught in a traditional school environment where classrooms were single cells (classrooms that typically held approximately 30 students), and the curriculum divided into subject areas or disciplines. The single cell classroom with one teacher in front of 30 students and learning designed around subject areas was seen as an effective classroom design for transmission style of teaching. This traditional curriculum structure seen as a 'curriculum operating in silos', with each subject regarded as a silo because it is taught separately or in isolation from the other subject areas. Alongside this change in how teachers deliver curriculum through a range of pedagogical approaches and a change in the space learning takes place has been the rapid change in technology. These changes in technology include rapid developments in artificial intelligence, big data, bio and Nano technology and the internet which has seen knowledge and information being accessed anywhere, anytime with a device and access to the internet.

Education, including the understanding of how humans learn, has become a science in its own right (Darling-Hammond et al., 2020). How the brain functions and how learning can be structured, has created a science of learning that sits behind practice in teaching and learning. This understanding of the science of learning is based on educational neuroscience,

which is a relatively new field of research that includes the fields of cognitive neuroscience and cognitive psychology (Bruer, 2016). Drake (1998) makes the statement, “Curriculum integration involves shifting all aspects of curriculum design to align with what we know about the learning process” (p. 2). It is necessary for teachers to understand not only the subject-content knowledge, but to understand the pedagogy behind the teaching (pedagogical content knowledge) (Cochran et al., 1993). Teaching and learning programs need to provide the opportunity for students to create and develop knowledge and gain 21st-century skills, such as collaboration and communication. To provide a future-focused learning that applies pedagogical content knowledge and 21st-century skills, in a balanced manner, is complex and curriculum integration is an approach that could make this accessible. Further research in this area is necessary to address the gap in literature.

1.2 Background to the research

Curriculum integration is not a new idea in curriculum design, having been around since the 1920/30s (Eisner, 1992). Curriculum integration saw a resurgence internationally in the 1990s (Beane, 1993) and today, educators across New Zealand are using curriculum integration in schools, especially those with open-plan learning environments with two co-teachers (McDowall & Hipkins, 2019). Schools across New Zealand are being redeveloped based on the “the policy direction of the New Zealand Ministry of Education to implement a program of building new schools as flexible learning environments, and to retrofit existing schools by refurbishing, or adding new facilities” (Benade, 2017 p. 107). The retrofitting of existing schools and the building of entirely new schools due to population growth and movement, has enabled the Ministry of Education to facilitate the shift from single-cell classrooms to open flexible learning environments referred to as quality learning environments. Such a move is applying the evidence that physical space impacts learning (Ministry of Education, 2017b). The significant change in learning environment has provided the opportunity for teachers and schools across New Zealand to examine how they have traditionally delivered the curriculum to explore new and innovative methods (pedagogy) in diverse types of spaces. Hattie (2015) concludes that the effect size in the change in classroom design from single cell to open plan is minimal that is the pedagogy that takes place within the space which is has the greatest impact. The Education Review Office (ERO) (2018) published a report after visiting a range of schools, both secondary and primary, and researching innovative learning environments.

The report recognises that the schools visited had a range of physical environments from single cell classrooms to open learning environments. An innovative learning environment has three components, pedagogy, physical space and the social aspects (ERO, 2018). Modern Learning Environments requires teachers to change their practice to make the most of the flexible learning environments and technology (ERO, 2017) with larger classrooms, the opportunity for co-teaching, and the ability to integrate subjects is more accessible. These new flexible learning environments have the potential to disrupt traditional teaching methods (Benade, 2017). Teachers and schools are exploring new ways of delivering the curriculum using a variety of pedagogies, including team teaching, and collaboration between units of work or redesigning the integrated curriculum structure. There is evidence and literature on successful curriculum integration in primary and middle schools in New Zealand, for example, Fraser (2013) led a Teaching and Learning Research Initiative (TLRI) from 2010–2012 on connecting curriculum and learning using an art context or Brough's (2012) research on the implementation of principles and practices of student-centred integration of curriculum. These studies took place in primary schools, which already, to a certain extent, use a more integrated approach to curriculum. There is not yet the same volume of research on how secondary schools structure an integrated curriculum, especially against a national assessment framework, such as National Certificate in Educational Achievement (NCEA). In fact, there is little research on how schools make the transition from a traditional curriculum to one that is future-focused and where students are developing lifelong learning skills.

1.3 Motivation for and contribution of the study

The education community is inundated with new acronyms and teaching philosophies around engaging and preparing current-day learners for the future. I, professionally and personally, believe the New Zealand Curriculum document to be forward thinking and incredibly versatile, providing teachers with a great deal of autonomy on how they create teaching and learning programs. We are fortunate in New Zealand not to be restricted to a standardised curriculum with prescribed texts, activities, and assessments. However, as schools are making these significant shifts in practice and design, there is little available research on 'how' schools make this change. This includes how to create teaching and learning programs that use the research from the science of learning and effective pedagogy, the design of the teaching and learning

programs, or how teachers and students deal with this change, specifically in the New Zealand context.

The intention of this research is to understand and examine the journey of a co-educational, urban high school as it transitions from a more traditional mode of curriculum to a school that is future-focused. The future-focused approach to curriculum examines the shifts in design from single-subject structures to a more integrated or connected curriculum for students from Years 9–13. This research is very timely in that the Ministry of Education is currently refreshing the curriculum. The school involved in this case study is an inner-city school in South Island of New Zealand. Currently, the school is in the process of a new build on an established campus which includes large flexible learning spaces. This research will seek to examine *how* teachers deal with the change necessary to shift their understanding and practice from a traditional 19th-century approach to education, to a 21st-century approach. It will examine what processes are necessary for a traditional school structure to transition to a future-focused curriculum that involves curriculum integration through data gathered from the Senior Leadership Team. This research will examine teachers' collaboration, and their experiences of delivering an integrated curriculum within a traditional single-celled classroom environment.

The research reported on in this thesis is significant in that it will provide a practical case study for other schools, educators and wider community on the processes, systems, experiences of staff, on the transition and implementation of a future-focused curriculum within the New Zealand context. This research has gathered the viewpoints and experiences of the educators collaborating on the one Year 9 integrated curriculum class. It has sought to identify the processes in designing a future-focused integrated curriculum from the Senior Leadership Team. Currently, there is no 'road map' for educators to follow when making this transition, especially at the high school level. This research is one case study that highlights the experience of teachers, and the Senior Leadership Team. The school in this research is at the cutting edge of this change. The processes, systems and experiences will provide valuable insights for educators, nationally and internationally.

1.4 Research questions

The primary aim of this research is to examine how teachers collaborate to design and deliver a Connected program across three subject areas, English, Social Studies, and Science at

secondary school. These three subjects were selected to be involved in the research as the head of department for each department was on board with teachers within their departments being involved. This research will capture the enablers and constraints the teachers come against as they redesign the classroom curriculum. When changing how teachers design and deliver curriculum, it seemed necessary to explore how the Senior Leadership Team has fostered an environment where teachers are empowered to create change to better prepare students for the knowledge-based society. This research seeks to address the following questions:

1. How have the Senior Leadership Team created an environment where teachers can deliver a future-focused curriculum that includes curriculum connection across three subjects?
2. How did the teachers implement a future-focused Connected curriculum in a traditional high school?
3. What are the enablers and constraints when implementing a Connected curriculum?

Data were collected from the Senior Leadership Team in the form of interviews, one interview was conducted per senior leader. The Board of Trustees were invited to be interviewed, with one member of the Board of Trustees, additional to the Principal (the principal is automatically a member of the Board of Trustees) agreeing to be interviewed. The three teachers involved in this research were interviewed twice and asked to answer two questionnaires. Further data were gathered from the minutes of meetings, online planning and communication through the online platform of Microsoft Teams, and through my role as coordinator of the Connected curriculum program.

1.5 Summary

Educators need to acknowledge that teaching and learning are no longer based on the transmission of knowledge and the factory model of learning is outdated. One way of redesigning the curriculum to reflect this change in approach is to move from a content-driven curriculum to one based on issues or problems that currently exist in the world referred to as real-world concepts. Teachers need to ensure learning programs have not only subject-specific content and skills but also Twenty-first century skills. Twenty-first-century skills is a term coined to include skills such as creativity, collaboration, communication, critical thinking, citizenship, and a growth mind-set. These skills are termed 21st-century skills not because they did not exist prior to the 21st century, but are deemed necessary for students to excel in the

21st-century workplace (Rios et al., 2020). Educators at secondary level are increasingly turning to curriculum integration to provide these learning and Knowledge-Building experiences.

This research seeks to provide an understanding through action research of how one school in the South Island of New Zealand is creating opportunity for their teachers to initiate this change. A result of this research was a new pedagogical model for connecting curriculum and the experiences of three teachers using this model captured. A primary aim with this research is to provide practical steps for other educators and educational institutions to use and/or adapt to their own learning environment.

This thesis is structured into eight chapters. Chapter 1 provides a context and overview for this research, outlining the rationale for this research and providing the research questions. Chapter 2 provides a review of literature that explores curriculum integration, knowledge, and communities of practice. Chapter 3 provided detail of the methodology for this research, which is action research with a participatory component within a case study. This chapter provides details on data collection and ethical considerations. The findings and the analysis of this research are in Chapters 4 to 6. Chapter 4 examines the data gathered from the Senior Leadership Team on what they have done and are doing to move the school from a traditional model of instruction towards a future-focused school of instruction. Chapter 5 explains the new pedagogical framework developed as part of this research while Chapter 6 examines the Connected learning course, the teacher Community of Practice, and the considerations needed by schools implementing and responding to change. The discussion on how a school transitions from a traditional model of instruction to future-focused, the design and implementation of the Connected Curriculum Learning Design Framework, and the enablers and constraints for curriculum connection are in Chapter 7. Chapter 8 concludes the thesis and discusses the implications and limitations of this research as well as future research directions.

Chapter 2: Literature Review

2.1 Introduction

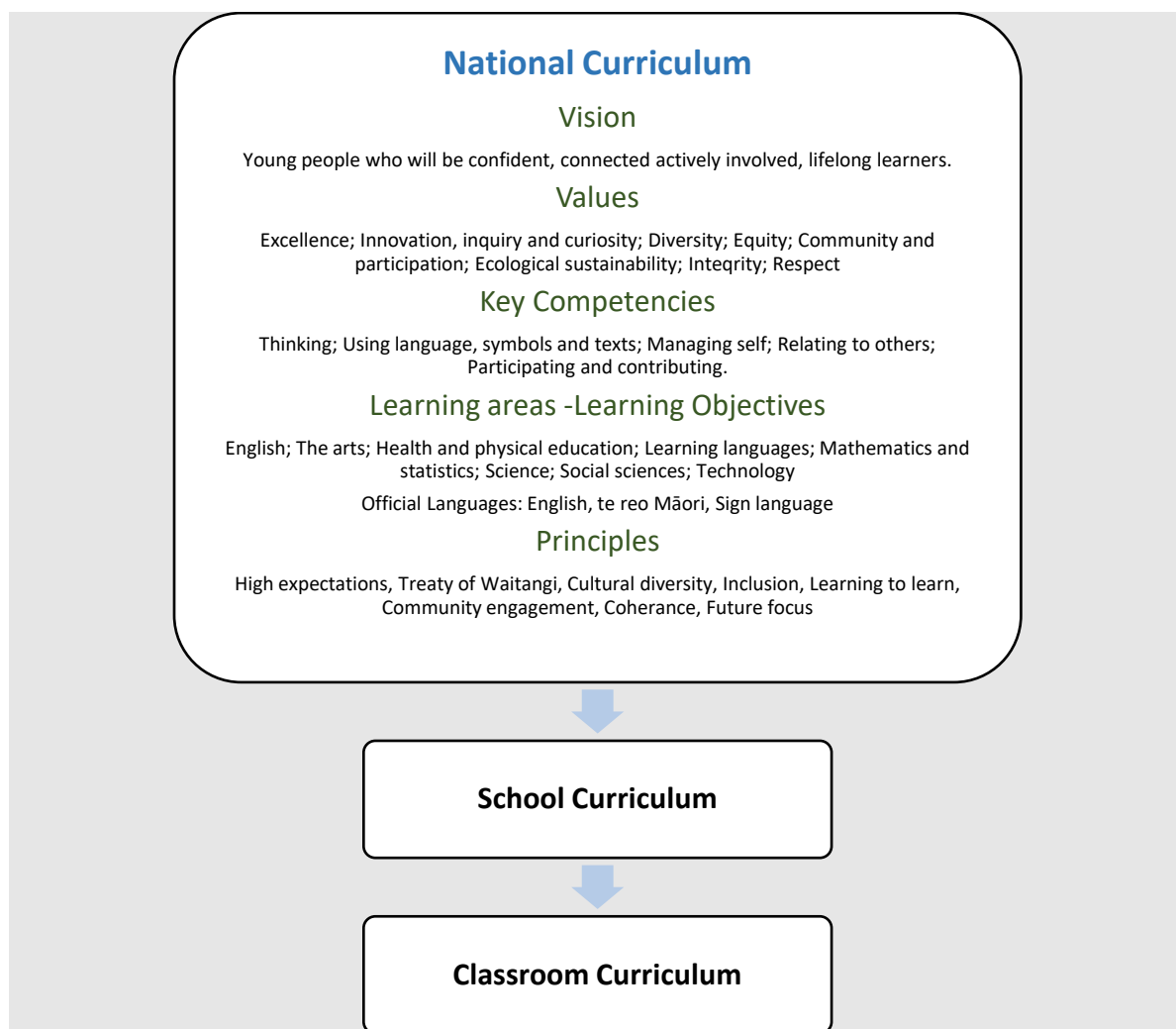
When looking at curriculum integration, and the subsequent curriculum design, it is first necessary to address the purpose of education and the significant change undertaken. Curriculum integration is more than how schools organise learning; it “is a way of thinking about what schools are for, about the sources of curriculum, and about the uses of knowledge” (Beane, 1995, p. 616). In the past, the purpose of education has been the transference of knowledge from teacher to student. Individual subjects were considered important as they “facilitated both the storage and retrieval of knowledge and because they maintained the methodical integrity of the subject” (Eisner, 1992, p. 30). The student would receive and retain as much information as possible and then go on to have a career in a chosen field. The purpose of a school education today is to provide students with the transferable skills and knowledge to succeed in a world where many of the careers they will enter do not yet exist (OECD, 2018a). Society is facing challenges which are environmental, economic and social. According to the OECD (2018a, p. 3), “Education has a vital role to play in developing the knowledge, skills, attitudes and values that enable people to contribute to and benefit from an inclusive and sustainable future” It is no longer about transferring knowledge from teacher to student, but as Hattie (2012) explains, education has the “important purposes in the development of critical evaluation skills, such as we develop citizens with challenging minds and dispositions who become active, competent, and thoughtfully critical in our complex world” (Hattie, 2012, p. 4). It is now recognised that students need a wide range of skills to be able to succeed in a knowledge-based economy (Stukalina, 2010). Students need to have the skills and the knowledge to be able to thrive in a world driven by globalisation and the rapid development of technology. It is necessary for students to develop skills to be able to problem-solve, create problems and find innovative solutions (OECD, 2018a). How do educators structure a school curriculum that achieves this? Curriculum integration is an approach that seems to allow for this change in purpose.

New Zealand primary and secondary schools have a high degree of autonomy on how they deliver the New Zealand Curriculum. When looking at the intention of the NZ Curriculum and its relationship to the school curriculum, this autonomy is evident. The New Zealand

Curriculum has three distinct levels (see Figure 1). These levels are: (1) the New Zealand Curriculum, which is a national framework rather than a detailed and prescribed plan; (2) individual school curriculum, which provides schools with the autonomy to be flexible with how they choose to deliver the New Zealand Curriculum; and (3) the classroom curriculum designed by the teacher, which reflects the school and national curriculum.

Figure 1

Schematic view of the New Zealand Curriculum (adapted from Ministry of Education, 2007)



The current version of the New Zealand Curriculum document (Ministry of Education, 2007) is organised into two sections. The first section focuses on values, vision, key competencies and the skills students need to gain at school; and the second section is organised by the different subjects with achievement objectives and indicators within each subject.

The New Zealand Curriculum (Ministry of Education, 2007) has eight principles that underpin how a school designs and delivers learning: high expectations, Treaty of Waitangi, cultural diversity, inclusion, learning to learn, community engagement, coherence, and future-focus. While each of these principles relates to curriculum design, coherence explicitly discusses the need to make horizontal connections across and within learning areas. It can help teachers and students have a common language of learning, plan collaboration across learning areas, and design ways to evaluate student learning for value-added learning, which would align teacher moderation, teacher judgement, and assessment for learning (Ministry of Education, 2020b). The future-focus principle is about designing a curriculum where "the curriculum encourages students to look to the future by exploring such significant future-focus (The Ministry of Education, 2007, p. 9). Achievement of coherence and future-focused principles has the potential to be achieved through curriculum integration. The future-focused principles require students to learn to focus on real-world issues or concepts and the coherence principle requires learning to make horizontal connections between and in subject areas.

The New Zealand Curriculum from Years 0–10 is in the process of being refreshed over the next five years, with the refresh expected to be completed in 2025 (Ministry of Education, 2021a) as mentioned in Chapter 1. This refresh is designed to integrate both sections (discussed in the previous paragraph) of the curriculum document. The Ministry of Education's goal is to design a curriculum, which is inclusive and includes Mātauranga Māori (Māori knowledge) (Ministry of Education, 2021a). The New Zealand Curriculum will still be organised with learning areas or subjects based on disciplines, and schools will still have a high level of autonomy on how they organise learning within their institutions and classrooms. The New Zealand Curriculum is clear that while the subject learning areas in the document are distinct, schools can be flexible in how they structure the curriculum within their community if the principles are the foundation of the curriculum (Ministry of Education, 2007, p. 37). Traditionally, most secondary schools in New Zealand have chosen to organise their curriculum by subject. In recent years, there has been a shift to explore new ways of delivering the curriculum by not organising curriculum by single-subject areas, especially as schools strive to become future-focused and the need to integrate key competencies (21st-century skills) into student learning.

Cross-curricular integration and building horizontal connections between subjects at secondary level is gaining increasing traction in New Zealand to create coherence and weave

the front end of the curriculum document which focuses on such areas as the visions and key competencies of the curriculum to the back end of the document which focuses on the learning areas (Arrowsmith & Smith, 2015). A 2018 national questionnaire, conducted by the New Zealand Centre for Educational Research (NZCER), of secondary school principals and teachers included a few questions on whether schools were engaging with curriculum integration. Over half of the principals who responded were engaging with curriculum integration at some level (McDowall & Hipkins, 2019). One example of schools engaging with curriculum integration is through Grow Waitaha, governed by the Ministry of Education and Ngāi Tahu–Mātauraka Mahaanui. Grow Waitaha is a partnership between its governors, four education providers, Canterbury schools, and their communities. Grow Waitaha was formed after the Christchurch earthquake of February 2011 for Canterbury secondary schools to work through educational transformation. Since 2020, Grow Waitaha has been working with many Canterbury high schools, through the secondary flexible learning Community of Practice. The vision is for secondary schools to become more flexible with their curriculum, including curriculum integration, to personalise learning for students (Grow Waitaha, 2022).

Curriculum integration is seeing a resurgence internationally as educators look to it to provide students with the skills for a knowledge-based society. The Ministry of Education is investing over one billion dollars to create innovative learning environments (Ministry of Education, 2012b). Part of this innovation is to encourage schools to create flexible learning spaces to cater to a variety of learning styles and needs to raise student achievement. Secondly, the redevelopment, rebuilding, and building of schools especially in Canterbury, has enabled the Ministry of Education to support schools to facilitate the shift from single-cell classrooms to open flexible learning environments. This significant change in learning environment has provided the opportunity for teachers and schools to shift their practice from traditional single (silos) subjects to create horizontal connections through the integration across subjects. Teachers and schools are achieving this change in a variety of ways including team teaching, collaborating between units of work, and redesigning the curriculum structure to be integrated (McDowall & Hipkins, 2019).

The purpose of this literature review is to examine the complexities of designing a curriculum that is integrated, and fosters students' development of knowledge and transferable skills. The similarities between the term curriculum integration along with different

frameworks and features for curriculum integration are explored and clarified. While there is evidence and literature on successful curriculum integration in primary and middle schools as discussed in Chapter 1 (Section 1.2, page 17), there is a gap in the literature regarding secondary schools. This literature review will attempt to examine the question of how to design and deliver an integrated curriculum across multiple subject areas. In the following sections, different approaches to curriculum integration are reviewed, including the transdisciplinary framework, conceptual learning, the science of learning, building and creating knowledge, and the importance of a Community of Practice for driving change. Before addressing different approaches to curriculum, however, it is first necessary to explore the organisation of knowledge and how knowledge is valued by society.

2.2 Organisation of knowledge

What is the purpose of curriculum within secondary schools? By examining this question in more detail, we can explore what knowledge society values, and how schools disseminate this understanding to design a curriculum. As society changes over time, it is necessary for our education system to re-examine the purpose of the curriculum (Young, 2013). Curriculum can be seen as a representation of what a society values and deems important for young people to learn to succeed as adults, representing the values, skills, and knowledge of a particular society (Kress, 2000). New Zealand, historically, has based the structure and design of curriculum on the British model of education brought with the British colonialists to New Zealand in the 19th century. During the colonisation of New Zealand, schools were expected to distil good morals, teach English and Christian values, with a focus on reading, writing, and arithmetic (Tearney, 2016). In 1915, the secondary curriculum was diversified from 'reading, writing and arithmetic' and structured around academic subjects and university entrance exams (Tearney, 2016). Hadley (1902) set about trying to define secondary education. His research found that the French curriculum, towards the end of the 18th century, was organised by Turgot into three sections, primary, secondary and higher schools (p. 730). The curriculum organisation by the French was, in Hadley's opinion, more advanced than in Germany and significantly more advanced than in England and the United States of America. Secondary school came from the French word 'enseignement secondaire' in English meaning secondary teaching or secondary education. Hadley's 1902 definition of secondary education,

“includes all those studies which are regarded by the public as too far advanced to be a part of that compulsory education ...and at the same time not sufficiently specialized in their purpose or aim to be considered part of the technical preparation of different groups of citizens for their several callings in life.” (p. 732)

Students at the turn of the 20th century could attend technical preparation for a specific career or could attend a secondary school with curriculum options that were more generalised and provided entry into university, including subjects such as English, mathematics French, Latin and science (Berrien, 1964).

Within NZ “families that had the financial capabilities were increasingly encourage to keep their children in formal education longer” (Tearney, 2016, p 16). The dominant policy for assimilation during this period of time meant that Māori were banned from speaking te reo Māori at school and Māori were expected to be instilled with European values, language and culture. The career pathway was limited with Māori seen as being ‘practical’ with skills and knowledge and expected to live off the land (Tearney, 2016). Primary education was a right to everyone, but secondary education was limited and not covered by the Education Act of 1877 which, in turn, limited the secondary education for Māori. For the late 19th century and into the 20th century, education was differentiated between those with the right class and gender seen as capable for further education and students directed to alternative pathways (Tearney, 2016). In 1903 with the passing of the Secondary School Act where students who passed a proficiency exam and received a certificate, could attend secondary school. This Act was abolished in 1936 removing the need to gain a certificate to have access to secondary education. The school curriculum at secondary level was based on the requirements for the exam to gain university entrance.

In New Zealand, between 1879 and 1939, examination papers for university were marked in the United Kingdom. With the start of the Second World War these exams were required to be marked in NZ (Pollock, 2012). The intention was to provide ‘fairness’ to the process. Secondary schools in NZ during the late 1800’s / early 1900s were separate from the Education Boards. The Secondary Schools Act was passed in 1903 and school were run by a Board of Governors (New Zealand Government, 2022). The Board of Governors were responsible for their own record keeping. The 1914 Education Act provided more authority to the Department of Education. This influenced of the Ministry of Education continued to grow throughout the 20th century.

In 1988, there was a call for greater clarity around curriculum design based on the 1987 curriculum review which led to the creation of the New Zealand Curriculum Framework in 1993. The 1993 curriculum was shaped around seven essential learning areas based on disciplines: arts, language and languages, mathematics, health and physical well-being, science, social sciences, and technology (New Zealand Government, 2008). In 2007 New Zealand Curriculum contained 8 learning areas with the addition of learning languages and maths now renamed as mathematics and statistics (TKI, 2008). The current curriculum refresh being undertaken between 2022-2025 retains the eight learning areas, with the addition of Aotearoa Histories within the social science learning area. These learning areas have knowledge structured around disciplines which has been the traditional method of organising curriculum since the early twentieth century.

The development of academic and non-academic subjects is the categorising of knowledge into subjects based on disciplines (Hadley, 1902). Disciplines are a way of viewing the world and the categorising of knowledge, such as natural and applied science, or humanities, which can be broken into further subsets, such as mathematics and history. Disciplines each have a unique set of skills and knowledge, as well as a community, to support the knowledge within that discipline (Hadley, 1902). Beane (1995) further explains that school subjects are a further categorisation based on disciplines:

Discipline (s) of knowledge and its representative school subject area are not the same things, even though they may be concerned with similar bodies of knowledge... subjects are a more severe case of “hardening of the categories” than are the disciplines they supposedly represent. (Beane, 1995, p. 617)

Curriculum integration contrasts the traditional transmission of learning in individual subjects in that it frames knowledge and learning around problems and issues that currently exist, contexts and problems (Beane, 1995). A criticism of curriculum integration by some teachers is the loss of integrity for the individual subject (Brough 2008, Drake, 1998, Fraser, 2013). Disciplines have fluid boundaries and will often cross over into other areas creating interdisciplinary fields, whereas subjects do not have fluid boundaries (Drake, 1998). Beane (2013) and Drake (1998) both agree that there is a difference in fluidity as to how knowledge is treated between subjects and disciplines. Beane (1995), for example, believes curriculum integration is not just the re-organisation of disciplines but rather curriculum integration is more about thinking about the “purpose of schools, the sources of curriculum and the uses of

knowledge” (p. 616). Brough (2008), supports both Beane (2013) and Drake’s (1998) perspective that teacher knowledge and expertise is just as vital within curriculum integration programs as subject-specific programs, the difference is the way knowledge is used and how knowledge and skills are brought together to within the context of the problem. Essentially, the knowledge needed is cumulative knowledge. Cumulative knowledge forms when the learner can build on past knowledge and create or build new knowledge. The ability to build cumulative knowledge is necessary to develop lifelong learners who can “continually build knowledge, add new skills, and give new meanings to existing abilities” (Maton, 2009, p. 43). In a knowledge-based economy, businesses value not only a highly skilled workforce, but also innovation which has led to the need for lifelong learners. The New Zealand Curriculum (2007) recognises the need to develop lifelong learners who are necessary for a knowledge-based economy (Maton, 2009). Thus, curriculum integration lends itself to developing cumulative knowledge as it starts with a real-world context issue or problem of interest to the students themselves or a societal issue. From here students draw on past learning and seek out new knowledge to solve the chosen issue or problem through the integration of curriculum (Beane 1995).

2.2.1 Knowledge-Building

It is widely recognised that we have moved from an industrial age to a knowledge age (Ministry of Education, 2012c). The ‘knowledge age’ sees knowledge as a commodity. Value is on the creation of knowledge and innovation. Because of this change, what ‘knowledge is’ has become a complex issue (Bolstad & Gilbert, 2012). The New Zealand Curriculum (Ministry of Education, 2007) includes the principle of Knowledge-Building and providing students with the skills to build knowledge. This could be knowledge already known but could also be new knowledge for the student, class or wider community. This Knowledge-Building principle in the New Zealand Curriculum is about enabling students to be empowered to create knowledge or innovation. As a result, students need to be comfortable with and have the skills necessary to deal with, change, both seen and unforeseen. Curriculum-integrated or concept-based teaching and learning programs can facilitate the development of these skills through enabling students to create issues or problems and solve issues or problems. When undertaking a concept-based approach, students start with a concept or issue rather than content. By starting with the concept or issue, students work together for the development of knowledge for their

community. The need now is to provide students with the capabilities to work with, and build knowledge (Scardamalia & Bereiter, 2010).

Knowledge Building refers to attempts to enable students to develop Knowledge Building competencies, and for students to see themselves as being able to contribute to a knowledge society, and to be able to advance knowledge for the community (Scardamalia & Bereiter, 2006). Knowledge Building is based on the idea that curiosity is not enough for inquiry (Scardamalia & Bereiter, 2010). The goal of Knowledge Building is to “generate and improve ideas to create a shared community knowledge” (Lai et al., 2014, p. 2). Knowledge Building enables a shift in role from ‘teacher-driven’ to ‘student-driven’ that provides the student with a more active role in their learning (student agency). Knowledge Building is an attempt to create a scaffold to educate students to become producers and creators of knowledge. Knowledge Building pedagogy aligns with curriculum integration in that it empowers the student to build and create knowledge through a series of 12 Knowledge Building principles focused real issues and problems grounding Knowledge Building pedagogy in concept-based learning (Scardamalia & Bereiter, 2010). These 12 principles provide a structure for teachers and students to develop Knowledge Building capabilities.

The 12 Knowledge Building principles described by Scardamalia (2002) and presented in adapted form in Table 1. The principles are not associated with specific curricula and allow students to take a concept and develop these key skills as they create knowledge for their community. Ideally, all 12 are used. However, teachers and students can focus on several as they learn how to use them. The principles are not a series of steps but a set of principles that can help the teacher and student critically understand the abstract idea of knowledge, what knowledge is and how knowledge is built upon. Principles one through to four focus on ideas, ideas that are authentic and can be improved and built on. This is built on in principles five through nine, which focus on the democratising of knowledge, that knowledge is for everyone and that every learner has a role in building the collective knowledge of the community. Principles 10 and 11 are about students understanding key vocabulary and the importance of reliable sources. Principles one through 11 are about the idea development and knowledge advancement whereas Principle 12 is more a principle for teachers in that assessment should not be an assessment for the sake of it but purposeful, essential how has the student developed their own understanding and how has this influenced those in the learning community.

Table 1**Twelve Knowledge-Building principles** (adapted from Scardamalia & Bereiter, 2010)

Principles	
1. Ideas	Real ideas, authentic problems: effort to understand the world.
2. Improvable Ideas	All ideas can be improved upon.
3. Idea Diversity	Understanding the ideas that surround the initial idea or problem.
4. Rise Above	Moving to a higher level of understanding.
5. Epistemic Agency	All students have a responsibility and active role in the learning.
6. Community Knowledge	Knowledge gained is for everyone.
7. Democratising Knowledge	Knowledge is shared in the community.
8. Symmetric Knowledge Advancement	Knowledge is exchanged within and between communities.
9. Pervasive Knowledge Building	Not restricted to the classroom but takes place at school and at home; not limited to an occasion.
10. Constructive Use of Authoritative Knowledge	Using information from reliable sources.
11. Knowledge-Building Discourse	Using the correct vocabulary.
12. Concurrent, Embedded and Transformative Assessment	Assessment is used as part of the advancement of knowledge.

Lai et al. (2014) found evidence that using Knowledge Building principles, built student agency. In a Year 13 Art History class (Lai et al., 2014) saw a “clear shift of the roles of the teacher and students, the teacher being the thinking coach, and the students as “co-curators”, responsible for generating content for the class collectively” (Lai et al., 2014, p. 7). Students, in this research, became epistemic agents as they created questions, researched those questions, and provided answers to further the knowledge of their community. The development of the content for the course provided students with agency as they monitored their own development.

The teacher attributed the increase in achievement to the students' control of their learning (Lai et al., 2014). In this case, Knowledge-Building principles and the transdisciplinary approach to learning are similar in that they allow the student to be at the centre of their learning and to drive it based on authentic learning contexts.

The creation of knowledge within an integrated curriculum approach is such that students are not just gaining knowledge, but are bringing their existing knowledge, who they are and what they already understand, to their learning. Knowledge-Building pedagogy and curriculum integration is an approach that can be culturally inclusive because it has the potential to allow Māori students to have their “cultural identities valued, valid and legitimate; in other words where Māori children can be themselves.” (Bishop, 2003, p. 226). This Ministry of Education (2011a) report recognised the “importance of Māori identity, language and culture in effective teaching and learning” programs. Webber (2012) found that racial-ethnic identity matters to Māori student “because it represented their family, [and] because it helped them to understand who they were” it is important for students to be able to ‘see’ themselves in the learning. Research (see, for example, Fraser & Paraha, 2002), has shown that Māori students benefit from an integrated curriculum approach as curriculum integration is as a power-sharing pedagogy (Brough, 2008). Curriculum integration is power sharing in that it is responsive to student needs, interest and draws on students' cultural capital. Students, being able to bring their culture to the learning, shows that their culture is valued in classroom making their school world and home world compatible (Bevan-Brown, 2005) . The power of learning resides in the students rather than just the teacher.

Culturally responsive pedagogy is a democratised process with a goal of reducing the inequity between Pākehā (New Zealander of European descent) middle-class students and students of diverse cultural backgrounds by having a student-centred focus on the learning taking place (Vavrus, 2008). Students who can bring their culture and own knowledge to their learning have control of their learning and realise that they themselves can change the world around them. Learning moves from an activity that is ‘done to students’ to ‘students controlling and owning their learning’. Bishop (2003, p. 226) describes this as a change in role for the teacher, “where the teacher does not have to be the fountain of all knowledge, but rather a partner in the 'conversation' of learning. Knowledge-Building “involves students not only developing Knowledge-Building competencies but also coming to see themselves and their work as part of the civilisation-wide effort to advance knowledge frontiers” (Scardamalia &

Bereiter, 2006, p. 2). Knowledge Building is about taking what you already know to build or create new knowledge for yourself and for the community (Scardamalia & Bereiter, 2006). An approach to learning that is culturally responsive means the teacher needs to promote ways for the student to bring their whole selves to the learning experience to provide a truly inclusive experience (Vavrus, 2008). In this way, the Knowledge-Building theory has a pedagogical approach that is culturally responsive, as it requires the learner to bring their whole self to the learning process. Curriculum integration, grounded in conceptual learning, enables students to have agency over their learning and be better equipped for their future. Curriculum integration creates greater flexibility for local curriculum design and be differentiated to student needs (Beane, 1997).

2.3 Curriculum integration

Curriculum integration within New Zealand is not new, with a long history of curriculum integration in New Zealand stemming as far back at the New Education Movement at the beginning of the 20th-century (Dowden, 2010). However, the release of the 1993 New Zealand Curriculum document, curriculum integration was reinforced as an approach, where it explicitly states that schools could use an integrated approach (Dowden, 2007). It has continued to gain momentum with the new national curriculum document in 2007 (Arrowsmith & Wood, 2014), and most recently with the redesign of schools from single-cell classrooms that hold approximately 30 students with one teacher to larger open-plan classrooms which can hold more than 60 students and have multiple teachers collaborating (Modern learning environments is discussed further in section 2.5). There has been little practical guidance for teachers wanting to design curriculum-integrated programs of study, which has resulted in various levels of success (Dowden, 2014). The Ministry of Education commissioned a report in 2006, on the New Zealand Curriculum, which states a benefit of the New Zealand Curriculum document is that it “prescribes the key competencies, ‘essential learning areas and achievement outcome but leaves the content and methodology to the teacher’s professional judgment” (Le Metais, 2006, p. 13). This creates autonomy for the teacher to design the teaching and learning programs for their classes.

A transdisciplinary framework, in its purest form, would see high schools structured not around subject areas, but modelled more like primary schools with more curriculum integration. The challenge with this framework is to have it sit alongside a national qualification

framework. In New Zealand, secondary school assessment is managed through the New Zealand Qualification Association (NZQA), which is responsible for the National Certificate in Educational Achievement (NCEA) (NZQA, 2017). Regardless, the Ministry of Education allows schools the autonomy to structure their curriculum to meet the character of their school, which means it is possible to run NCEA in a school that is not organised into subjects. Hobsonville Point High School has created learning modules around both subjects and by theme, topic or skill, which is a more integrated approach (Hobsonville Point Secondary School, 2017). The challenge is that, in high schools, educators are typically subject specific, and teachers are required to understand what NCEA standards (assessments) are available and how to assess against them. This is a challenge, as secondary teachers do not necessarily have knowledge or experience of other subject areas. The Ministry of Education wants to see students achieve in these innovative learning environments with more personalised learning options, which connect subjects (Ministry of Education, 2017b).

Each secondary state-school in New Zealand is governed by the elected Board of Trustees. The Board of Trustees (discussed further on page 52) hire the principal/staff and set the strategic plan for the school (Wylie, 2020). A strength of newly established school has over an already established school is the ability to choose an integrated curriculum from the outset. The principal is able to establish the new school by employing, staff, and establishing structures based on this mode of curriculum delivery instead of changing established structures, systems and curriculum. Research conducted by McDowall and Hipkins (2018), found that only newly established schools in New Zealand offered a fully integrated curriculum. This results in the Character and Culture of the school from conception based on an agreed curriculum and the pedagogies the teachers will use. These new schools can recruit a workforce from the outset with clear intentions and an understanding of how the school operates. Existing schools are struggling to make the leap necessary from single subjects to an integrated curriculum as they deal with changing school systems, training staff and getting parents/students on-board. A way to bridge this gap is to take a concept-based learning approach within subjects, build from the key issue or problem, and map the learning from the concept out.

Curriculum integration, and its importance to pedagogy, is not a new way of teaching and learning, having been around at the turn of the twentieth century through the progressive movement founded by John Dewey and Francis Parker (Hinde, 2005). There are a variety of definitions of curriculum integration and descriptions of what curriculum integration is, as a

result, it is often interpreted differently by teachers resulting in the term ‘curriculum integration’ frequently being misused (Fraser, 2000). A continuum describes the level of integration that takes place within the learning. The continuum demonstrates the level of integration taking place, from individual subject learning to a level of integration where the subjects are no longer identifiable.

Fogarty (1991) and Drake (1993) use a subject-centred approach to defining a lack of curriculum integration and use a continuum to organise and explain the levels of integration. Fogarty, Drake, and Beane all agree that with curriculum integration the approach is student-centred. Fogarty describes three significant ‘Forms’ (areas) of curriculum integration on the continuum, (1) within single disciplines, where learning is in isolation or fragmented from other subjects, (2) across several disciplines for example, where learning may be shared or webbed together, and (3) within and across learners, where learners direct the focus and reach across subject areas to use relevant resources. Drake (1993) has created three broad categories for explaining the various levels of curriculum integration: Multidisciplinary, Interdisciplinary and Transdisciplinary. Drake (1993) does not include a single-subject curriculum learning definition as Fogarty (1991) does in Form 1. Beane (1997) and has extended Fogarty’s (1991) and Drakes (1993) definitions of curriculum integration with the ‘four dimensions’ of curriculum integration by further explaining that curriculum integration is based on authentic contexts from the world around us rather than “the mastery of fragmented information within the boundaries of subject areas” (p. 622). What the three definitions have in common is the approach to curriculum integration when curriculum integration is taking place; it is student-centred. In this way, the learning is negotiated between the student and teacher and provides more of a ‘how to’ approach with curriculum integration making the learning taking place responsive to the needs of the learners (Dowden, 2010). These curriculum integration approaches by Drake (1993), Fogarty (1991) and Beane (1997) align with the research undertaken in this thesis, as they take a student-centred approach to teaching and learning as discussed earlier in this chapter. By taking a student-centred approach the learning places the student, who they are, the knowledge and skills the student currently has and enable the learning and knowledge gained to be specific for the individual student.

This section examines the different curriculum-integration continuums, as described by Fogarty (1991), Drake (1993) and Beane (1997). As the literature is reviewed, a visual representation of the continuum will be built on to show curriculum integration for each of the

theorists' approaches. The aim is to provide greater clarity on how the different understandings of curriculum integration by these three theorists are related. The curriculum-integration continuums developed by Fogarty (1991) and Drake (1993) are similar in that the start of each continuum on the left describes a subject-centred approach. However, as the continuum moves further to the right to the fullest form of curriculum integration, this changes to a student-centred approach. Fogarty (1991) developed three forms describe the different levels of curriculum design from no integration to full curriculum integration. The first two forms, illustrated in Figure 2, describe the traditional structure of curriculum into single disciplines or silos.

Figure 2

Fogarty's model of curriculum integration (adapted from Fogarty, 1991)



Fogarty has models within each of the forms, which provide more detail of the nuances in curriculum design at each form. Fogarty has divided the levels of curriculum organisation into the three forms and 10 models or methodologies and are outlined in Table 2. As we move from left to right of the continuum (see Figure 2), the focus on the single disciplines makes way for an increasingly student-centred approach, especially within the final networked model of Form 3. Fogarty's (1991) model places the integrated curriculum itself as model 8, prior to the final form (Form 3). At Form 3, students are fully agentic with the learning taking place, and at model 10 (networked), the student directs the curriculum-integration process. Fogarty (1991) has created, within the three forms, 10 detailed models of the different stages of curriculum integration.

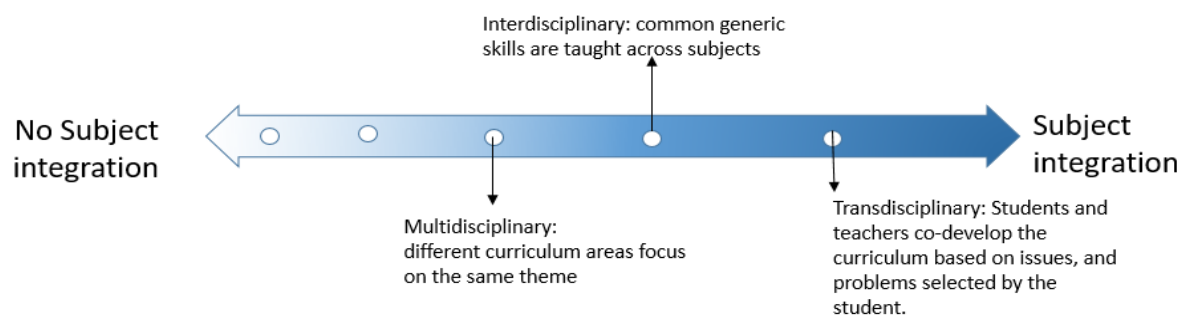
Table 2**Ten models of curriculum integration** (adapted from Fogarty, 1991)

Form	Model / Methodology	Descriptor
Form 1: Within a single discipline	Fragmented	This is the traditional form of organising curriculum and referred to in New Zealand as siloed subjects.
	Connected	Subject disciplines remain separate, but the learning draws connections within the discipline, connecting content and/or skills across units of learnings.
	Nested	The Nested model takes this thinking a step further within a discipline clearly connecting knowledge and skills where relevant.
Form 2: Across multiple disciplines		Content within a discipline is organised and sequenced to provide a broad framework to the learning.
	Shared	Two disciplines come together to over shared concepts and/or skills.
	Webbed	Thematic connections made between disciplines. Subjects use the theme to connect concepts/idea/skills.
	Threaded	Skills and learning threaded through subjects.
	Integrated	Interdisciplinary approach. Concepts, ideas and skills are overlapped and draw connections in and across different subjects.
Form 3: Within and across learners	Immersed	Content and skills for learning comes from the student. Agentic approach to learning where the student immerses in an area of their choice and the different disciplines relate to this area of interest.
	Networked	The learner directs the curriculum-integration process. Making the connections for the learning across disciplines, accessing the necessary resources.

Drake's (1993) model (Figure 3) is similar to Fogarty's (1991) in that his definition also has three broad categories that can also be organised on a continuum to explain the difference between models within curriculum integration. Like Fogarty's (1991) model, the categories along the start of the continuum have a subject-focused organisation of the curriculum. However, where Drake's (1993) model is different is his continuum does not examine curriculum design within a subject area. Instead, Drake (1993) defines the different levels of curriculum integration that align with model 6 of Fogarty's (1991) Form 2. The first category of Drake's (1993) model is, multidisciplinary, in which different curriculum areas focus on the same theme. The second is Interdisciplinary, which focuses on common generic skills taught across subjects. The third is the closest to full subject integration, Transdisciplinary, where students and teachers co-develop the curriculum based on issues and problems.

Figure 3

Drake's model of curriculum integration (adapted from Drake, 1993)

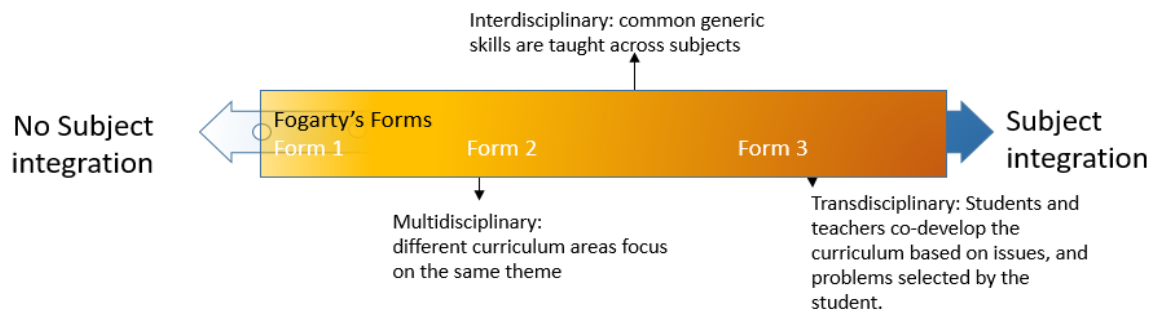


Drake's multidisciplinary approach begins to align with Fogarty's in models 5–8 of Form 2. Model 5 of Form 2 of Fogarty's model is where he first makes connections between subjects, which makes the multidisciplinary level similar to Fogarty's Form 2. It differs from Form 1 in that it extends beyond the single curriculum subject area and learning though thematic in nature at this early stage of the curriculum integration continuum is nevertheless making connections between subject areas. Drake's Interdisciplinary approach begins in the later stage of Form 2 with 'Model 8: integrated' of Fogarty's model (as seen in Table 2). The transdisciplinary is divided into two parts of Form 3, through the immersed and networked models. Figure 4 provides a visual representation of the broad categories created by Fogarty

(1991) and Drake (1993), viewed on a curriculum continuum, and all are recognised as valid vehicles for delivering curriculum (Drake & Burns, 2004, p. 15).

Figure 4

Overlay of both Fogarty's (1991) and Drake's (1993) models (part 1 of 3)

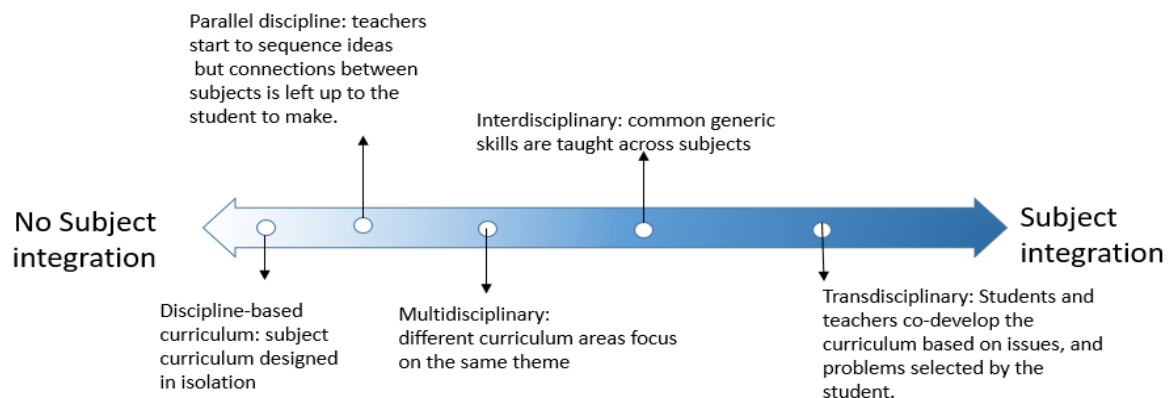


Drake and Burns (2004) refer to two additional types of integration, single discipline and parallel curriculum integration, which precede multidisciplinary. These two models sit at the beginning of the continuum where the curriculum is taught in isolation from other subjects (see Figure 5). Parallel discipline is slightly further along than single discipline, where teachers design learning across the subjects to plan and sequence similar ideas of the continuum. While discipline-based and parallel disciplines were briefly discussed in Drake and Burns (2004), they did not develop these further. However, I have included these two additional definitions as they provide a more detailed picture of what curriculum integration can look like.

The transdisciplinary approach can be interpreted as curriculum integration in its truest form. It is where the learning taking place bears no resemblance to individual subject areas and the student is at the centre of the learning taking place. The transdisciplinary approach is about asking the question, "How can we teach students to be productive citizens in the future? Knowledge is explored as it is embedded in a real life or cultural context" (Drake, 1993, p. 41). In this approach, the learning has shifted from specialist-subject content being based around a concept grounded in the real life, which could be historical, present day or futuristic. The student is both the questioner and the researcher, with the learning based around the student's interest. The student can bring their whole selves to the learning and enables the student to use their own cultural lens.

Figure 5

Types of integration prior to multidisciplinary (adapted from Drake & Burns, 2004)



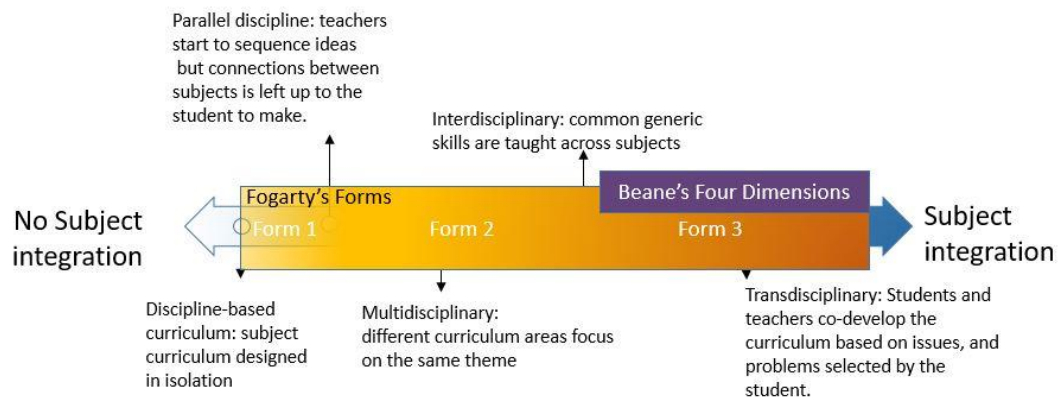
The concepts explored, and knowledge needed, are at the heart of the learning with the student's self and social views influencing the learning happening. How the transdisciplinary approach is different from a single-subject curriculum or a thematic approach to learning is that it enables curriculum integration as a theory to "promote the integration of self and social interests, school and societal issues, and human experiences with the discipline of knowledge." (Fraser & Paraha, 2002, p. 57). It is a way of "thinking about what schools are for, about the sources of curriculum and about the uses of knowledge" (Beane, 1995, p. 616). This approach to learning and knowledge can provide students with the necessary skills for a knowledge-based society. Both Fogarty and Drake have designed models that begin with the traditional structure of subjects or disciplines and, as the models developed, they move to a more student-centred, agentic approach to learning design.

In contrast, Beane (1996) takes a slightly different approach, and his model, outlined in Table 3, is considered a process used by educators to design integrated programs rather than specifically defining different stages of curriculum integration. Beane's Four Dimensions model is similar to a concept-based curriculum, where learning is designed around a real-world issue or problem. The process the learner goes through with Beane's model begins in Dimension 1 where an issue or problem is identified. This issue/problem can be at personal, local, national or international level. Once this issue or problem is identified, then in Dimension 2, the knowledge and context are identified, for example, what information does the student already know? What do they need to know? Dimension 3 and Dimensions 4 is where the student develops the knowledge and applies it to a project or presentation to demonstrate the knowledge created to demonstrate their learning in an authentic context.

Table 3**Beane's four dimensions to design an integrated program** (adapted from Beane, 1997)

Dimensions	
Dimension 1	Learning organised around an issue of problem of personal or social significant
Dimension 2	Learning is organised in relations to around the knowledge and context not subject
Dimension 3	Knowledge is developed and used not stored for a later test
Dimension 4	Emphasis is placed on projects and a real application of learning

As illustrated in Figure 6, Beane's Four Dimensions align most with Form 3 of Fogarty's (1991) model and Drake's (1993) Transdisciplinary area of the continuum. Both Fogarty's Form 3 and Drake's Transdisciplinary models focus on the students co-designing their learning within a curriculum that focused on real-world context where individual subjects are no longer the focus of the content. Interestingly, the transdisciplinary framework is in line with the vision for the New Zealand Curriculum, which is to help create "young people as lifelong learners who are confident and creative, connected and actively involved" (Ministry of Education, 2007, p. 4).

Figure 6**Overlay of Fogarty's (1991), Drake's (1993) and Beane's (1997) models (part 2 of 3)**

A curriculum designed in this manner becomes culturally inclusive, as it is student-centred. A student-centred approach also allows the learner to bring who they are to the learning taking place. Based on a real-world issue or problem, the learner brings his or her own cultural lens to the learning taking place. Fogarty, Drake, and Beane all agree that curriculum integration is agentic and based on an authentic context. The student can design learning based on who they are, and what they currently know and then build knowledge to further their understanding demonstrating this learning in a final project. This student-centred approach to learning is at the heart of curriculum integration and seen in each methodology: Fogarty's, Form 3 - Model 9 and 10, Drake's Transdisciplinary model, and Beane's Four Steps. Curriculum integration is "underpinned by the idea that learning is more relevant and meaningful if it is organised around concepts that are relevant to students. In real life, these concepts are rarely contained within the bounds of one learning area" (Beane, 1997, p. 17).

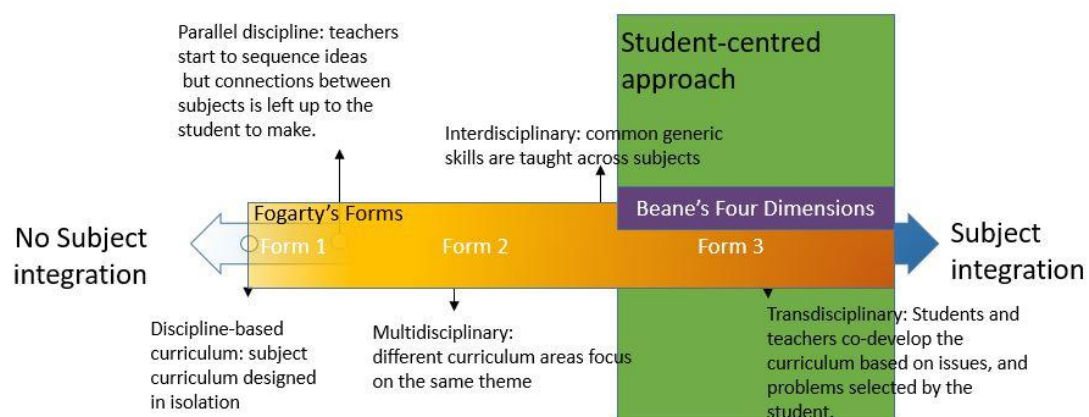
Student-centred curriculum design is also recognised as fostering student curiosity (Engel, 2011), especially when combined with student-led inquiry. Student-led inquiry is an opportunity to students to be involved in the learning process. The cycle of inquiry is where research questions are developed, information gathered, information is sorted and synthesised, use the information usually presented in some way and then finally students reflect and evaluate the learning (Boyd, 2013). Student-led inquiry has been part of the New Zealand Curriculum (2007) document within the social science learning area. Specifically, focusing on social inquiry, with a "dual commitment to gaining deeper knowledge about society as well as

knowledge, dispositions, and skills to be able to participate in society (now and in the future)” (Wood, 2013, p. 22). This student-centred, agentic approach to curriculum design is counter in design to that of a single-subject structure (Dowden, 2010). It is possible to overlay all three approaches and understandings of curriculum integration into one continuum (see Figure 7). By creating a single continuum, it is possible to see where three different approaches intersect and provide clarity and better understanding of curriculum integration for educators.

The models of curriculum integration provide a starting point for understanding integrated curriculum design. Creating a continuum can provide an explanation and guide for teachers to use to explore ways of designing curriculum and clarity around what units of learning when integrated could look like.

Figure 7

Completed model integrating Fogarty (1991), Drake (1993) and Beane (1996) (part 3 of 3)



The challenge of curriculum integration is the lack of understanding by teachers and little guidance on ‘how’ to design learning programs, at the teacher level, that are integrated and can work within current school systems and be implemented over time. This lack of understanding on how to create an integrated program has led to teachers’ lack of clarity regarding curriculum integration. Based on the literature discussed, the author of this research defines curriculum integration as having an authentic context based around a real-world context or issue (Beane, 1997), is agentic for students (Fogarty 1991, Drake 1993 and Beane 1997) where the student and the teacher co-develop the learning taking place (Drake 1993) which is responsive to the needs of the students (Dowdan, 2010). Being responsive to the needs of the students includes

the co-construction of learning between the student and teacher recognises that learning is reciprocal between the student and teacher and is recognised as a feature of culturally responsive practice (Bishop, 2010). Curriculum integration not only addresses a range of subject-specific knowledge and skills designed around the authentic learning context it also embeds 21st century knowledge and skills, ensuring the learning is culturally responsive.

2.4 Features of curriculum integration

Curriculum integration can be confusing to educators as there can be a misunderstanding between curriculum integration and thematic learning. Fraser (2000), for example, argues that teachers can confuse thematic links for curriculum integration, and, thus, are not implementing true curriculum integration. Even within the literature there can be several different models discussed when referring to ‘curriculum integration’ including the models previously discussed. However, both within the literature and among educators, it is increasingly recognised that curriculum integration is more than thematic. This is because it breaks down the silos/fragmentation of individual subjects (Fraser, 2000). It is, therefore, not a thematic approach to teaching which tends to be topic-driven and strives to cover all subject areas through a specific lens (Fraser, 2013). When reviewing the Fogarty, Drake, and Beane’s models of curriculum integration, thematic links of curriculum design, seen on the left of the continuum, at which point links are being made within or across subjects (Figure 7). When full curriculum integration is taking place on the right side of the continuum, the learning is concept based and it is through this concept-based curriculum integration that students’ needs are at the forefront.

2.4.1 Concept-based learning

As previously mentioned, a core feature of curriculum-integration design is that it is a concept-based curriculum where the learning is relevant, purposeful, and framed around a real-world issue or problem. Erickson (2012) defines concept-based curriculum as:

Concept-based curriculum and instruction is a three-dimensional design model that frames factual content and skills with disciplinary concepts, generalisations, and principles. Concept-based curriculum is contrasted with the traditional two-dimensional model of the topic-based curriculum, which focuses on factual content and skills with

assumed rather than deliberate attention to the development of conceptual understanding and the transfer of knowledge. (Erickson, 2012, p. 3)

A concept-based curriculum can be seen as a coherent curriculum that integrates curriculum. Beane (1995) explains a coherent curriculum as one where not only the teachers understand the purpose and learning experiences, they want the students to have, but where the students also clearly understand what they are learning, the purpose, and how it connects to the bigger picture. Using concepts as the basis of curriculum and instruction allows the learning to be organised, based around abstract ideas and broad generalisation, and assists students with making links between the knowledge within the concept they are learning and the world around them (Erickson, 2002).

The concept-based curriculum is not to be confused with thematic learning. Thematic learning is like curriculum integration in that the learning can cross discipline boundaries and students can co-create their learning (Loughran, 2005). A key difference is thematic learning is based on a theme such as Space, or the rainforest whereas a concept-based curriculum is based on big ideas such as sustainability. The big ideas require students to bring depth to the learning by developing knowledge around the facts of the issue, then asking conceptual-based questions, and finally examining debatable questions on the concept/issue (Erickson et al., 2017). A concept-based curriculum can be designed within subjects or across subjects (Erickson et al., 2017). Being able to make links between and across subject areas is part of the coherence principle that underpins the New Zealand Curriculum (Ministry of Education, 2020b).

A concept-based curriculum is increasingly being used by teachers as a framework to 'trial' and deliver an integrated curriculum. Erickson, a leading expert in concept-based curriculum and instruction, realised in the late 1980's that for students to develop their thinking abilities, there was a need to develop a curriculum model to support this learning (Erickson, 2009). Using concepts and conceptual ideas as drivers for learning, enables the students to have a deeper understanding, not only within the discipline, but also across other situations. Concept-based learning sits on the continuum within the Interdisciplinary aspect, as it allows subject teachers to change their approaches to teaching, but still maintain the integrity of the subject area. Schools do not have to adjust timetables, systems, or infrastructure to implement a conceptual learning program. The learning, driven by concepts and student interest, can be taught within a subject with the connection being made apparent (see Figure 6).

The fundamental aspects that need consideration, when designing curriculum, are how students develop knowledge, processes, and skill abilities and that students develop critical thinking skills and conceptual understanding. The OECD (2019) recognises that “knowledge and skills are both interconnected and mutually reinforcing” with researchers understanding the increasing “importance of being able to understand, interpret and apply knowledge and skills in various situations” (pg, 2). Structuring a curriculum-integration program to consider these fundamental aspects needs to address several critical components (Erickson, 2002). These components are student outcomes, critical content (key concepts, and essential understandings), major processes and skills to ensure quality performance, and quality assessments to evaluate students’ learning (Erickson, 2007). Curriculum integration delivered through a conceptual lens moves learning beyond a transaction of information to a meta-cognitive level where ideas can be applied in new but related contexts (Hattie, 2012). Students can build and create new knowledge as they apply the learning to knowledge already gained and to future ideas/contexts (Erickson et al., 2017). The learners gain deeper understandings that can be drawn, and applied, to a variety of disciplines and situations. Increasingly schools are recognising the need to move from curriculum structured as discipline subjects with specific curriculum knowledge organised around facts “towards understanding disciplines as interrelated systems” (OECD, 2019, p. 2).

2.4.2 The learning process

As educators design and deliver curricula for students to develop and create knowledge, it is also necessary to create learning programs based on how people learn. Learning, as defined by Hattie and Yates (2013), is “the process of developing sufficient surface knowledge to then move to deep or conceptual understanding” (p. 26). The aim is for students to reach a deep understanding of the concepts taught. Learning can be conceptualised as moving through a series of phases: starting from surface learning moving to the deep or conceptual understanding and then to the transference of knowledge (Hattie & Donoghue, 2016). Two of the three phases of learning, surface and deep learning can take place concurrently, and each phase, including the transferring phase, has an acquiring of knowledge and a consolidation component (Hattie & Donoghue, 2016). Each phase of learning is of equal importance, and all are critical and can happen simultaneously. To feed the student’s disposition, the learning taking place needs to be meaningful, and this contributes to the argument for student agency in teaching and learning. The goal for students is to acquire the surface and deep learning to develop their

“repertoire of skill and strategies” (Hattie & Donoghue, 2016, p. 4). The transfer of knowledge is an active process where the students “actively choose and evaluate strategies, consider resources and surface information, and, when available, receive or seek feedback to enhance these adaptive skills” (Hattie & Donoghue, 2016, p. 4). Once students have a deep, or conceptual based, understanding they are more readily able to apply or transfer this knowledge to a new or different context (Hattie et al., 2013).

A key component to facilitate this transfer of knowledge can be achieved by students, setting goals, requesting feedback, and reflecting to have a clear understanding of what they are learning, the success criteria, and how they will know where they are at with their learning. While students transfer new learning to a new or different context, students can further develop concurrently a range of 21st-century skills such as critical thinking, collaboration, and creativity. Hattie and Donoghue (2016) argue that the integration of 21st-century skills during the learning process is more effective if embedded in the learning taking place, rather than as standalone activities or classes. Teachers and students can design and co-design rubrics or success criteria, which then become a key document when having learning conversations and maximise the learning taking place (Hattie & Donoghue, 2016). Hattie and Donoghue (2016) argue that their research shows that learning happens when students move from surface-to-deep learning and can transfer knowledge or conceptual understanding depending on the situation and need.

This model of learning, as described by Hattie and Donoghue (2016), is like the Seven Principles of Learning. The OECD (2010) has identified Seven Principles of Learning, based on research, which examined the nature of learning through the perspectives of cognition, emotion, and biology. These seven principles are (1) learners at the centre; (2) the social nature of learning; (3) emotions are integral to learning; (4) recognising individual differences; (5) stretching all students; (6) assessment for learning; and (7) building horizontal connections. Hattie and Donoghue (2016) and the Seven Principles of Learning are challenging educators in “rethinking what is taught, how it is taught, and how learning is assessed” (Dumont et al., 2016, p. 2). Learning, regarded as a socio-constructive concept where the learning taking place, is “shaped by the context in which it is situated and is actively constructed through social negotiation” (Dumont et al., 2016, p. 3). This means that the learning is often collaborative, contextual, and self-regulation by the learner is continually developed. The goal of learning as identified by Dumont et al. (2016) is the ‘adaptive

expertise', which can be seen as the same flexibility described by Hattie and Donoghue (2016) and includes the transfer of knowledge and skills in different contexts.

How teachers 'assess' learning needs to change from 'end-of-topic' assessments to 'value-added' learning. Value-added learning is where a student's baseline performance is compared to performance after a unit of work, or learning that year (Kennedy et al., 2011). Value-added learning for the individual student is the focus rather than the imaginary average student. End-of-topic assessment demonstrated what a student knows at the end of the unit and does not consider if the student knew the knowledge prior to the learning taking place. To measure the impact the teacher or school has had on student learning it is necessary to use a formative assessment to plan what learning needs to take place rather than one summative assessment which assesses what the student gets correct rather than what has been learned (Binkley et al., 2019). Value-added learning is about creating a plan for the student to progress with their learning over time to ensure that students are developing skills and knowledge, not just getting the answers right on a test or assignment. Students themselves should be part of the learning progress by understanding where the student learning currently is at and what the next steps of understanding are (Bishop, 2019). Teachers who make learning visible for students by being explicit with learning and success criteria as well as gathering formative data from the students can then design learning activities that will enable student success (Hattie, 2005). Teachers can use data gathered from formative assessments to help students learn to set goals for themselves to align with the success criteria and what the student needs to learn to reach their potential.

Providing opportunities for goal setting and reflecting on learning is effective in providing student agency and can help students with their motivation and understanding metacognition (Binkley et al., 2019). Metacognition is the student thinking about how they learn, which is 'knowledge about cognition', for example, what you know or don't know, realising you have understood something; and 'self-regulating mechanism', such as what to next, checklists, and revising (Black et al., 2006). To evaluate 21st-century learning for students requires educators to understand that there are multiple methods of evaluating students' learning including:

Consequently, twenty-first century assessments must systematically ask students to apply content knowledge to critical thinking, problem-solving, and analytical tasks throughout their education, so that we can help them hone this ability and come to

understand that successful learning is as much about the process as it is about facts and figures. (Binkley et al., 2019, p. 25)

There are various methods teachers can use to make learning visible for students. A particular tool that can help students and teachers is rubrics. Rubrics give certainty by making the learning intentions visible, the students and teacher sharing a common language in what the expectations for the learning and/or skills that are taking place (Moskal, 2000). There are two types of rubrics – holistic rubrics for an overall judgement, and analytical rubrics, which have scores for each section being evaluated (Bennett, 2016). It is the analytical rubrics that are predominantly used by teachers in schools and have three sections, the performance criteria, graduated levels for achievement with descriptors, and a numerical scoring guide (Bennett, 2016). Rubrics have the potential to provide students with a clear understanding of the learning being evaluated and can be differentiated. The student reviews the different criteria, reflect on their own learning, and set goals to attain the required outcome. When students have completed the task, the teacher can provide thorough feedback directed to the individual student on the work the student completed and the next steps. Effective feedback, according to Hattie (2003), has a significant effect on influencing student achievement.

Learning is not just about subject content or skills; it is about creating skills and competencies the student can use in a variety of different contexts and with concern for the wellbeing of the learner. In this way of viewing learning, student agency is central to the framework. The Seven Principles of Learning (OECD, 2010) place the individual student and their wellbeing at the heart of the learning taking place. This is achieved by ensuring learning considers the whole student, from the student's emotional wellbeing to providing a learning environment that makes connections. These connections are across not only knowledge and subject areas but also help to create global citizenship from a local to international level. The OECD has also developed an evolving learning framework, published in 2019 called the 'Learning Compass 2030', which sets out an aspirational vision for the future of education. The 'Learning Compass 2030' (OECD, 2019) has used a compass as a metaphor to emphasise the need for "students to navigate themselves through unfamiliar contexts and their direction in a meaningful and responsible way, instead of simply receiving fixed instructions or directions from their teachers" (OECD, 2019, p. 2). The intention of the OECD is to provide a broad vision of the key competencies students will need in 2030 and beyond.

New Zealand's recently released National Education and Learning Priorities (NELP), set out the government's priorities for education to ensure the success and wellbeing of all learners issued under the Education and Training Act 2020. The priorities in this document share similar themes as those found in the OECD Learning Compass document. The National Education and Learning Priorities aim to create educational environments that are learner-centred:

... ensuring that they (students) are safe and inclusive and free from racism, discrimination and bullying, strengthening the quality of teaching our learners receive to giving our learners the skills they need to succeed in education, work, and life, collaborating more with whānau (family) employers, industry and communities, taking account of learners' needs, identities, language and cultures in their practice and incorporating te reo Māori and tikanga Māori into everyday activities. (Ministry of Education, 2021b)

What we can see in New Zealand is an education system that is adopting a student-centred holistic approach to education, centred on all aspects of the student where the student can bring their whole self to the learning. Teaching moves from the teacher talking up the front of the classroom, the student listening intently and responding when asked to a relationship with a power-shared approach. Bishop (2015, p. 152) describes learning with a power-sharing approach as being “interactive, dialogic and spiralling, and participants would be connected and committed to one another through the process of co-constructing shared common understandings and meaning. Learning in this manner moves away from a transaction to a partnership where students can develop a range of knowledge and skills, not just limited to a specialist subject area. Using a student-centred approach to teaching and learning requires a partnership between the teacher and student. Where the students, own voice, experiences culture and interests are taken into consideration and help drive the learning. The learning taking place sits within a context relevant to the student (Brough, 2012). To democratise the classroom in this manner requires flexibility by the teacher and a curriculum that is not so rigid that students cannot participate in the co-design of the learning (Brough, 2012). Students have agency and are able to make connections between their world and the learning taking place.

There is complexity to the learning and knowledge that students of today need. Educators need to create a balance and as such, it is necessary to consider the role of pedagogical content knowledge (PCK) and content knowledge (CK) within the design of curriculum. Pedagogical content knowledge was term developed by Shulman (1986) for the blending of content and

pedagogy (Shulman 1985, Gudmundsdottir & Shulman, 1987). Pedagogy is the knowledge needed by teachers to make the subject/content accessible to students, whereas content knowledge is the understanding a teacher has of their subject area/s. It is not sufficient for a teacher just to understand the subject matter; they must be able to understand the ‘why’ of the subject matter (Shulman, 1986, p. 9). According to Kleickman et al. (2013) recent research has found that teacher’s subject matter knowledge does in fact affect a teacher’s instructional practice in turn affecting student achievement. Both content knowledge and pedagogical content knowledge are necessary and rather than viewed separately should be viewed as an “amalgam of knowledge of content and pedagogy that is central to the knowledge needed for teaching” (Loewenberg Ball et. al. 2008, pg 392). Despite the interest Shulman and his colleagues generated with the development of pedagogical content knowledge, as educators, we must not lose sight of the importance of pedagogical content knowledge when wanting to help students develop knowledge and skills outside of a particular subject or discipline.

We live in a knowledge society where information is growing exponentially. The question for educators is, ‘What do students need to know and what skills are necessary for them to contribute to society in a valuable way, and more importantly, how do we do this?’ Students need to not only know key information and learn key skills, for example, multiplication, sentence structure and so forth, they also need to have an ability to contribute to knowledge creation, effectively problem-solve, to have a set of values, which enable them to address issues, and consider other cultural perspectives (Drake, 2007). Curriculum integration can be used to address the complexity in creating learning programs that provide students with a holistic approach to knowledge and skill necessary for the 21st Century.

Curriculum integration is seeing a recent resurgence, research conducted in New Zealand by McDowell and Hipkins (2019) found teachers identified the opportunities curriculum integration created for students to make deeper connections, explore relevant and authentic issues, and for all students to achieve. The rationale McDowell and Hipkins identified for the reason teachers are wanting to integrate subjects are like what Beane (1996) identified, in that curriculum integration enables students to apply knowledge rather than just accumulating and memorising information. It is necessary for students to be able to think critically with increasingly abstract ideas. A curriculum structured into specific subjects lacks the flexibility to allow students to develop these key skills and values. For students to learn effectively how to build and create knowledge as well as to create and solve problems, the learning environment

needs to reflect how this happens in the real world. Knowledge Building pedagogy is an effective pedagogy that can sit within the transdisciplinary framework to enable students and educators to measure the knowledge building and creation happening as they learn. The challenge for educators is how they assist students to learn these skills and how do schools assess or measure this.

2.5 Creating change within a school

Schools wanting to create and move from a traditional model of instruction to future-focused it is necessary to understand the role of governance and leadership in navigating the change taking place. The *Tomorrow School's* reforms in 1989 saw schools move to self-management (Wylie, 2021). Schools in New Zealand are not part of a district but instead are self-managing. The school principal is appointed by the Board of Trustees (Wylie, 2020). Each school in New Zealand has a Board of Trustees. The Board of Trustees as mentioned in the introduction consists of the elected members from the community, a staff elected representative, student elected representative and the principal (Wylie, 2010). The role of the Board of Trustees is the governance of the school, “Boards of trustees have a stewardship role that involves planning for, and acting in, the interests of the school and its community. Student learning, wellbeing, achievement and progress are the board’s main concern” (ERO, p.2 2017). The Board of Trustees is primary concerned with the wellbeing and achievement of the students. The Principal has the responsibility of employing the teachers or delegating this role to a deputy principal.

The senior leadership team have the responsibility of leading the school based on the strategic plan, vision and policies initiated by the Board of Trustees. Each school has significant scope to develop their own goals and reporting systems. Schools are usually reviewed by the Education Review Office on average every three years (Wylie, 2020). Teachers and senior leaders within a school who want to make significant change need to have the support of the Board of Trustees. Research undertaken by NZCER national secondary survey undertaken every three years “suggested that principals and teachers may be underestimating how much a school’s teachers can learn from each other.” (Wylie, 2002, p.54). This could have the unintended consequence of schools not utilising their own internal expertise. The findings discussed in Chapter 4 supported the need for Senior Leaders to understand the capabilities within the school to be able to leverage this knowledge to drive change.

The challenge for schools who are planning to change to a future-focused integrated curriculum, is how to change from a structure designed around individual subjects to one that encourages learning on a more integrated or connected level across and within subjects. When schools look to implement change, they may categorise change into three broad categories: systems, curriculum, and pedagogy (Grow Waitaha, 2021). Systems include the day-to-day running of a school for example the timetable, staffing, and reporting. Curriculum is the schools' interpretation of the national curriculum and based around learning areas/subjects, values and key competencies. Pedagogy is the method teachers use to deliver the school curriculum at the classroom level. This could be as single-subject area, teacher-guided, episodic lessons or include pedagogies such as student-led inquiry, and project-based learning. Each of these categories have an impact on the other and has the potential to make change a slow cumbersome process.

Secondary schools in New Zealand, historically, have been structured around specialist subject areas found in the back half of the New Zealand Curriculum document. Traditionally in Christchurch, classrooms had been single-celled with approximately 30 students in a class. Students would move from class to class based on their timetable. While open-plan learning was a feature of education internationally in the 1970's, it is seeing a resurgence in school design (Imms, 2018). The Christchurch earthquakes in 2010 and 2011 presented an opportunity in the rebuilding of schools to create a physical learning environment that was significantly different and aligned with the Ministry of Education property strategy 2011-2021 (MOE, 2011b). The Ministry of Education took the opportunity for schools rebuilt, due to earthquake damage, or newly built schools to have innovative, flexible learning environments, which are large open spaces. Schools could still provide a level of input into the design of the new buildings with some school preferring the traditional single-cell classroom environments and other schools could opt for a larger open-plan, innovative learning environment. However, not all school received their preferred choice, even with the new builds. The retrofitting of existing schools and rebuilding of new schools needed to align with the Ministry of Educations policy on the environment being "fit for purpose...and empower students and teachers to succeed (MOE, 2011b, p. 9). This means that schools have flexible teaching zones that can be easily reconfigured and used in a variety of ways" (MOE, 2011b. p.13). With the modern, flexible design of classrooms, the opportunity became available to explore innovative ways of delivering the curriculum. Modern, flexible, innovative learning environments provide an opportunity for teachers to develop a range of new

pedagogical approaches which are student-centred, relationship-based and culturally responsive. These innovative pedagogies can have implications for how the school is managed. As schools explore new ways of designing and delivering curriculum, they look at these changes through three broad interconnected categories, systems, curriculum, and pedagogy.

When a school is looking at changing its pedagogical approach or the curriculum content of the learning a problem can often lie with a system such as the timetable. A school wanting to have a pedagogical approach, which includes project-based learning or student-led inquiry, might find that teachers want to have more than a 50-minute period. The challenge for the school then becomes how to rework the timetable. There is a potential for schools to overlook the fourth component, which is people. The Educational Leadership Model developed by the Ministry of Education which focused on Middle and Senior Leaders states the importance of each school knowing its “own culture, history and model of leadership” (Ministry of Education, 2012a). When teachers and leaders are from within a school, they can assume they all have the same opinion of the school’s Character and Culture. Whilst there have been significant shifts in teaching and learning, schools have been slow to change. Change within schools often does not gain the traction necessary for success because there is a lack of understanding for the complexity of the change taken place, and the school’s culture. Schools need to look at change as not simply a restructuring of systems and process but rather re-culturing. It is necessary to understand that “school cultures are the shared orientations, values, norms, and practices that hold an educational unit together, [and] give it a distinctive identity” (Kaplan, & Owings, 2013, p. 29). School culture is not static and consists of multiple cultural spheres that overlap. These cultural spheres include where the school is located, the students within the school, the local community, and the teacher and staff within the school to name a few. The purpose of the school should be shared with all involved working towards a common vision (Redding & Corbett, 2018). A school’s shared vision will focus in some-way on ensuring success for the learners within the school community.

Middle Leaders and Senior Leadership roles are important in improving the quality of student learning. Senior leaders in New Zealand schools have oversight of school-wide operations, whereas the Middle leaders perform a dual role of teaching and managing staff (Cardno & Bassett, 2015). Middle leaders have an important role in leading curriculum development, keeping up to date with current teaching and learning theory, and modelling best pedagogical practices. Systems are what Middle and Senior Leaders use to create the

conditions for staff to work effectively and for students to learn. Systems include the day-to-day administration, pastoral care, academic tracking, data analysis, staffing, budgets, and so forth (Ministry of Education, 2012a). Generating change within and across these systems requires creative leadership in which leaders have involved not just in problem finding, but also in problem solution (Stoll & Temperley, 2009). Teachers wanting to design innovative approaches to learning which are future-focused and innovative are trying to create a problem-solution. This problem-solution is to address the learning needs of students for a knowledge-based economy and is based on professional learning, building capacity, and working in the Community of Practices, all of which depend on creativity. Creative leadership is about Senior Leaders and Middle Leaders being adventurous, thinking outside the box, and finding innovative approaches. It requires Senior Leaders to change systems and pedagogical approaches because there is not just one way (Stoll & Temperley, 2009). It is often the role of the Middle Leader to develop professional learning for teachers within their faculties/departments/learning areas to change or improve practice (Bassett, 2016).

2.6 Teacher professional development

Moving teachers from a familiar mode of teaching, for example a transmission mode of teaching to another pedagogical approach, requires meaningful sustainable professional development (Edwards-Groves et al., 2016). Teachers have a knowledge-base to draw from when teaching which includes content knowledge; general pedagogical knowledge; curriculum knowledge; pedagogical content knowledge; knowledge of learners and their characteristics; knowledge of educational contexts; and knowledge of their own educational philosophy and historical context (Shulman, 1987). This base of knowledge comes into play into classroom with teachers being able to make quick decisions around classroom management and to implement the necessary strategy for their desired outcome. Teaching is a dynamic activity where teachers need to understand the individual student and how to nurture that child (Darling-Hammond, 2006). Over time, teachers develop and hone their skills within this base of knowledge. It is possible after a period of time that a teacher may settle into a particular style of teaching and making a change requires understanding the purpose as well as developing a new range of skills. Teacher professional development is about altering the beliefs, practices and understanding to create better outcomes for students (Guskey, 1986). Teacher-led inquiries is one methodology used by school in New Zealand to have teachers identified aspects of their

practice that could be modified to have a positive effect on student learning. Teachers in New Zealand are familiar with inquiring into their own practice often through a teacher-led inquiry. A teacher-led inquiry is a form of action research where a teacher examines an area of their practice and seek to identify ways to improve practice through a series of steps similar to Tripp's (2005) seven-step model discussed in the Methodology chapter, Section 3.2.1.

When a school is undertaking change Senior Leadership will use professional development to create a shift in teacher belief towards the desire change. Professional development is around changing a teacher's belief to influence a change in practice that requires good relational trust between those wanting the change (usually Middle Leaders) and the teacher/s developing their practice. Brown, Daly and Liou (2016) found that high levels of trust within a school were associate with the uptake of learning within the school that teacher received from school leaders. Valdivia (2021) research supported the work by Brown, Daly and Liou (2016) that "higher levels of perceived trust among teachers is significantly associated with higher degrees of perceived teacher collaboration" (pg.215). Relational trust plays a significant in role in the sustainable change within schools (Edwards-Groves et al., 2016). Relational trust by Middle Leaders is necessary to build the professional development of teachers. Edwards-Grove and Grootenboer (2021) provide five dimensions (Table 4) to build relational trust to create pedagogical change (Edwards-Groves & Grootenboer, 2021, p. 265) which are outlined in Table 4.

Table 4

Five dimensions to build relational trust (adapted from Edwards-Groves & Grootenboer, 2021, p. 265)

Dimensions	
1. Interpersonal	Where Middle Leaders demonstrated approachability, empathy, care, acceptance of difference and expertise, mutual respect, trustworthiness, related responsively and genuinely, and engendered confidence among teachers.
2. Interactional	Where Middle Leaders created open and safe spaces for inter-thinking, cooperation, dialogic integrity, collaboration and democratic dialogues among teacher participants.

3. Intersubjective	Where Middle Leaders demonstrated ‘witness’, consensus, and collegiality through shared language, a productive dialogic, sense-making, problem-solving, activities and community because they, too, were invested in the change agenda for their own teaching.
4. Intellectual	Where Middle Leaders conveyed self-confidence, professional knowledge, expertise and wisdom regarding the focus of the development work.
5. Pragmatic	Where Middle Leaders led activities and professional learning agendas in ways that were practical, relevant, realistic and achievable.

Edwards-Groves and Grootenboer’s (2021) five dimensions of relational trust are interconnected and convey the complex nature of building an environment where teachers feel safe and supported. Communities of practice provide an environment where relational trust can “unfold” and be built between the teachers and Middle Leaders (Edwards-Groves & Grootenboer, 2021, p. 278).

2.7 Teacher Community of Practice

Teaching an integrated curriculum relies on strong collaboration and high levels of relational trust between the teachers working together. A high-functioning Community of Practice can ensure that teachers feel supported and can provide the professional learning and tools necessary to become effective in the co-creation and delivery of an integrated curriculum. The three key elements for a Community of Practice as described by Wenger (2000) are, firstly, a sense of joint enterprise; secondly, a community which is built through mutual engagement; and thirdly, a shared repertoire of communal resources. Participants of a Community of Practice need to feel that they are full participants and engaged in a shared purpose, where teachers are not only receiving, but are also contributing in a valuable manner (Printy, 2008). Teachers who are actively reflecting on their practice can apply their learned knowledge and skills creatively is called adaptive expertise (Hayden et.al.2013). A Community of Practice relies on a foundation of high relational trust as the participants can show levels of vulnerability when developing their understanding relating to their practice (Li et al., 2009). This sense of

joint purpose and mutual engagement lead to the creation and curation of communal resources/artefacts.

Curriculum integration, through inquiry learning and project-based learning, is a very different way from the traditional way of teaching. Teaching in this manner requires teacher to develop skills in adaptive expertise. Timperley et.al (2020, p.2) defines adaptive expertise as demanding “in-depth knowledge and skills, being flexible and responsive to the cultures and languages of their students and not feeling the need to subscribe to preconceived ideas about what effective teaching means”. Teachers with adaptive expertise will adjust their teaching and learning responsive to the needs of the individual students in front of them. It requires teacher to regularly and actively reflect on the needs of the students, ensuring the learning taking place is of benefit for the students. Teachers need to feel comfortable with feeling uncomfortable with the ambiguity of curriculum integration because curriculum integration requires adaptive expertise with dynamic and interactive modes of instruction, where the student also negotiates the learning.

Change, particularly to models of curriculum integration can feel to the teacher like there is a loss of control or the outcomes can seem unclear (Fraser et al., 2013). A well-functioning Community of Practice is where teachers can feel able to share not only their successes, but also their fears or problems. Teachers who are changing the design of a teaching and learning program from a teacher at the front transmitting the information to one that is integrated and student-centred requires an investment of time. It is not an easy process to change from a style of teaching and learning a teacher is familiar with to a new pedagogical approach where learning activities are carefully planned around the students’ needs and the needs to the curriculum. Teachers are building adaptive expertise by reflecting on their practice and then changing what they are doing to benefit the student (Hayden et.al. 2013). A Community of Practice becomes a shared space for teacher to actively reflect and seek solutions together building their adaptive expertise through collaboration and shared knowledge and experiences. For a Community of Practice to thrive it needs to be based on Enterprise (the level of learning energy), Mutuality (the depth of social capital) and Repertoire (the degree of social awareness) (Wenger, 2000). Each of these areas can be further divided into engagement, imagination and alignment.

According to Wenger (2000), enterprise is the learning energy and engagement within this area that looks for teachers to negotiate a joint inquiry and explore important questions.

The members of this Community of Practice need to identify gaps in their knowledge and be willing and able to work with the others to address these. The teachers or members of the Community of Practice need to have imagination, understand the visions that are guiding leaders and inspiring the participation. Alignment is when there are methods, standards and routines that define the practice, and where they adopted by those in the Community of Practice and passed on for the future. Alignment happens when the member can articulate a shared purpose and their investment in this purpose, who and how are the members accountable and what is the distribution of leadership. Mutuality is the social capital of the Community of Practice as when there is engagement, there is the opportunity to develop trust through activities and interactions. Imagination focuses on what the members know of each other. It is relationship-focused with members knowing and understanding what their participation means to each other. Alignment comes from knowing what role each person plays, the codes of behaviour, shared principles and an understanding of the expectations of the Community of Practice. Repertoire is in relation to self-awareness. Engagement is about the extent of shared experiences over time. What learning and/or artefacts have been gained and what is the potential for future interactions? Imagination is the Community of Practice imagining or reimagining new ways of being and being reflective in their shared language. What we can see from Wenger's (2000) framework is the importance of high relational trust to facilitate the collaboration between teachers for the advancement of, or implementation of an idea/s. It can be a period of ambiguity and the teachers need to be able to trust the others in the Community of Practice and raise questions or concerns that can have a feeling of vulnerability. When engagement or high relational trust is in play, the other aspects of the Community of Practice are developed.

2.8 Summary

Curriculum integration is complex but is a type of curriculum design that is gaining increasing momentum, especially in New Zealand. Curriculum integration, as examined in this literature review, can be visualised on a continuum (as seen in Figure 7), which starts describing subjects in isolation moving through to transdisciplinary integration. As the curriculum-integration continuum moves towards transdisciplinary integration, the learning becomes less subject-driven and more student-driven. This literature review has discussed Fogarty's, Drake's, and Beane's models of curriculum integration and found that subjects taught in isolation tend to be

subject-driven yet when curriculum integration is increasingly integrated the learning becomes student-driven. The learning moves from specialist-subject to concept-based learning focusing on authentic real-world issues or problems.

The literature review argues that curriculum integration is an effective method for using a concept-based curriculum for students to build knowledge as well as enabling students to develop the skills recognised for success in the 21st-century such as, collaboration and critical thinking. It is necessary for students to move through three phases of learning to create and build knowledge. These three phases are surface learning, deep learning and the transference of learning. Students who can transfer the learning from the surface and deep phase are better able to make connections and think critically with new scenarios and situations (Hattie & Yates, 2013). Darling-Hammond et al. (2020) state that the students are better able to build 21st-century skills through inquiry and investigation. A concept-based curriculum is based on students exploring and investigating a real-world issue or problem usually through pedagogies such as student-led inquiry and project-based learning. These pedagogies support the development of not only knowledge but also 21st-century skills. Students can succeed in this integrated curriculum environment because they are better able to transfer their learning and make connections. This learning environment enables Māori students to be affirmed as Māori, because their home environment and school environment become compatible (Bevan-Brown, 2005). An integrated curriculum approach that includes Kaupapa Māori in an educational context at the centre provides an environment for all students to excel. Curriculum integration is a culturally responsive pedagogy (Fraser & Paraha, 2002) and facilitates Kaupapa Māori in an educational context because it allows students to bring their own culture to the learning design through co-construction. The co-constructing of the curriculum by the students and teachers in an integrated curriculum enables students to bring all their prior knowledge to the learning, as well as allowing students to use their own cultural lens. As Fraser (1999) said, “In the hands of talented teachers, such a pedagogy engages students in deep level learning which has lasting effects on their views of the world and their views of themselves as active learners” (p.1). Students are active participants with their learning and move beyond student agency (control over own learning) to an interdependent environment which sees students collaborating to further their collective knowledge and the knowledge of their community.

Previous research has indicated that there are different ways to approach and support curriculum integration and it requires a shift in thinking by the teacher. It requires teachers and

students to be creative and for teachers to allow students more autonomy with their learning (Beane, 1997). It is the autonomy that students have through the building and creation of knowledge, through a concept-based curriculum, which makes it student agentic and culturally responsive. For teachers to learn and develop their skills with curriculum integration using a concept-based curriculum and pedagogies such as student-led inquiry and project-based learning a strong Community of Practice can be a useful system. A Community of Practice can provide support for teachers working together and building a community within the school to support each other making the necessary changes to their practice in a supportive environment.

The literature shows that it is important when a school or individual teacher undertakes curriculum integration that the school leadership team and curriculum leaders support this approach with a sound pedagogical knowledge base (Jellyman, 2015). Curriculum integration has at its basis a power-sharing dynamic when students are part of designing the learning which makes it is culturally responsive (Fraser, 2013). The literature affirms that the integration of subjects is culturally responsive and enables students to understand how they learn as well as to create knowledge in a high school environment. The success of an integrated curriculum approach for students in New Zealand is still in the early stages. Schools that have adopted curriculum integration are using a multidisciplinary or interdisciplinary approach rather than the transdisciplinary approach, but there are currently no academic research or case studies on these school and their experiences. The integrated curriculum model enables schools and teachers to design learning programs that can move along the curriculum or to choose to design a school curriculum based on where the school feels comfortable on the continuum and meet the needs of the students, whānau/family and community.

The gap in the research is the lack of case studies that help or show teachers how to design an integrated program for their students based on research for both how we learn, and the skills and knowledge needed for students to navigate confidently their futures at the secondary school level. The literature review highlights the complexity of curriculum design that ensures not only students gain the PCK and CK but will develop 21st-century skills to assist with knowledge advancement, is culturally responsive, agentic, and based on the advances in the science of learning and meets the requirements of the New Zealand education system.

The purpose of this case study is to provide an explanation of how one school is moving from a traditional model of instruction to a future-focused mode of instruction that provides

coherence across the curriculum through curriculum integration. This case study explores the teacher experiences of designing and implementing a Connected curriculum, and the enablers and constraints of delivering a Connected curriculum across three subject areas, English, Science and Social Studies. This action research case study considers the complexities mentioned above and captures the teacher's experiences of delivering a Connected curriculum with the support and direction from the Senior Leadership Team.

Chapter 3: Methodology and Method

3.1 Introduction

This research follows the journey of a co-educational, urban high school, in the South Island of New Zealand, to develop a future-focused curriculum for Year 9 and 10 students. The methodology used is action research with a participatory component and presented as a case study. The rationale for the action research with a participatory element to the methodology is that the researcher (myself) is the coordinator within the school for the integrated curriculum program, and therefore, embedded in the work studied. The subjects were chosen based on the willingness of the Middle Leaders for English, Science and Social Science teachers to be involved. Year level 9 and 10 were chosen as the curriculum does not have a national assessment such as that at Year 11, 12 and 13.

Positioning of the researcher

The author, at the time of this research in 2019, had been employed at the school for just over a year, and had over 15 years' experience in teaching. It was the author's previous professional experience with curriculum integration as part of her teacher-led inquiries and interest in what support teachers needed that led to this research being conducted. The author had become increasingly interested in student-led inquiries and project-based learning as pedagogies to develop not just knowledge, but 21st-century skills. Knowledge Building pedagogy has underpinned the author's practice since her master's thesis on Knowledge Building pedagogy and then her involvement with the New Zealand Knowledge Building community. As previously stated, the author has been actively involved in the wider teacher community and was increasingly interested in how schools were making the transition from a traditional model of instruction to one that is future-focused.

The catalyst for the research undertaken was to address the changes happening in education within New Zealand, especially curriculum. With the schools in Christchurch that were damaged due to the 2011 Earthquake, there was a need for the rebuilding and establishment of new schools. This new building coincided with the Ministry of Education strategic plan for modern/innovative/flexible learning environments (Charteris & Smardon, 2018). Teachers

were going to be expected to teach in these new learning environments and there was a need to change curriculum design and pedagogical approaches which was going to be challenge some teachers (Charteris & Smardon, 2018). As a teacher in a secondary school in New Zealand, I found that teachers in these new flexible learning spaces needed a roadmap or framework to guide them to design and create changes in teaching and learning. Senior Leadership have also needed to move from a traditional approach to teaching and learning to one that is future-focused. The systems, pedagogies, and curriculum within school in most cases needed to change and I could see schools experimenting with systems such as timetabling as well as teachers experimenting with innovative curriculum design. As a teacher and researcher, I wanted to provide a pedagogical framework that could be adapted into any context, which gave teachers a clear roadmap on design and implementation of curriculum that integrated a range of pedagogical approaches, provided key subject-specific skills and knowledge whilst also building 21st century skills. To create change within a school, as a researcher I felt it necessary to provide senior leadership with an approach that could empower teachers within their schools to create and drive change. It was important to me that this research undertaken could be picked up and used easily within the context of any school.

My position as an experienced secondary teacher in New Zealand influenced the research undertaken as I felt there was a lack of professional development on developing teacher capabilities to easily facilitate the shift from single cell classrooms to modern learning environments. At the same time there was a call on teachers to develop 21st century skills. The knowledge I gained through undertaking my master's degree in education significantly influenced how I understood knowledge. While undertaking postgraduate study, I learnt that teaching was not about filling a vessel but building knowledge to enable students to create new knowledge (Knowledge is discussed section 2.1 and 2.2) My experience as a learner with dyslexia, I found that when learning was applied to a real-world concept, it was agentic and where I could build on the knowledge I already had, that I experienced more success. The culmination of change happening in education and my experiences led me to curriculum integration. Based on the research and readings, I felt confident that curriculum integration, using a concept-based approach, that included innovative pedagogies, a framework could be designed that would support teachers in both single cell and flexible learning environments.

My identity as a researcher and teacher influenced my perspective. I wanted to design a framework based on research that would support those in education in creating a future-focused curriculum. My role as the co-ordinator of the Connected classes informed the research as I

was able to be responsive to the teachers and provide support as necessary. The responsive nature informed me as a researcher in areas that needed further development. My position as a teacher within the school was an advantage as there was a foundation of relational trust to build from. I had a professional relationship with most of the participants involved which I could build on through the Community of Practice created as part of this research. My position as both a participant and a researcher conducting this study informed the methodology. My role, as the coordinator, was to lead the teachers involved, and ensure the development and delivery of the integrated program aligned to the New Zealand Curriculum and the school's values. The research used a case study approach as the research was of how one high school supports its teachers as they transition from a traditional mode of instruction to curriculum integration at Year 9 and Year 10. This research was a case study as the research was based on the 'individual' structure, environment, and real-world context being the nature of the school (Yin, 2014). Schools are microcosms of the community in which they exist, and this research will provide valuable information that other educational institutions can choose to use or adapt for their own context.

3.2 Methodology paradigm

This research was primarily concerned with how teachers designed and delivered a Connected curriculum. However, it was necessary to first find out how the Senior Leadership Team created an environment to foster change. More specifically how the Senior Leadership Team enabled a Connected curriculum to be designed and implemented. The research questions were:

1. How have the Senior Leadership Team created an environment where teachers can deliver a future-focused curriculum, which includes curriculum connection across three subjects
2. How did the teachers implement a future-focused Connected curriculum in a traditional high school?
3. What were the enablers and constraints when implementing a Connected curriculum?

These research questions above examined how Senior Leadership within a school enabled teachers to develop and trial innovative curriculum to create change. Through identifying how the Senior Leadership created an environment for change, this research

examined how teachers designed and delivered a Connected curriculum, and the enablers and constraints they encountered. This case study intended to provide those in education with a practical approach that could be adapted within other schools on how they may choose to undertake and deliver curriculum change.

3.2.1 Action research

Action research has become an increasingly popular methodology for teachers to inquire into their practice to improve their teaching and students' learning (Tripp, 2005). It is a systematic process, which can take many forms but is essentially an inquiry model centred on improving student outcomes through identifying an area of teacher practice to improve. Action research has underpinned my teacher-led inquiries throughout my practice and my familiarity with this methodology was a contributing factor in why I chose it as a methodology for this research. There are numerous inquiry models. However, I used Tripp's (2005) seven-step model, as it allows for an iterative process with steps 4 – 7 being repeated as necessary. The seven-steps are as follows:

1. Identify the problem/issue
2. Collect data around this problem/issue
3. Analyse and interpret this data
4. Develop an action plan
5. Implement the plan
6. Collect data
7. Evaluate and review the success.

Tripp's (2005) model is different from other models such as Mills (2007) four-step model, as it includes Step 5 'Implement the plan' and Step 7 'Evaluate and review the successes. The inclusion of Tripp's Step 5 and Step 7 means the inquiry model becomes an iterative process, rather than linear, leading the person undertaking the inquiry to deepen their understanding. In my work, the 'evaluation of the success' was valuable in working out where to go next with the plan undertaken. The initial inquiry can often lead to more questions, which can then lead to another linked inquiry, known as double looping (Argyris, 2002, p. 206). This research built on previous inquiries I had undertaken as a teacher, and the evaluation and reflection of those inquiries had created multiple loops of learning to culminate in this case

study. As an approach, action research recognises the need to be flexible and responsive, especially as the complexity of real social situations makes it impossible to anticipate everything that could arise (McTaggart, 1991). Therefore, it is both a strength and weakness of action research that there is no wrong way or right way to conduct it.

This research had two distinct parts: firstly, how Senior Leadership and the Board of Trustees created an environment for change to create a future-focused school; and secondly, the design and implementation of a Connected curriculum. I used Tripp's Steps 1–3 and Step 7 when conducting the research that focused on the Senior Leadership Team. The focus of research on the Senior Leadership Team was about examining what the Senior Leadership Team had done to create an environment for change. Researching what actions, the Senior Leadership Team had taken, did not require a plan to implement. However, it was necessary to the research as it provided the background and detailed how I designed and implemented the Connected curriculum. Steps 1–3 of the action research undertaken for this case study could provide guidance for other schools to use in developing an action plan to implement a change in curriculum. The design and implementation of the Connected curriculum required me to use Tripp's seven steps of action research. A clear strength of this methodology was that action research can be used in a variety of settings to examine a variety of issues/problems (Cohen et al., 2007). It was a key consideration of mine that the research I undertook could be adapted and applied to different schools' contexts, using a methodology familiar to teachers. The action research I conducted involved myself as not only the researcher but also as the participant. Being a participant in action research is not unusual and is "often identified as a core feature of action research" (Dick, 2015, p. 434). Because of these multiple roles within the research, it was necessary for me to use a participatory component to the research.

Part of the design of the research was the creation of strong Community of Practice for teachers to build and create new knowledge on how to connect curriculum at Year 9 and Year 10. Action research is concerned with knowledge creation through and for action (Rose et al., 2015), which aligns to the goals of this research and the for the school involved. The knowledge gained from this action research has practical implications as this knowledge can be used to inform the school's Deputy of Curriculum with the future direction of curriculum. Action research with a participatory component involves the participants to not only use an action led by the researcher to make a difference, but to create new knowledge, as these participants draw on their own experiences, reflections, and observations with this action. Action research is

concerned with knowledge constantly developing and this involves the researcher critical reflecting on the actions (McNiff, 2013).

Action research is a methodology based on action, reflection and data collection with the aim, in this case, to present knowledge and experiences of curriculum integration. This enables the participants and the researcher(s) to actively reflect and inquire into their practice (Baum, MacDougall, & Smith, 2006). Reflection and inquiring into teacher practice, is an activity that teachers are familiar with at secondary school as it is like the teacher inquiry cycle as part of their professional development. Timperley's Spiral of Inquiry was used and was where teachers focused on an aspect of their practice by reflecting, gathering data, implementing a strategy, evaluating the outcome of the implementation and then repeating the process. This empowers the teacher to improve their practice (Timperley, Kaiser, & Halbert, 2014). The teachers involved in creating and delivering the learning in the Connected class met face-to-face weekly as a Community of Practice to discuss students regarding student behaviour, engagement and learning, as well as the design and implementation of the learning taking place. Often, in these meetings, the design of learning task would be adapted based on the response of students, student learning needs and teacher observations. The teachers achieved this by inquiring into their practice.

As a participant and researcher, I would ensure in our Community of Practice that all participants would engage in critical reflection to develop our collective understanding. It was necessary for the research that I have dual roles, that of researcher and as a participant, action research with a participatory component as a methodology allows for the researcher to hold both roles. My role as a participant in this research is as the Head of Social Science and the teacher coordinator for the Connected classes, which is a role that involves the oversight of the design and delivery of the course and supporting the teachers, involved. In this research, I used my experiences, reflections, and observations of discussion to develop my understanding. Developing new knowledge on designing and implementing a new pedagogical model for Connected curriculum was my focus as a researcher.

3.2.2 Case study

Researchers in the Social Science fields use case study research extensively. Yin (2014), an acknowledged expert in case study research, explains that case study methodology "contributes uniquely to our knowledge of individual, organizational, social and political

phenomena ... in order to understand complex phenomena” (p. 4). It tends to be smaller in scale, focusing on a specific geographical location or limited by population.

Case study methodology has been seen in the past by some researchers as a weaker methodology or not robust in nature (Yin, 2014). It is the design of the case study that is of great importance if the research is regarded as having a robust methodology (Zainal, 2007). The design of case study research can be either singular or multiple (Yin, 2014). For this research, it was appropriate to conduct a single case study, as the setting is in a school with its own school curriculum. Each school in New Zealand, as discussed in Section 2.1 of the literature review, sets its own school curriculum based on the national curriculum. The curriculum model developed in this case study and its implementation can be adapted by other schools to suit their unique school needs and school curriculum. These considerations are addressed in Chapter 4, Section 4.19. The case study design used in this research has clearly specified research questions, focuses on a small location, that of an urban high school in New Zealand. The participants were clearly defined and limited, focusing on the Senior Leadership Team involved with change, the three teacher participants, and myself as coordinator. The complex phenomena that needed understanding was the complexity of curriculum design and implementation of a Connected curriculum across three subject areas.

There are several strengths to using a case study methodology including the flexibility in its design. Yin (2014) discusses that both quantitative and qualitative data can be used, and some case studies can be completely derived from quantitative data. In this case study, the data gathered was qualitative in nature using interviews and questionnaires.

3.3 Approach and data collection methods

The research examined how one co-educational, urban, high school supports teachers as it transitions their curriculum from a traditional approach to an approach, which saw the integration of three subject areas: English, Science, and Social Studies. The qualitative data gathered involved using a variety of tools including unit and lesson plans, interviews and questionnaires with teachers, and transcripts from meetings. It also included interviews with members of the Senior Leadership Team and the Board of Trustees.

The purpose of interviewing the Senior Leadership Team and Board of Trustees was to examine the actions the school has taken up to the point of interview. To find out the processes to date on how the school was moving from offering a traditional mode of instruction, based

on individual subjects, to a curriculum integrated across three subjects (Science, English and Social Studies). It was the result of decisions and the vision of the Board of Trustees, in conjunction with the Senior Leadership Team, which created this shift. Including the Board of Trustees and the Senior Leadership Team, this research provided an opportunity to include the differences in perceptions of priorities as experiences of implementation between the researcher, teachers, and the Senior Leadership Team.

Action research was used as a methodology to gain new understandings of teacher experiences of curriculum integration. Action research also provided a method to address issues and problems around collaboration that may arise through reflection on and discussion by the teachers of the class and the researcher (Von Pressentin, Waggle, & Conradie, 2016). The results of this research study aimed to underpin and inform any changes made to the curriculum-integration model implemented in Years 9 and 10.

3.4 Ethical considerations

The University of Canterbury, Educational Research Human Ethics Committee (ERHEC) granted ethics approval prior to the commencement of the study (see Appendix A). The teacher participants for this research were identified from a class the researcher was not teaching to address the potential for a power imbalance as discussed in Section 3.4. The teacher participants, Senior Leadership Team, and Board of Trustees were invited to voluntarily participate in this research. As a professional member of the same school and as the coordinator of the Connected classes, it was necessary to seek permission from the Board of Trustees, of which the Principal is a member, to use the school as a case study. The teachers, principal, deputy principals, and the Board of Trustee member were invited by letter to participate in the research as part of the ethical obligations. Besides the Principal, one other member of the Board of Trustees agreed to be interviewed. One of the key roles of the Board of Trustees in New Zealand is to provide strategic leadership on the future direction of the school (NZSTA, n.d.). It was for this reason that I wanted to interview a Board of Trustees member besides the Principal.

3.4.1 Confidentiality for participants

The researcher has endeavoured to protect the participants' anonymity as far as possible in this study, but the nature of the research means that there are limits to this and, thus, complete

anonymity of participants cannot be guaranteed. Confidentiality of people's names and placenames in the reporting of the research were protected as far as possible. The school and participants have not been identified by name and details that may identify the school or participants have been minimised as much as possible. The names of participants have not been used in the research. However, it was impossible to provide complete anonymity, as participants are identified based on their position within the school, for example, Principal, Board of Trustee member or by subject area, such as, Science Teacher.

3.4.2 Issues of power and coercion

As the researcher, I recognised that there was a power relationship within the school and with the researcher (myself), as a teacher at the school, who worked with the participants as the coordinator of the Connected classes. This power relationship issue was mitigated as much as possible by selecting a class to research, which the researcher does not teach, but I did have a professional working relationship with the teachers as the coordinator. As the researcher, I recognised the possibility of social or psychological risks (e.g., being watched/judged) in that the researcher was the coordinator of the Connected class team. However, the 'teaching as inquiry' process and feedback on teaching by other teachers/lead teachers are established processes in New Zealand schools.

Due to my dual roles, there was a need to reduce the potential power imbalance in this research in several ways. The main way I addressed the power imbalance as the Head of Social Science and researcher, was that I removed myself from being the in-school appraiser of participants. Appraising staff is also part of my role as Middle Leader and Head of the Social Science Faculty and appraisal is part of the promotion process. While the school had two Connected classes running during this time, the Connected class that I was not teaching was used for the research. By not using the class I was teaching, I could limit my participating role in the Community of Practice for the class that I did not teach. In order to minimise and manage the risks of participants feeling that they were unable to speak honestly about their experiences, the researcher did not lead the team meetings. Instead, the other two teachers nominated the English teacher as the 'team leader' and, therefore, ran the meetings. During these meetings, the researcher was involved as the coordinator of the integrated class and participated in sharing knowledge of curriculum integration and curriculum design.

In this research, the participants and researcher knew each other, and a level of relational trust already established and developed further. For systems and guidelines for the Community of Practice to function effectively, transparency needed to be established with a focus on effective communication between the participants and researcher. This research involved gathering information from a variety of sources and there were ethical considerations around gaining consent. It was important to gain consent from all participants. All participants were made aware that they had the ability to withdraw from this research at any time and participation was voluntary. All participants were anonymous, and identifying information, as much as possible, was removed to ensure anonymity. All participants were informed as to how the data would be collected and for what purpose. It was important to ensure the security of the data collected and to have systems in place.

The researcher was the appraiser of one of the teachers involved. In this instance, the teacher was given the choice to have a different appraiser or could choose to remain with the researcher and only have classes not relating to the research included in the appraisal observations. The participant chose to remain with appraiser/researcher and had observations from their other classes used in the school appraisal process. The Deputy Principal of Curriculum also approved this decision. Participants were advised that the Deputy Principal of Curriculum (who is the researcher's line manager) was the person they should approach for any questions or issues that might arise throughout the data-gathering period. Participants were informed their participation was completely voluntarily. They were also advised that not participating would not influence possible opportunities within the school. Participants were made aware that they could stop interviews at any point, to take breaks and had a choice to answer a question or not.

3.5 The School

As mentioned earlier in this chapter and in Chapter 1, this action research had a participatory component, as the author of this research was a teacher employed by the school involved. The author's primary role at the school is Head of Department, with the additional role of coordinator of the Connected curriculum program.

3.5.1 School Character and Culture

The culture of a school encompasses its history, character and vision for the future. The school in this case study is a central city high school in New Zealand. The mandate for this school's

original establishment was to “provide an education for students who may not otherwise access mainstream education” ([Name of School], 2017). This original mandate was part of the reason that in 1996, it became a designated special character school, under section 156 of the Education Act (New Zealand Government, 1989). This means that the school must have a character that is different in some way to ordinary state schools. To disclose the special character of the school would be to reveal information that would make the school involved in this research easily identifiable, for that reason I have omitted the special character of the school. Because of the designated special character of the school, the spread of students through the year levels is unique. The roll for the school sits at 2300 full- and part-time students with over 56 different nationalities enrolled. The junior school is specifically limited to a relatively small size compared to the senior school with only 125 students at each of Year 9 and Year 10.

A broad curriculum, offered for both Year 9 and Year 10, with core subject and specialisation pathways for both full-time and part-time students. The students entering Year 9 come from approximately 40 schools for various reasons. This school, in addition, is unique in that there are no school bells, no school uniform, and teachers are referred to by their first name. The school values diversity and wellbeing, from the classroom right through to school policies and positions (at the time of the interviews) such as the Deputy Principal for student wellbeing and a Deputy Principal for staff wellbeing.

3.5.2 The participants

This research involved two groups of participants. Firstly, the Senior Leadership Team and Board of Trustees. These participants were the Principal (who is also a member of the Board of Trustees), the Deputy Principal of Curriculum, the Deputy Principal of Wellbeing, and a single member of the Board of Trustees. The second group of participants was the teachers involved in the design and implementation of the Connected curriculum. These three teachers, profiled in Table 5, had a variety of teaching experience and a range of experience with connecting the curriculum either within or across subject areas. While pseudonyms were considered, I made the decision to refer to the participants by their role or subject area. The rationale for this was that because the role or subject a participant had been a significant piece of information for the research, referring to the participant by a pseudonym would not add additional anonymity.

3.6 Data collection methods

The main sources of data were from the weekly observations and participation in the weekly planning meetings by the three teachers and the researcher as the coordinator of the Connected class. Data also included the online communication documented through Microsoft Teams, two questionnaires (Appendix E), and two interviews (Appendix E), one conducted in 2019 and another in April of 2020. The Senior Leadership Team and one member of the Board of Trustees had one interview on their role within the school to create and foster change and innovation.

3.6.1 Weekly planning meetings

The three teacher participants and the coordinator (researcher) of the Connected classes met face-to-face once a week. These meetings were part of the Community of Practice, which typically took 30 - 45 minutes. The coordinator would take notes and list of next steps in relation to the planning and design of the unit plan and student tasks. The coordinator was also responsible for disseminating the knowledge on concept-based curriculum, student inquiry and project-based learning to the teachers involved in the Connected program.

Table 5

Profiles of teacher participants in the Connected class

Teacher	Profile
A: English	<ul style="list-style-type: none"> • Experience teaching in intermediate (Year 7 and 8s) for three years and 14 years at the secondary school level (Years 9–13) • Seventeen years teaching experience • Taught a range of subjects including, English, History, and Media Studies • Appointed Specialist Classroom Teacher 2019–current • Form Teacher for the Connected class involved in this research

B: Science	<ul style="list-style-type: none"> • Second year beginning teacher in 2019 • Specialist science subject Biology <p>Science teachers must collaborate across specialist areas to design and deliver junior science programs, as they include learning from Physics, Chemistry, Biology and Earth/Space Science.</p>
C: Social Studies	<ul style="list-style-type: none"> • Newly appointed to the school in 2019 • Four years secondary teaching experience in NZ • Experience teaching primary and secondary students • Experience teaching in Japan as an Assistant English teacher in four primary schools and a Junior High school for 4.5 years from 2009–2014

As the coordinator of the Connected classes and with the teachers' permission, I kept minutes of the weekly meetings to inform teachers what had been discussed as well as using the minutes to inform the findings of this research in Chapter 5. The English teacher (who was also the class Tutor teacher) was nominated by the Science and Social Studies teachers at the first meeting in January 2019, to be the team leader. The team leader oversaw the running of the face-to-face meetings and was the first point of contact for the other two teachers in relation to pastoral care of students and questions on the current teaching and learning program. This was in line with current school systems where the Tutor teacher was the first point of contact should another subject teacher have any concerns regarding any students. The data from these meetings included minutes that kept a record of the planning for the teaching and learning units, ideas and questions that arose.

3.6.2 Online communication

The school uses Microsoft Office 365 and the key feature of this software used is Microsoft Teams, as an online learning management system (LMS). All teachers and students within the school use Microsoft Teams, with each user gaining access through a school single sign on username and password. The coordinator of the Connected classes created a Microsoft Team called 'Connected Teachers Only'. This was a 'Team' which students had no access to and where teachers could communicate and collaborate online. Each Microsoft Team had a

series of channels with the ability to store folders and files and have collaborative online discussion through the Chat or Conversations function.

In between the weekly face-to-face meetings, the three teacher participants and coordinator would communicate online to share their lesson planning and next steps. The coordinator of the Connected classes would develop the first draft of student inquiry projects, rubrics for evaluating student learning and unit plans. Any questions, successes or issues that arose for the three participant teachers was shared online through Microsoft Chat. I have been able to go back through the online communication from 2019 and 2020 and refer to the experiences of the teachers, looking at questions and solutions that arose. This formed part of the data analysed. The data from the online communications was useful in analysing how the teachers collaborated both face-to-face synchronously and online asynchronously.

3.6.3 Questionnaires

Questionnaires (see Appendix E for questions) were conducted with the three teacher participants to gain knowledge and understanding of their experience of collaborating to deliver an integrated program. The first questionnaire conducted in November 2019 was to gather baseline information, such as, *“How long have you been teaching?”* and *“Have you collaborated with teachers before, within or across departments? Please explain.”* The purpose of the questionnaire was to capture the teachers’ previous experience of teaching and with curriculum integration as well as their understanding of curriculum integration, for example, *“What is your understanding of curriculum integration?”* The teachers involved in this research had been teaching in the Connected class since February 2019 and the questionnaire asked, about the teachers’ experience between February and November 2019, with questions such, *“What systems for collaboration with the teachers has worked well to date? Explain.”*

In April 2020, when the students were in Year 10 and at the end of the data-gathering period, a second questionnaire (see Appendix E) was also completed. The questions in this questionnaire were to see how the teachers involved understanding of curriculum integration had changed, for example, *“What is your understanding of curriculum integration?”* and how the teacher participant’s understanding had changed over time: *“How has your understanding of curriculum integration changed or developed over the course of delivering this integrated class?”* The questions were designed to try and capture the participants’ viewpoints on the

positive and negative aspects of delivering a Connected curriculum, the support the participants felt were necessary, for example, “*What systems or supports do you think are necessary for collaboration with teachers?*” This final questionnaire delved into what the student experience was based on the teacher judgements: “*What is your understanding of the student experiences with curriculum integration?*” Students had not been part of this research; however, teachers had conducted several student questionnaires based on the student experience throughout the year. I wanted to be able to include the teachers’ perceptions of the student experience.

The Board of Trustees were also invited, via letter, to complete an interview (Appendix D) to gain information on their involvement and perspective on the future direction of education at the school. Only one member of the Board of Trustees was willing to be involved, preferring to be interviewed rather than completing a questionnaire. The questionnaire comprised of only two questions and after email correspondence, an interview was conducted and audio-recorded based on those two questions. In New Zealand, the Principal is a member of the Board of Trustees and had participated in an interview as a member of the Senior Leadership Team, so was not asked to complete the questionnaire.

3.6.4 Interviews

The researcher conducted interviews with the three teacher participants, the three Senior Leadership Team members, including the Principal, and one Board of Trustees member. However, during the interview with the Board of Trustees member, it was discovered that they had not participated in the Education Brief. One of the key roles of the Board of Trustees in New Zealand is to provide strategic leadership on the future direction of the school (NZSTA, n.d.), and it was for this reason that I wanted to interview a Board of Trustees member besides the Principal. The Education Brief is a critical document in this research as it provides a clear picture of why the school was first established, the current special character, how the school has in the past and operated at the time, and the vision at the time for the future direction of the school. The Board of Trustee member willing to be interviewed was absent from the Board of Trustee workshops in 2018 around the future direction of the school and therefore unable to answer the two questions regarding the process.

The Senior Leadership Team and Board of Trustees were interview once as the information gathered focused on what the school had done to date in creating a future-focused direction. The focus of these interviews related to the position the participant had within the

school. For example, the Principal was asked, in relation to the Education Brief, *“to discuss the move from the traditional subject structures, to more project-based or thematic. What was the thinking behind that at the time?”* Whereas the Deputy Principal of Wellbeing had questions that related to their role around staff wellbeing, such as, *“And in regards to the staff wellbeing? Because implementing new is really tiring, so what advice [do you have] around that?”* All members of the Senior Leadership Team were asked about the future direction of the school, the steps that were undertaken, and what they saw the next steps to be.

The interviews with the teacher participants were conducted in November 2019 and April 2020 and built on the responses from the questionnaires and enabled the teachers to further elaborate on their experience. This was achieved through the duplication of some questions from the questionnaire, such as, *“What’s your experience so far with curriculum integration?”* Questionnaire questions such as this were designed to provide me with the opportunity to ask questions in response to the interviewee's response. The questionnaire questions were designed to delve deeper into the teacher’s experience, for example, finding out about the frequency of meetings, *“During each term, the teachers met once a week; was the frequency of the meetings sufficient, valuable, good use of teacher time? Any other comments on that?”* The interview allowed questions to be specific to the subject area: *“What has been a particular challenge regarding planning and implementation of the program? ... you use the science capabilities ...”* or *“With teaching the integrated and then teaching your normal English, has there been anything that's flowed from the integrated into your other classes, or do you tend to teach them both in a similar way?”* The final questionnaire focused on the individual teacher’s experience. *“At what point did it start to click for you, where you felt, okay I've got a handle on this?”* and on advice for teachers undertaking this type of curriculum delivery by asking the question, *“what advice [do you have] for either schools or teachers wanting to implement and integrate a curriculum?”* The interviews provided an opportunity to discover what units of learning worked well with the students and why, how these teachers planned the teaching and learning units and evaluated student learning. I interpreted the interview data by creating tables with key themes, such as planning, positive, negatives, and evaluating student learning, to analyse the data.

Interviews were held at a time agreed by mutual agreement in a room free of interruption, usually in the teacher’s classroom or office. The interviews were audio-recorded and then transcribed. Participants were provided with a copy of the transcribed interview and

given the opportunity to remove or add to the transcript, either electronically by track changes or by using pen on a hard copy.

3.6.5 Role of the coordinator for the Connected curriculum

As the coordinator of the Connected curriculum, and in my role as a participant, I gathered a range of data to inform the design and delivery of the Connected program. Meeting minutes were kept for each class from the weekly face-to-face meetings and for any additional meetings. As coordinator of the Connected classes in 2019, I held four meetings for all Connected teachers with the focus on professional development for teachers involved in the Connected classes. Minutes and resources, such as lesson ideas, lesson plans, and planning documents were kept of these meetings. The Covid-19 lockdown in 2020 prevented the professional development meetings running in Terms 2 and 3. In Term 4 of 2020, another meeting was held to gather the feedback and experiences from all teachers involved in the research to continue the iteration of the design of the Connected program. This was done to explore what were non-negotiables in delivering the program, what the constraints and enablers of the program to date were, this meeting was video recorded for the school to use and all teachers in this meeting consented verbally to the recording. This recording was shared in the Teacher Only Connected Team for other teachers interested to view.

3.7 Summary

This chapter has outlined the methodology of the research and the ethical considerations. This case study, using participatory action research design, has been detailed and the underlying power dynamics through using this approach have been addressed. The position of the researcher as an active participant has been explained. The recruitment of the participants has been detailed. The data gathered consists of a single interview with the Senior Leadership Team based on their role within the school. The teacher participants completed two questionnaires and interviews. Further data has been gathered from the weekly face-to-face meetings, online communication, planning and delivery of the units of learning, and minutes taken from professional learning meetings. This data has informed the Connected Curriculum Learning Design Framework and the design and delivery of the Connected program at this school. An outline of how data was gathered has been provided.

The findings have been organised over the following three chapters with each chapter focused on a different research question. Chapter 4 will examine in detail, the Senior Leadership Team's approach to creating an environment where teachers can be innovative with teaching and learning programs. Chapter 4 will provide a detailed analysis of the relevant data gathered from the individual interviews with three members of Senior Leadership. The considerations for schools designing and implementing change will be discussed in Section 4.19 by exploring school Character and Culture, systems, pedagogy and curriculum. The Senior Leadership interviews conducted were based on the role the senior leader had within the school and their role with developing the Education Brief, which details the systems and processes the school has used in the past and the potential future direction of the school. The Connected Learning Design Framework I designed will be explained in detail in Chapter 5. The Connected Curriculum Learning Design Framework has been designed using data gathered from the literature review as well as data gathered from weekly meetings, meeting minutes, and online correspondence from teacher participants to inform how this new pedagogical framework designed. Chapter 6 focuses on the teachers' experiences of the design and implementation of the Connected Curriculum Learning Design Framework. The importance of a strong Community of Practice is discussed in Chapter 6. Data in relation to the Community of Practice is based on how three teachers collaborated and delivered the Connected curriculum, using interview and questionnaire data from the beginning and end of the research, and data gathered from meeting minutes, and online correspondence, which will be fully analysed and explained.

Chapter 4: Findings – Creating an Environment for Change

4.1 Introduction

The Findings are divided into three chapters to represent three key research questions. Firstly, this chapter explores how the Senior Leadership Team created an environment for change. The chapter focuses on addressing the research question, “How have the Senior Leadership Team set about implementing a future-focused curriculum that includes curriculum connection across three subjects. The second findings chapter examines the design of the Connected Curriculum Learning Design Framework and, the third findings chapter looks at the collaboration and implementation of the Connected Curriculum Learning Design Framework with the Connected class.

This first findings chapter addresses how the Senior Leadership Team created an environment that enabled the school to transition from a traditional model of instruction to one that is future-focused. The Senior Leadership Team’s approach to creating change and becoming future-focused provided the environment for me, as a teacher and researcher, to design and implement a Connected curriculum at Year 9 and Year 10. Chapter 4 will provide an analysis of the data from interviews with the Senior Leadership Team to address this first research questions.

To provide clarity on the steps the Senior Leadership Team took in the transition from the traditional mode of instruction to future-focused education. Table 6 provides a timeline of the significant contributions of the Senior Leadership Team in the process this school took, and that I took as a participant in my role as a Middle Leader and the coordinator of the Connected learning program. The starting point for the change to curriculum integration in this research was the design of the Educational Infrastructure Brief (referred to as the Education Brief) in 2017. The Education Brief document was instrumental in reviewing past and current systems to establish the future direction of the school.

Table 6**Timeline of overview of significant points by the Senior Leadership Team and coordinator**

Year	Senior Leadership Team (SLT)	Coordinator (Me)
2017	Education Brief is created and published Pilot programs are running, e.g., English and Te Reo.	
2017	Current Head of Faculty (HoF) Social Science retires, school advertises for new HoF with an interest with collaboration and curriculum design to work with other subject areas. Pilot programs continue to run, English/ Te Reo, Social Studies and English	Apply and appointed new HoF for 2018
2018	Term 4: Over 60 students want to opt-in, SLT decided on two classes for 2020. Meeting to discuss additional three teachers with SLT and Coordinator, form teachers chosen. Staff timetabled into classes. An attempt is made to try and co-ordinate non-contact time for teachers to meet. This works for one of the Connected classes One double for each subject a week is timetabled.	Term 2 work I collaborate with the English teacher to design and deliver an integrated unit of work with a Year 10 class. Term 2 I submit a proposal for an integrated class for Science, English and Social Studies using the Sustainable Development Goals – already spoken to Heads of Department (HoD) of English and Science Term 4 speak to incoming Year 9 families about the opt-in Connected class at Year 9 in 2020 through to end of Year 10 in 2020. Inquiries and projects are part of the design of the course, based on the literature research I had undertaken.

Year	Senior Leadership Team (SLT)	Coordinator (Me)
2019	<p>Term 3 discussion on Connected for 2021, decision for one Year 9 class = total of three Connected classes – one at Year 9 and two at Year 10.</p> <p>Term 4 incoming students interviewed and opt – is based on willingness to collaborate.</p> <p>Staff are selected to teach this class based on interest after discussion with HoD.</p>	<p>Based on feedback from teachers, a criterion for 2021 new cohort is the willingness to collaborate with others</p>
2020	<p>Term 3 decision for 2021 and future direction of the program meeting with me.</p> <p>Building teacher capability by selecting teachers into the new two Year 9 classes (one at Year 10) who have not previously taught them.</p> <p>Decision to roll out connected learning across all Year 9 in 2022.</p>	<p>Term 4 meeting with all Connected teachers on positive and negatives, and gain advice for moving forward, video-recorded for future reference.</p>

The Education Infrastructure Brief (referred to as the Education Brief), a requirement by the Ministry of Education for any school in New Zealand undertaking a new infrastructure project, was created. The Education Brief has two sections with Section A outlining the character of the school, aspirations of the project, how the school operates and the link between pedagogy and learning space, while Section B relates to the details for the project such as budgets, funding and project scope (Ministry of Education, 2021c). In the development of their Education Brief, the school involved several key stakeholders, the Principal as the lead writer, the Senior Leadership Team and Board of Trustees as the lead group, and a representative group in the school, as well as consulting with members of the school community (Principal, Interview, 2019). The Deputy of Curriculum attributes the details of the Education Brief with the questions raised by the Navigator (the Navigator is the person appointed by the Ministry of

Education to support the school with the Education Brief) to examine in depth the changes the school wanted to make:

The school's philosophy and then mapping how that could be more future-focused and to lead us into the building process... [Name of Navigator] was very helpful; they were good at asking the tricky questions. It really made us examine what we were doing. It made us look at programs and at timetabling and all sorts of things beyond just looking at what buildings might look like, and what might go on in them. (Deputy Principal of Curriculum, Interview, 2019)

The Education Brief continued to provide a reference point for having a cohesive approach to the future direction of the school. There were also a few current systems, like the timetable and junior curriculum, which had not changed at this school in over 25 years (Deputy Principal of Curriculum, Interview, 2019). The Principal saw this as an opportunity to have a “stronger focus on key competencies/transferrable skills” (Interview, 2019) and to break down the single-subject structure of curriculum: “We felt quite rightly that we were quite siloed and traditional in the way we'd approached the curriculum” (Interview, 2019). The Principal, and those leading the writing of the Education Brief, “saw this as an opportunity, not to say we're just going to keep doing what we're doing thanks, but to certainly put out there what we saw as desirable practice” (Principal, Interview, 2019). The Senior Leadership Team used the process of creating the Education Brief as the critical starting point of change in how the school could become future-focused.

For over a “quarter of a century” (Principal, Interview, 2019) the school had used a structured curriculum, based around individual subjects. Students moved through the week on a timetable structured around core subjects, Mathematics, English, Science, Social Studies, health and physical education and optional subjects, such as Dance, Art, Digital Technology, and Cooking. Each subject area had a Head of Department or teacher in charge that would lead the curriculum for that subject area. Learning was isolated to subject departments and rarely was there a connection across the subject areas. The school operated two timetables, a timetable for junior students in Years 9 and 10 and a senior student timetable for Years 11–13. A key difference between these two timetables was the junior students had single one-hour periods and senior students had double periods of two hours duration (Education Brief, 2017). The challenge for this school was where and how to implement the change identified in the Education Brief.

A key message that has come through from the interviews with the Senior Leadership Team was not to “*mandate change*” (Deputy Principal of Staff Wellbeing, interview, 2019), but rather to take an approach which created “*pockets of change*” (Principal, Interview, 2019) within the school. The Principal and the Deputy Principal of Curriculum encouraged staff to put forward ideas for pilot programs on curriculum integration. The Principal preferred to use the term

Pilots, and I think that’s an important term ... pilots were significant in that they allowed us to experiment and see, are these valid ideas.... We’ve often overstaffed those [pilots] to let them happen so there’s a consequence, an implication with that, but it’s a considered decision ... I see them as highly significant ... here are opportunities to do more of this or to branch into new areas. It’s so important and it’s like a penny in a pool effect that really... if you wanted to backtrack and map things onto why we are doing it this way, it goes back to a lot of those pilots. It’s actually hugely influential. (Principal, Interview, 2019)

Any teacher from any area of the school could put forward a proposal for a pilot program and the school did its best to provide the resources including staffing, “*often at a cost*” (Deputy Principal of Curriculum, Interview, 2019). The pilot programs that the school implemented between 2017 and 2020 focused on curriculum design that was future-focused, created connections between subject areas and based on developing student transferable skills. The development of pilot programs involves developing teacher capabilities and a willingness to examine current pedagogical practice for teachers to try a different approach. Shifting teacher belief and pedagogy is not without its challenges, which the Deputy Principal of Curriculum in their interview (2019) identified as a key problem:

I think one of the problems you have in a big organisation like ours, because we’ve got a department structure, you’re really dependent on the leaders of those departments to progress development or professional development in the way that you want it to be progressed.

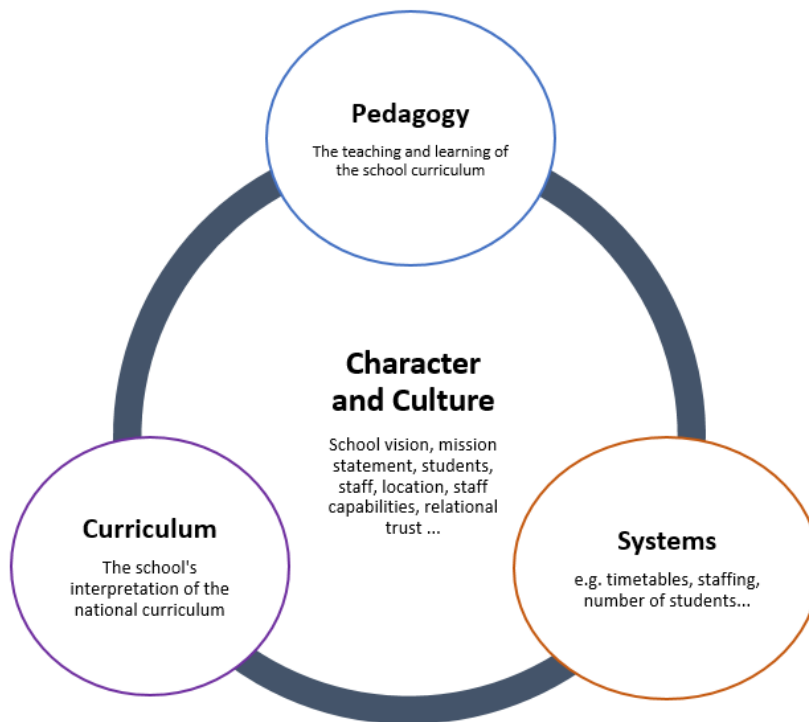
The school in this case study was purposeful in the hiring of new staff to help drive the change in approach to curriculum. The job advertisements mentioned themes, such as teacher collaboration and connecting curriculum, and included a copy of the Education Brief. This had led me to apply for the position of Head of Social Science’s at this school in November 2017. The Senior Leadership Team were explicit in the desire to have teachers collaborate and

connect across subject areas, which was an area I was interested in and researched. After my appointment, I expressed an initial idea of collaborating with Head of English on a unit of learning in 2018 as a first step. The Senior Leadership Team ensured that the Head of English and I had the same Year 10 class in our timetable. This was an initial pilot program that was the precursor to the pilot program for the Connected classes in 2019–2020.

4.2 Character and Culture

This research found that the school in this case study had reviewed the current Character and Culture of the school. The understanding of the school's history and current position was significant in the approach by the Senior Leadership Team in how they created an environment for change moving from a traditional school to becoming future-focused. Schools are unique and can be a microcosm of the local community in which it is located. The uniqueness of a school is based on the people within, the students, the teachers, support staff and wider community. Over time, the Character and Culture may change. This could be due to such things as changing demographics in the area and turnover of staff, because it is the people who make up the Character and Culture within a school. These people can also be seen as the variables. The variables being the reason any change should take place and who have the capacity to design and lead this change. By having a clear understanding of the Character and Culture of the school and the future direction, it is then possible to examine and plan for change with the other three components: systems, curriculum and pedagogy. Figure 8 visually represents how the four components are connected, with an emphasis on Character and Culture. Changes made in any one component will then affect the Character and Culture of the school.

The school wanted to provide students with future-focused learning, creating a change in curriculum from single-subject learning to connected learning across discipline areas, wanting teachers to develop innovative pedagogies and transferable skills and changes to the timetable structure. The school created an environment for change by using the pilot programs and understanding the role of Middle Leaders in driving change.

Figure 8**Four components of a school****4.2.1 Senior Leadership Team and the use of pilot programs to create and drive change**

According to the Deputy Principal of Curriculum, the school had, “*tried out different models, different ways of working*” (Interview, 2019). These different models of working had been designed by teachers at the school and termed ‘pilot programs’ by the Principal. While the Senior Leadership Team and some teachers had visited a range of schools, this school recognised the importance of contextualising the models used. I agree with the DP of Curriculum that schools need to develop a model that works well for the individual school’s context, culture and ethos. These pilots, in the opinion of the Senior Leadership Team, have been key in allowing the school to develop a pathway into what future learning design could look like for their school community. By experimenting with different models to see what worked best for this school, the Deputy Principal of Curriculum could see it was “*changing thinking*” (Interview, 2019). The teachers working in the Connected classes and in other pilot programs were:

Having a bit of a ripple effect and teachers are starting to think, ‘maybe I could try that’’. The positive consequence is that teachers are becoming more open to

trying new ways of delivering their programs. At a middle leadership level, Heads of Department are exploring new models and ways of working within their departments. The Senior Leadership Team, instead of mandating change, are empowering their staff to develop their learning and try implementing new curriculum design and pedagogy. This has created “pockets of change which over time are growing bigger.” (Principal, Interview, 2019)

This distributed leadership model, where teachers, regardless of position within the school, could design and deliver learning programs that were not currently part of the school curriculum fostered relational trust. This trust enabled teachers to feel empowered to try something new based on their professional judgement and the interests they had based on their own research.

These pilot programs demonstrated the agility needed to navigate through change. By having teachers present options for new pilot courses, it actively promoted the idea of collaboration between teachers and subjects. Towards the end of Term 2, teachers met with the Senior Leadership Team to put forward ideas for the following year. This allowed time for discussion around how it might affect school systems and the delivery of the curriculum. Applying for funding to help facilitate the pilot programs was key and enabled programs where there were two teachers in one class such as collaborations between Art and Technology, and te reo Māori and English. However, some of the pilot programs had been overstaffed and the Principal saw this as *“a considered decision ... as they are highly significant ... here are opportunities to branch into new areas ... these pilots are hugely influential”* (Interview, 2019). Pilot programs had enabled teachers to try new ways of delivering the learning, which gave a high degree of autonomy to the teacher while encouraging agility rather than a fixed approach.

However, just because a pilot program had been implemented or was successful does not mean it became a permanent fixture in the school curriculum program for the near future. Pilot programs had been encouraged by the Senior Leadership Team as a method to find a model that worked for this school and to develop teacher practice. The Principal, in his interview (2019), stated that he saw pilot programs as a *“considered decision”* that allowed teachers to *“experiment”* with courses being offered throughout all year levels. The Senior Leadership Team took a holistic approach rather than a staged approach. A staged approach would have had clear timelines and what the change being implemented would look like with teachers

being told what to do and when to do it. Instead, the Senior Leadership Team was interested in the teachers shaping the change based on the teachers' capabilities. The Principal said, “*We’ve looked for people [both within the school and with new appointments] who can deliberately span learning areas and quite intentionally do that ... the goal is to have teachers think of their role as a teacher*” (Interview, 2019) beyond their subject area. Change was seen as being about enabling teachers to be innovative in their approach to curriculum design based on their professional knowledge and experience. Developing change through pilot programs was seen as being developed by ‘coalitions’ of teachers who also implemented what they were working on. The Principal in the interview described how the Senior Leadership Team valued and encouraged coalitions:

Coalitions of the willing, that’s the way we’ve always pitched this is (pilot programs) are driven by others, although, and when I say others, I’m not just talking about a senior team here. It’s always people with the aptitude, the interest, the initiative, and the sustainability, to put things into practice. Our [SLT] job is to identify those people and encourage coalitions to form if they haven’t done already. Clearly, in the ripple effect, you want to promote experiences as in more people. That’s significantly important. (Principal, Interview, 2019)

In saying this, the Principal recognised the importance teachers play in whether the pilot programs were a success or not. The Principal recognised the importance of giving autonomy to the teacher/s to trial new programs without making it compulsory helped to drive success:

The worst things happen through compulsion and if things don’t happen, they just don’t work; you get resistance; you get people that will undermine, either intentionally or unintentionally, who’ll just do a mediocre job and initiatives fail. (Interview, 2019)

When a school mandated change, there was the potential to plan for the change and anticipate systems that might need adjusting. A school that was taking a more fluid approach by empowering teachers to design and trial new programs needed to work within the current systems, or the school needed to examine ways to change systems without impacting hugely on the day-to-day running of the school. If a Senior Leadership Team, like the one involved in this research, was willing to overstaff a program or course, this came at a financial cost to the school. Schools in New Zealand have an operational budget and staffing based on the number of students within a school. The Senior Leadership Team in this research was willing to overstaff the Connected classes in 2019. The Senior Leadership Team made the decision to

reduce my teaching load by four hours to provide time to design, implement and support the staff involved in the Connected class. This overstaffing meant that the Senior Leadership needed to pay another teacher to take one of the classes for four hours a week.

4.2.2 Considerations for schools implementing and responding to change

There are several considerations a school or educational institution needs to address when creating an environment where innovative change can take place. The main considerations schools focus on are systems, curriculum, and pedagogy. Systems are related to the day-to-day running of a school, such as the timetable, staffing, students enrolled, and so forth. The curriculum is how the school in New Zealand chooses to implement the national curriculum. Pedagogy is about how the teachers design and deliver the school curriculum in the classroom. These three areas interconnect, with an impact in one area influencing another. For example, a system, such as a timetable, can influence the teacher's choice of pedagogy in delivering the curriculum because they have limited time. The fourth area, in my opinion and based on this research, is a key factor influencing how a school designs and delivers the curriculum is the Character and Culture of a school. The Character and Culture of a school, including the classroom level, is key to the success of changes a school or teacher undertakes. The Character and Culture of a school or classroom are essentially the people involved, who they are, their capabilities, relational trust, capacity, and so on.

4.2.3 The role of Middle Leadership

The school in this case study, much like several New Zealand schools, is organised into curriculum subject departments, with each department having a Middle Leader, usually referred to as the Head of Department. These leadership roles have permanent management units attached to them with time allowances. Schools in New Zealand are allocated a few fixed-term units for positions within the school for positions that are short-term. These fixed and permanent management units have a monetary recognition for the additional roles the teachers take on. Traditional leadership roles within a school focused on managing staff. It was necessary to shift thinking of leadership within schools from management to designer (Gallagher & Thordarson, 2018). As discussed in Chapter 2, with a knowledge-based economy, we needed learning programs designed to provide students with the ability to build and create knowledge as well as develop strong 21st-century skills. Our Middle Leaders were in a position

to design innovative learning programs to provide support to teachers within or across departments.

This research affirms that the role of Middle Leadership in leading change is critical. Teachers in this role are the connection between the Senior Leadership Team and the teachers within their departments (Ministry of Education, 2012a). The Deputy Principal of Curriculum spoke of the challenge of shifting teacher practice within a *“large organisation [that] can be the department structure; you’re really dependent on the leaders of those departments to progress development or professional development”* (Interview, 2019) in a way that the school wants to move towards. The Deputy Principal of Curriculum had undertaken her own leadership inquiry where, she had found that *“to get school improvement (change) it must be all tied in from the start. From the strategic vision ... everyone needs to be working for the same goal”* (Deputy Principal of Curriculum, Interview, 2019). The leadership inquiry activity was based on a teacher-led inquiry cycle, developed by Timperley, Kaiser and Halbert (2014), and implemented in the school. The purpose was a way to focus the leaders on instructional leadership and the larger role that they had to play. To help facilitate the learning and lead the discussion on instructional leadership and curriculum, an external facilitator assisted teachers with understanding and undertaking a leadership inquiry. The goal was to have Heads of Department lead professional development within their department and work with their teachers, preferably to lead a collaborative inquiry to improve student outcomes. To assist Heads of Department and Learning Leaders, the Deputy Principal of Curriculum decided to shift the focus of the school’s leadership meetings (Head of Department meetings) to focus on leading their subject departments with a focus on pedagogy and curriculum rather than the administrative focus the meetings traditionally have been.

As a result, since 2018, the focus of the Head of Department meetings with Senior Leadership shifted from day-to-day administration to a focus on teaching and learning, as a Community of Practice to create and support change. Part of this shift involved moving Middle Leaders from a teacher-led inquiry to a leadership inquiry the Deputy Principal of Curriculum said, *“[A]ll the research points to the fact to get school improvement it has to all tied into that. You start with the strategic vision and then, moving back, everyone needs to be working for the same goal”* (Interview, 2019). The creation of a Community of Practice, from administrative meetings, saw a noticeable shift in Middle Leaders' thinking about their role, and the need to shift to an instructional model of leadership. The Deputy Principal of

Curriculum stated, “[T]he introduction of the leadership inquiry was a way of focusing leaders on their instructional leadership that they have a big role to play” (Interview, 2019). The Deputy Principal of Curriculum led the Middle Leaders through fortnightly meetings. Each meeting had a clear focus and led the leaders to not only understanding such models of leadership, including instructional leadership, but also examining the individual learning areas in the New Zealand Curriculum (2007) document. The New Zealand Curriculum had been explored through both the curriculum learning area and the front half of the document, which focused on key competencies and 21st-century skills. The Middle Leaders, through the leadership inquiry and working in/across their departments, had seen a significant amount of change. Departments had been working on reviewing and changing curriculum design in their learning areas and shifting a focus to the key competencies.

4.2.4 Systems

Prior to 2019, the school in this case study had two timetables operating for school day and had done so for more than 25 years. The junior timetable (Year 9 and Year 10) ran on one-hour periods with five periods a day. Year 9 and 10 students had the full range of subjects derived from the learning areas of the New Zealand Curriculum (2007). These subjects have traditionally been referred to as the core subjects and include English, Mathematics, Science, Social Studies, Physical Education, and Health. Year 9 students would also participate in 10 introductory course module options for an hour each week. The modules would include areas such as Drama, Film, te reo Māori, Music, and Art. Year 10 students would then choose up to four option subjects with each studied for one hour over 20 weeks. The timetable for Year 11-13 ran on a two-hour period timetable with three periods in a day. Year 11 students would select six subjects to study each week for a total of four hours. All Year 11 students were required to study Mathematics, English, and Science. Students in Years 12 and 13 had several study options and programs and could be full-time or part-time, based on their individual needs. Each subject had four hours timetabled per week.

Figure 9

Timetables for 2020

Junior Timetable 2020

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:30-9:20 P1	Option 3	Option 1	8:20-9:20 Staff Meeting	Option 2	Option 5
9:20-10:15 P2			Option 4 9:40-10:35		
10:15-10:45	Interval		10:35-11:30	Interval	
10:45-11:40 P3	Option 2	Option 5	Interval 11:30-11:40	Option 6	Option 7
11:40-12:35 P4			11:40-12:20 Tutor		
12:35-1:20	Lunch	Lunch	Lunch 12:20-1:00	Lunch	Lunch
1:20-2:10 P5	Option 4	Option 6	Option 7 1:00-2:40	Option 3	Option 1
2:10-3:00 P6					
3:00-5:00	Option 8	Option 9	Option 9	Option 8	
5:00-9:00	Option 10	Option 11	Option 12	Option 13	

Senior Timetable 2020

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:30-10:15	Option 3	Option 1	8:20-9:20 Staff Meeting	Option 2	Option 5
10:15-10:45	Interval		9:40-11:30 Option 4	Interval	
10:45-12:35	Option 2	Option 5	Interval 11:30-11:40	Option 6	Option 7
			11:40-12:20 Tutor		
12:35-1:20	Lunch	Lunch	Lunch 12:20-1:00	Lunch	Lunch
1:20-3:00	Option 4	Option 6	1:00-2:40 Option 7	Option 3	Option 1
3:00-5:00	Option 8	Option 9	Option 9	Option 8	
5:00-9:00	Option 10	Option 11	Option 12	Option 13	

It was necessary to change the timetable to help facilitate the change in curriculum and curriculum delivery at Year 9 and Year 10. My experience as a classroom teacher using innovative pedagogies such as student inquiries and projects was that a 50-minute class was too short. I requested and received support from the Senior Leadership Team, for a least one double period to allow sufficient time to use these pedagogical approaches in the classroom. The Senior Leadership Team then passed this request on to the person in charge of timetable. This timetable change request was a significant challenge for the school, as the school had operated using the two timetables for several years. However, they worked on this and in 2019, a new timetable was implemented after consultation and feedback with the teaching staff.

This new timetable saw the bringing together of the two different timetables with junior students now having a double period as well as some single periods. The school day was also adjusted, and the addition of a form time added to the timetable. Form time was on Wednesdays for 50 minutes.

Figure 9 shows the 2020 junior and senior timetables. The Senior Leadership Team were responsive to the needs and feedback from staff. When changing the timetable was first presented to the whole staff in 2018, it was made clear that any changes would not be permanent, but changes could be made to be responsive to staff and student needs. Student feedback was gathered at the end of 2018 in relation to breaks between classes. The feedback from students saw a change in 2019 to the Wednesday timetable with the inclusion of a short 10-minute interval prior to tutor-time reflected in the 2020 timetables in Figure 9.

4.2.5 Pedagogy

Heads of Department, and teachers within the school involved in this research, have a high degree of autonomy with how they deliver the New Zealand Curriculum. There is a variety of pedagogy throughout the school, including student-led inquiry, project-based learning, and social action, as well as more traditional modes of instruction, such as transmission teaching. When designing the learning for the Connected classes, as the coordinator I wanted to ensure innovative pedagogies were at the core of teacher practice (Section 2.4). Future-focused learning with the Connected class is about the relationship between the teacher and student ensuring students have the opportunity exercise agency in what they are learning, understanding how they learn (metacognition) and what the students next steps are.

While researching and writing the literature review, I found that student-led inquiry was not sufficient to move students from deep to transference learning (Chapter 2). Instead, I wanted students to take learning from student-led inquiries and specialist-subject content knowledge and skills and apply it to a new context. While designing the Connected Curriculum Learning Design Framework (Chapter 5) there were three key pedagogical approaches that were identified as the framework to facilitate the movement from surface-to-deep-to-transference of learning while concurrently developing 21st-century skills. These pedagogies were student-led inquiry, specialist-subject teacher-directed learning, and projects. Student-led inquiries are agentic for students by their very nature, allowing the students to bring their prior knowledge, interests, and culture to the learning context while developing the students'

transferable skills in how they organise their learning. I found that student-led inquiries empowered students to take ownership of their learning. This was especially so when working on projects that saw the student select the relevant knowledge they had gained through the inquiries and apply this knowledge to a new context. Specialist-subject teacher-directed learning was equally important, as the subject teacher needed to ensure the students developed the skills and knowledge relevant to the subject area. Within the Connected class, specialist-subject teacher-directed learning was often in the deep learning state, as the other subject areas would teach the surface learning relevant to their own subject areas (discussed in Chapter 5). The Senior Leadership Team involved in this research allowed a high degree of teacher autonomy in the pedagogical approaches used for curriculum delivery that facilitated the ability of myself, and the teacher participants, to design innovative learning tasks.

4.2.6 Curriculum delivery at the school involved in this research

The Deputy Principal of Curriculum supported the Middle Leaders in 2018, within their departments and at the leadership meetings to explore, ‘how better to deliver the transferable skills’ (key competencies) that had been developed in 2017 and 2018. This questioning initially came from questions asked by the Navigator during the design of the Education Brief (2016/17). This led the Deputy Principal of Curriculum to examine curriculum cohesion and consider how to better integrate the front end of the New Zealand Curriculum into teaching and learning programs. After reflecting on the internal professional development of staff and the lack of change, the decision was made to “*go back to basics and look at what transferable skills [key competencies] we wanted the students to have. That is how we ended up with six key competencies instead of the five (in the New Zealand Curriculum)*” (Deputy Principal of Curriculum, Interview, 2019). The challenge then became how to integrate these transferable skills across departments. Being challenged by the Navigator to look at how the front end of the New Zealand Curriculum was being delivered across the school, the decision was made to focus on the key competencies which are identified in the New Zealand Curriculum (2007) as thinking, using language, symbols, and texts, managing self, relating to others, and participating and contributing.

This school focused on what was happening in different curriculum areas to tease out what the transferable skills, could look like in the different subjects. In consultation with both Middle Leaders and all staff, spent much time working through how this could be changed and developed. In the end, five transferable skills and a mindset were created; based on the key

competencies in the New Zealand Curriculum and 21st-century skills and the feedback from teachers:

- Collaborating
- Communicating
- Contributing
- Thinking
- Self-Regulation
- Maker Mindset.

Once these transferable skills had been identified, the next step was how to bring these to the front of the learning. The school spent a considerable amount of time on in-house professional development. The aim of the professional development was to work with teachers around what these transferable skills and mindset could look like within their curriculum area and in the classroom. It was a challenge, as not all teachers initially embraced the focus to integrating the transferable skills and mindset into their teaching and learning programs. The role of Middle Leaders in supporting and implementing this change was crucial. The Deputy Principal of Curriculum *“found that it could be hard to get a whole school movement in a way that doesn’t involve departmental leaders”* (Interview, 2019). Middle Leaders who took this initiative and then further developed learning within the department, saw concepts grasped more authentically. However, the Deputy Principal of Curriculum found that teachers across the school varied in their approach to incorporating transferable skills in the classroom as part of the learning programs. Another step in creating a focus on the transferable skills was to change the junior reporting process so that teachers reported against the transferable skills and mindset, and not just curriculum levels. The assumption was that if teachers had to report on the transferable skills, they needed to be explicit in the teaching of transferable skills. Exploring what teachers wanted for the students and what a graduate profile could look like was the initial starting point for the development of the transferable skills. This led to the idea of moving away from what is a core subject, and what it is not and, is there even such a thing as a core subject.

For the school involved in this research to move to a future-focused approach, the Deputy Principal of Curriculum had to work with the curriculum leaders within the school to reimagine the curriculum. This was framed around the question of “What is core? Is there such a thing as

core subjects?” that drove the curriculum leadership Community of Practice for 2018 in Term 1. The curriculum leaders, with the Senior Leadership Team, went back to the New Zealand Curriculum and, with some external professional development guiding the meetings, conversations and ideas were developed. There were initial concerns over staffing and the timetable as subjects, which had not traditionally offered optional subjects, were now able to put ideas forward.

This led to the complete redesign of what had traditionally been option subjects. This now moved beyond the ‘pilot programs’ that had been running to a new way of delivering curriculum. All departments put forward a range of courses that Years 9 and 10 students could choose. Two key system drivers, staffing and the timetable, needed to be responsive to the programs being developed. These optional courses were renamed to reflect the school and intent of the programs. This redesign of the traditional options has been incredibly successful with the traditional optional courses, such as food technology and music, being reimaged and courses that did not previously exist being delivered. One such example of a new course is a collaboration between the Māori Department and Fashion Department to have students design and create an original garment, modelled at the school’s fashion show, which represented the student's culture. Students selected these at the end of 2018 for the 2019 school year. The options chosen were based on the student selections. This helped with organising the staffing and the design of the timetable instead of the staffing and timetable driving the options available. Students received a book with all the courses offered to choose two for each trimester. Some options were multi-level including both Year 9 and 10 students. The Deputy Principal of Curriculum said, “*when we first said we’re going to combine Years 9 and 10 there were looks of horror, but people now realise this is good*” (Interview, 2019). It had been a goal in the Education Brief to create more flexibility, and students from Year 9 and Year 10 were no longer organised by year level for these optional courses. Instead, some of the optional course had a beginners or advanced option for subjects like music or languages. This was to ensure that all abilities of students could be catered for as well as developing student understanding beyond an introduction.

Through the Education Brief, the school involved in this research, had examined the Character and Culture of the school before designing and implementing the change. This school built relational trust with the teachers by working with teachers and empowering the teachers to design innovative programs that were piloted. It had created a culture within the

school where shifts in curriculum and pedagogy could be made in ‘pockets’, which helped to support and build teacher capabilities. A school wanting to change the curriculum design and pedagogical approach to teaching, such as connecting subjects and moving to a 21st-century skills focused learning design, will need to ensure the teachers have the capabilities and the systems in place to support this change.

4.3 Fostering initiative to create change

Each school is unique in how they support teachers who want to try a new method/pedagogical approach of teaching and the school involved in this research had clear processes. The processes used by the school in this case study included pilot programs (Section 4.1) to encourage teachers design and implement new ideas. Middle Leaders were used as a conduit between the change the Senior Leaders wanted to make and the implementation by teachers at the classroom were an important to facilitate the change by running professional learning within department and to support the teachers within the department to try new innovative pedagogies. A teacher cannot necessarily decide to make a significant and innovative change in their approach to teaching and learning without first moving through a series of steps and gaining approval from the Senior Leadership Team. The Deputy Principal of Curriculum had the responsibility at this particular school to shift the teacher practice to align to the future-focused approach towards the curriculum the school wants. The Deputy Principal of Curriculum had the key role of working with and supporting Heads of Department to support teachers within departments to implement the schools strategic plan, goals and Education Brief. This is done by *“mentoring curriculum leaders in particular around their leadership inquiry and then the leaders working with their teachers – preferably through a collaborative inquiry, and then to improve student outcomes”* (Interview, 2019). When I wanted to design and create a new program, it was necessary to seek approval and support from the Senior Leadership Team.

4.3.1 From pilot program to a new course

The Senior Leadership Team involved in this research, fostered innovation from teachers by allowing any teacher to put forward a new course proposal. These new courses were purposefully coined *“pilots”* (as discussed in Section 4.1) by the Principal and seen as significant as *“as they allowed us to, if you like, experiment and see, how are these ideas valid?”* (Interview, 2019). The Deputy Principal of Curriculum affirmed this term in a pilot allowed for a deeper reflection, *“Do they work? Well, they seem to work, so we’ll do a bit more.*

Or actually, what doesn't work" (Interview, 2019). The school involved in this research did not have a Year 9 or Year 10 Connected or integrated class in 2019. The school had pockets of curriculum integration, happening between two teachers either informally or through specifically designed courses such as a combined English and te reo Māori class. In 2018, the Deputy Principal of Curriculum was asking teachers to put forward ideas for junior classes that had some form of integration to trial in 2019. I put forward a course proposal on curriculum integration, which was accepted, in my role of Head of Faculty designed based on my review of literature and experience to date. The Connected classes ran in 2019 with two classes, and in 2020 and 2021 with three classes. In 2022 the school, as a result of this pilot, made the decision to no longer have separate Connected classes but instead all Year 9 teachers are expected to connect the curriculum using the Connected Curriculum Learning Design Framework (CCLD) (discussed in Chapter 5) as least once in 2022. With the aim of building teacher capabilities over time to have all teachers at Year 9 and Year 10 connecting the curriculum using the Connected Curriculum Learning Design Framework.

4.4 Summary

The findings in Chapter 4 have focused on the considerations for a school leadership team who wanted to create change. A significant finding was the need for a leadership team to consider the Character and Culture of the school to have an explicit understanding of the people within the organisation and the ability to build staff capabilities to work with in the change and/or drive the change. It is necessary for a leadership team, such as the one in this research, to understand the history of the school in relation to the four components and to address questions such as the purpose for the change that is taking place; which staff members have the capabilities to drive change; and what supports are necessary for staff. When a school, such as this one in this case study, has an explicit understanding of the Character and Culture of the school, the school is better positioned to make informed decisions around, Systems, Curriculum and Pedagogy.

Chapter 5: Findings – The Connected Curriculum Learning Design Framework

5.1 Introduction

Chapter 4 described how the plan to implement a Connected curriculum was implemented. Chapter 5 will now describe the development of the pedagogical framework for implementing the Connected curriculum. When I embarked on this research, a challenge was the lack of literature on how to create an integrated curriculum that was cohesive across the subjects - integrated, but placed the subject specialist, with deep knowledge and skills of the subject, at the centre of the learning. This chapter will provide an account of the pedagogical framework I designed for the Connected class and the rationale.

5.2 New pedagogical framework and learning design

How teachers design their learning programs should be based on a pedagogical framework that enables students to move from surface-to-deep-to-transference of learning to a metacognitive understanding of the concept and to develop an understanding of how they themselves as students learn. The school curriculum is the organisation of knowledge and skills, that in this instance, the New Zealand Ministry of Education and the school deem important. Teachers have a range of pedagogical tools, either from what they learned through their pre-service education, or through further professional learning and in-service teacher education (formal or informal). Although the transmission style of teaching, where the teacher stands at the front of the class and transmits (delivers) the information to the student, is still happening in schools, we are seeing a shift to other forms of pedagogy to enable students to not only receive knowledge but to create new knowledge and skills (Scott, 2015). The purpose of Chapter 5 is to provide an outline of the development of the design of the Connected Curriculum Learning Design Framework by examining how it supports students with learning and how the framework supports specialist-subject knowledge and skills.

5.2.1 Development of the pedagogical framework

I started to design a framework for connecting the curriculum when I found a gap in the literature that went beyond defining curriculum integration. My purpose with this research was to provide teachers with a framework that could be adapted to individual teacher contexts. The literature describes how curriculum integration is placed on a continuum, such as with Fogarty (1991) and Drake (1993), but did not provide a practice framework, starting with the national curriculum, and working through to the teacher delivery. Through the literature review, I developed my understanding of the different types of knowledge and skills students will need for the future and different innovative pedagogies that could facilitate learning, such as student-led inquiry and projects. In discussion with the participant teachers in our first meeting, I found that there was a concern for the ‘watering down’ of the subject, which also came through in the literature (Drake, 1998). I drew on this to create a pedagogical approach to teaching and learning for the Connected class. This was centred around three phases of learning and it was necessary to continue to implement and refine the framework based on the teacher participants' experience.

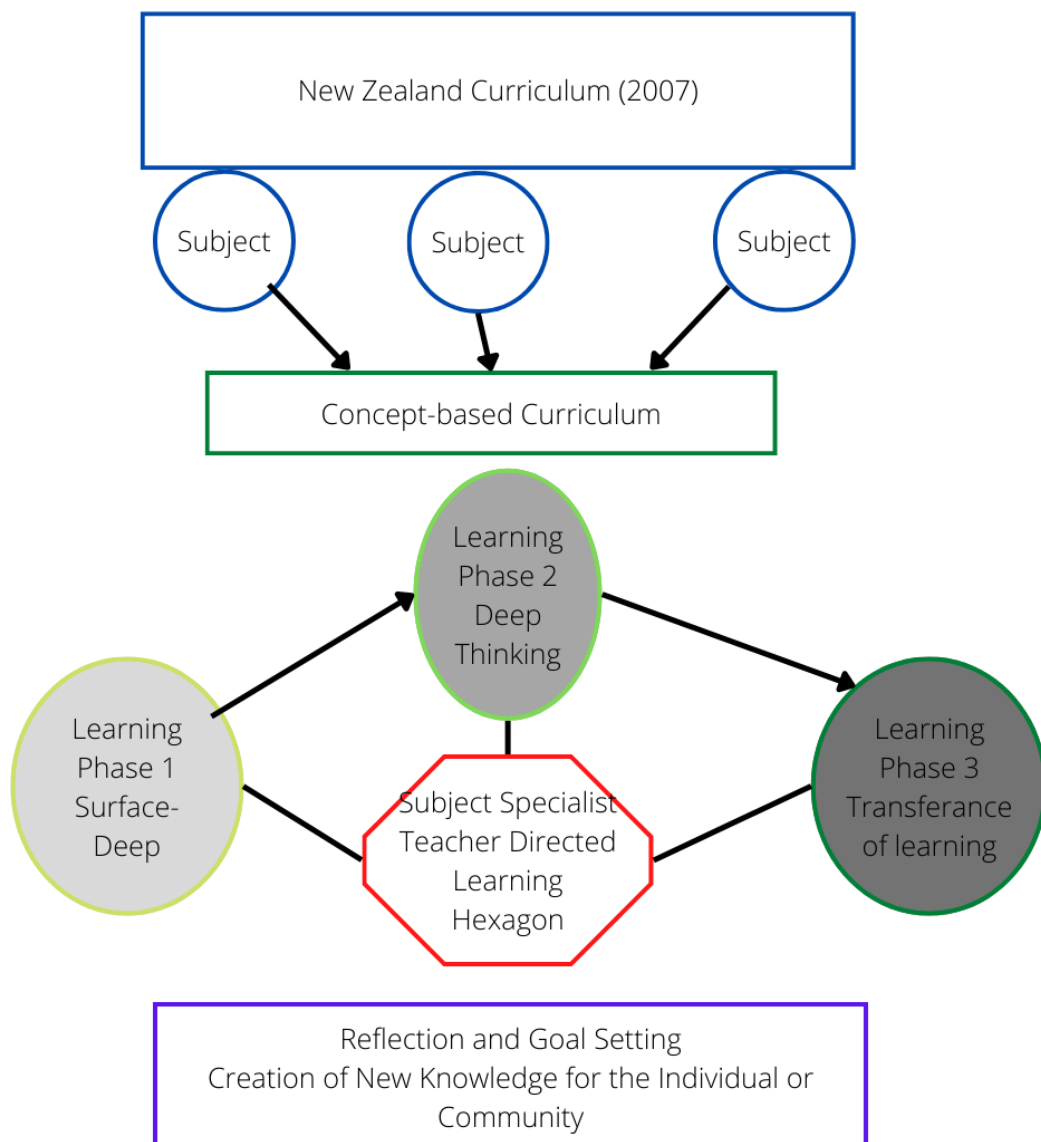
The Connected Curriculum Learning Design Framework (Figure 10) was designed by examining the national New Zealand Curriculum Framework as well as exploring what was important to the students and our community at a local, national and international level. The pedagogy of the Connected class has endeavoured to try to build adaptive expertise, which is central to building lifelong learning. The ‘Nature of Learning’ report by the OECD explains that we need students to acquire adaptive expertise, which is the “ability to apply meaningfully learned knowledge and skills flexibly and creatively in different situations ... beyond mastery and routine expertise in a discipline... It involves the willingness and ability to change core competencies and continually expand the breadth and depth of one’s expertise” (Dumont et al., 2016, p. 3). The teachers involved in this research and I achieved this by examining concepts at a personal, local, national and international level where relevant, actively working with students to co-design their learning programs and working with students to understand how ‘they’ learn (these areas will be discussed in more detail further in this chapter).

The Connected Curriculum Learning Design Framework, as seen in Figure 10, has been designed as part of this research to provide a framework for teachers to follow when collaborating on designing the Connected teaching and learning programs. When designing the Connected Curriculum Learning Design Framework, I wanted to ensure that it was informed

by literature and research that had both 21st-century skills and pedagogical content knowledge at the centre. My primary aim with the design of the Connected curriculum was to create a curriculum, which is differentiated, focused on value-added learning, based on a concept-based curriculum that was firmly grounded in student agency and still allowed the subject-specialist teacher to be an expert in the learning design.

Figure 10

Connected Curriculum Learning Design Framework



My intention for The Connected Curriculum Learning Design Framework was for educators to use it, much like a roadmap to guide them in the planning of the teaching and

learning units. A unit of learning was planned (approximately six to ten weeks) that moved students through the three phases of the Connected Curriculum Learning Design Framework.

The framework starts with the national curriculum document, which is the New Zealand Curriculum (Ministry of Education, 2007). The subjects identify the learning area and this feeds into the concept-based curriculum. Each specialist-subject teacher was responsible for ensuring the achievement objectives were met, and this was represented by the subject circles in the framework. The school, the teachers or the students could decide on what concept they were going to design the learning around. The second half of this framework gives a picture of how the units of learning are designed around three phases moving students from surface-to-deep-to-transference of knowledge where the students applied the learning in a new form (Section 2.4.2). The professional judgement of the subject-specialist teacher-directed learning fed into each of these phases. Reflection and goal setting was used throughout with an in-depth focus as the beginning and conclusion of each unit of work. This was to spend time celebrating and understanding the new knowledge that has been created for the learning community (Section 2.2.1).

5.2.2 Subject-Specialist Teacher-Directed Learning Hexagon

I developed a range of visuals for teachers to understand and make sense of the Connected curriculum. This was based on my experiences of teaching and on literature such as Shulman's (1987) understanding of a teacher's knowledge base in order to address the concern that the subject could be watered down. The key visual I created to assure teachers that the subject was important, was a visual called the Subject-Specialist Teacher-Directed Learning Hexagon (Figure 12). This diagram referenced teacher knowledge including, subject knowledge, subject-skills knowledge, the New Zealand Curriculum (2007), pedagogical content knowledge, and 21st-century skills but which centred their expertise as subject-specialists. The visual is a hexagon with no particular order or starting point and it was explained to the teachers that they used their professional judgement to move into the aspects identified on the hexagon based on the teaching and the learning taking place. I wanted teachers to feel confident that their specialist subject was not being watered down and that their professional judgement was valued. The English teacher commented on the ability to *"come up with a project that was really integrated, but I could still teach these quite sort of standalone English skills ... but it*

was in the context of the integrated context and that seemed to work really well” (Interview, 2019).

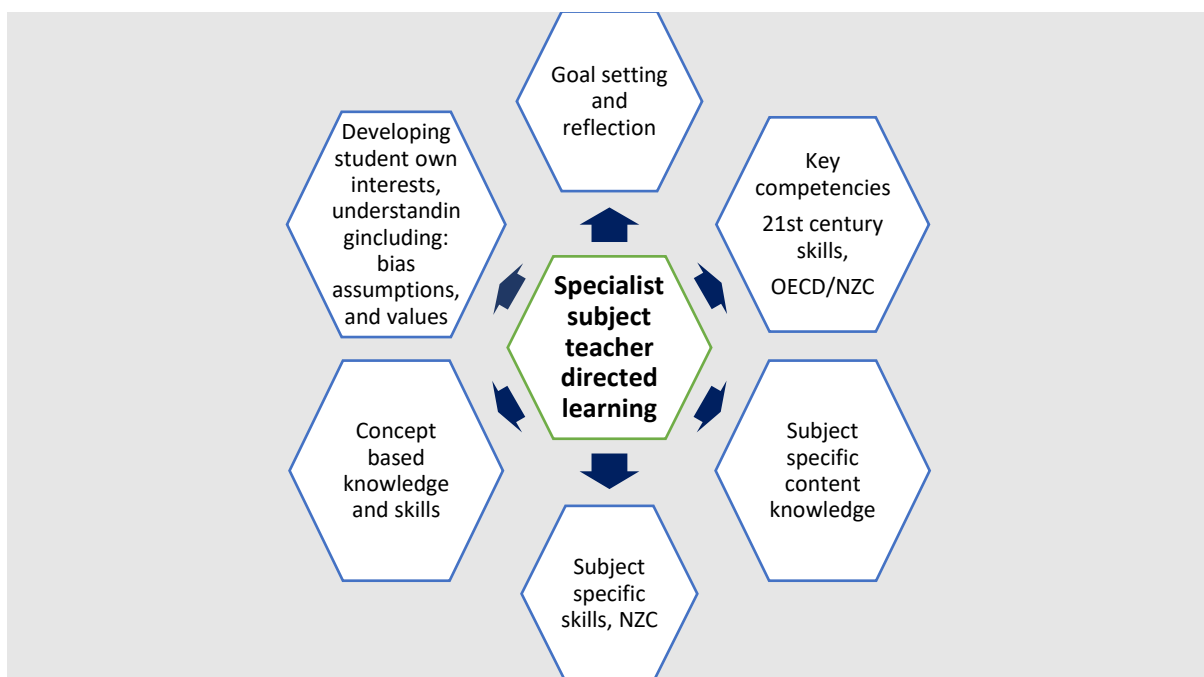
The Subject-Specialist Teacher-Directed Learning Hexagon sits in the centre of the three learning stages of the Connected Curriculum Learning Design Framework (Figure 12). This is to show the importance of the teacher’s professional judgement in the design of the learning taking place and in ensuring the students meet the achievement and learning outcomes for the subject area and the connected learning taking place. The English teacher structured their teaching using a workshop approach. Students would all have learning tasks that the students ‘must do’ and there were different choices for the students based on their learning needs. This enabled the teacher to focus learning on specialist-subject content and the Connected program: *“We might do some work on something English around visual language ... a reading program ... standard English work, nothing to do with our integrated learning, and the students had silent reading and follow-up work”* (English teacher, Interview, 2019). Students would come into class, complete the ‘must do’, and then choose what they needed to work on next, either English specific tasks or the Connected learning tasks with deadlines to have work completed by. The English teacher would work with students in small workshops throughout the lesson. I found in the teaching and learning units that there were two key moments of teacher-directed learning. The two key moments are at the beginning of the unit of work, and after the first inquiry. It was up to the teacher to use their professional judgement for when this style of learning is necessary.

It was up to the teacher, and their professional judgement, to design the teaching and learning program to best cater for the students in the class. The teacher used their professional judgement to design learning tasks for students to deepen their understanding. The teachers gave students as much agency as possible to develop the learning program. By using information including observations, and discussions with students, the teachers would build learning tasks to further the students’ understanding of the concept. It was at this point that the teachers, during their Community of Practice face-to-face meetings, worked together to backward map the project outcomes through the inquiries to ensure the content being covered was relevant. The relevancy was determined by both student agency and the teachers’ professional judgements. During the teacher-directed learning phase, it remained important that students were working on skills. These skills were part of the key competencies, non-specialist-subject skills, and specialist-subject skills to assist with their learning and

project. Each subject had specific content and skills that needed to be covered and teachers needed to ensure that the New Zealand Curriculum for their subject was covered. In Social Studies, we often started with a Social Studies specific quiz and had micro-learning sessions within their timetabled class that focused on the specific content skills/knowledge. At other times, subjects decided to break away from the integrated learning program to run a series of specialist-subject lessons. The face-to-face meetings with the Connected teachers for the class were the ideal times to discuss this.

Figure 11

Specialist-Subject Teacher-Directed Learning Hexagon based on teacher knowledge (adapted from Shulman, 1987)



The specialist-subject and non-specialist-subject skills acknowledge both the place of specialist-specific skills and non-specialist subject skills in the learning. The teacher ensures to integrate relevant literacy and/or numeracy skills, subject specific skills, non-specialist skills such as 21st century skills, or challenge the learner with their own ideas and understanding. When studying poverty, for example, the focus was on graphing to show forms of poverty and writing about perspectives of people living in poverty. Teachers collaborated to build on learning across the three subjects. The Social Studies teacher introduced graphing, gathered some benchmark data, and found out what the student could already do. The students completed some learning on the features of graphs, as well as plotting data. The Science teacher

then built on this graphing knowledge. The English teacher taught about the place of graphs in texts, how they can be analysed for example, persuasive, biased, or interpreted in different ways. While the skills may cross over the different subjects, it was important that the teachers explained how the skill was used in a specialist-subject context.

The front of the New Zealand Curriculum (Ministry of Education, 2007) document outlines the key competencies that need to be embedded in the teaching and learning programs. As mentioned previously, this document is a framework where schools can create their own curriculum. The school involved in this research has developed a set of transferable skills that are reported on to parents several times a year. These are very similar to the 5Cs (collaboration, communication, creativity, and critical and computational thinking) which are discussed in international documents by organisations, such the OECD, and are generally regarded as the skills students need for the future. The Social Studies teacher commented in their first interview that students are, *“building skills over time and it’s more recognisable than normal class... I see confidence in working together collaboratively ... it’s winning in terms of skills such as collaborating and time management”* (Interview, 2019). A focus on student-led inquiry and project-based learning with strong student agency creates an environment for students to learn and develop these skills. To follow the steps for project design, from the initial design of the project through to completion, for example, requires the student to develop strong self-regulation. How and what they create for their project can allow creativity to be fostered.

5.2.3 Concept-based knowledge

A challenge was to decide on a concept for the unit that could underpin the learning taking place and that was broad enough in context and authentic to allow for teacher and student agency. The 17 Sustainable Development Goals are:

Adopted by all United Nations Member States in 2015 and provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries – developed and developing – in a global partnership. They recognise that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests. (United Nations, n. d.)

There is a large international community focused on these SDGs and learning resources to support educators in a range of subjects. Each of the 17 SDGs can be broken down into smaller components, for example, SDG1 is zero poverty. Students could explore child poverty in New Zealand. The SDGs provide a broad concept based on real-world issues and problems.

The United Nations SDGs have provided the real-world broad concepts context for learning in this case study for Year 9, with an additional focus in Year 10 of Global Citizenship. The learning taking place for these students was grounded with authentic concepts, which are relevant to the world they live in now, and in the future. It would be difficult to cover all 17 goals in depth over the two years, instead, there was a focus on four in Year 9 with connections made to other goals. In Year 10, the learning shifts to a focus on global citizenship with connections made to the relevant SDGs. Throughout the teacher-directed learning, students learned more about the SDG, which is underpinning their learning for that unit. Students explored their own views, values and perspectives of the concept. They continued to explore the concept at a local, national and international level. An example of this was when looking at climate change. Students looked at the impact of sea level rise in relation to where they lived. They were then presented with opportunities to develop and follow their own particular interest within the SDG. By learning about the SDGs, they were able to see themselves as global citizens and that they have power to create change at a local, national or international level now or in the future.

Throughout the unit of learning, it was important for students to develop their own interests and to create agency in their learning. During the teacher-directed phase, there was the opportunity to develop learning activities that allow students to explore their own assumptions, values and bias. By using the SDGs and learning about such problems as poverty or sustainability, students share their own experiences and communicate with others to develop their own thoughts. I noticed, with the Year 9 class, that students started to create their own understanding of what was important and compare this to the people around them. This needed to happen in a safe and managed way to prevent judgement or problems arising. By explicitly teaching about bias, assumptions and values, we can help students to understand who they are, and their place as global citizens. Global citizens are aware of their place in the world and understand the wider world. Global citizens work with others in the community to try to make the world a place that has equity and is sustainable (Oxfam, 2015).

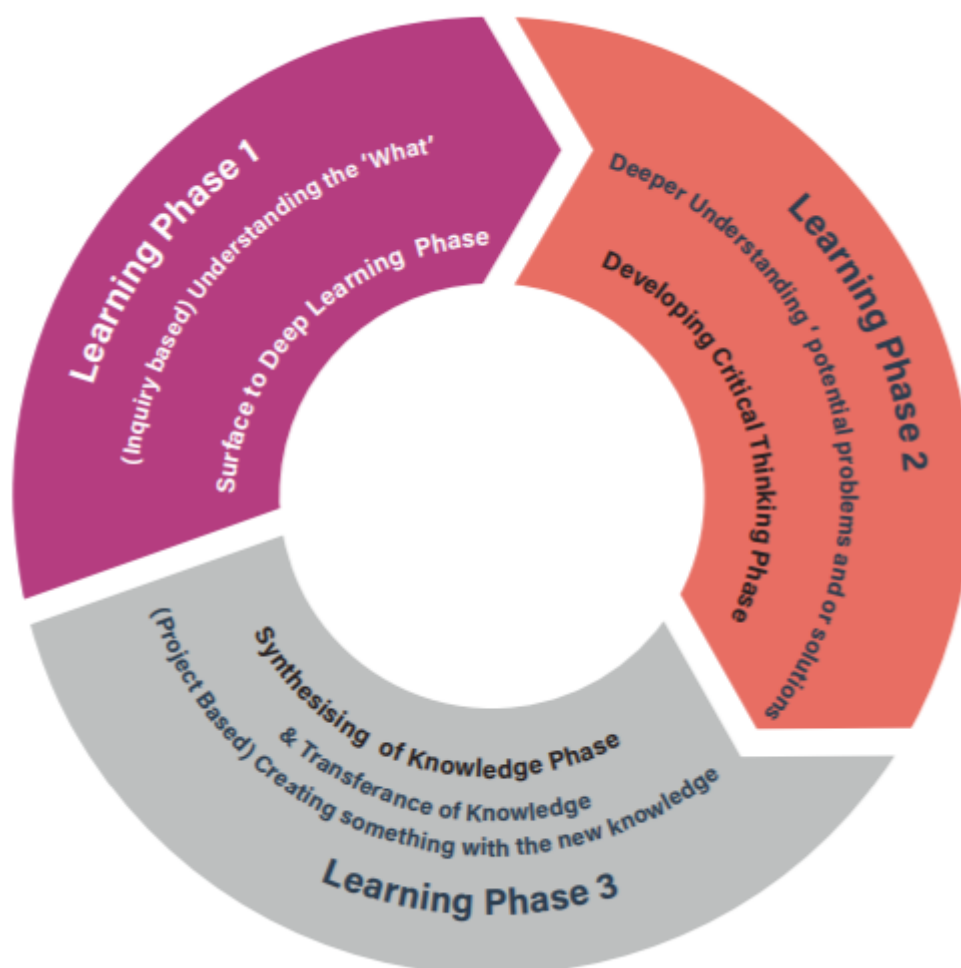
5.2.4 The Connected classes' classroom curriculum

The flow of the units of work (six to ten weeks) is a blend of specialist subject teacher-directed learning with student-led inquiry being a key pedagogical approach to the learning design. The goal of the student-led inquiries and the transference of learning activities was to use the evidence in how students learn as discussed in the literature review chapter (Section 2.4.2) which sees students needing to move through three phases of learning in each unit of work. This was from surface learning to deep learning to the transference of learning, each building on the previous stage. This is illustrated in Figure 12.

The first learning phase in Figure 12 focused on surface-to-deep learning and was about what the problem or issue was. It was necessary for students to move from surface learning through to the deep learning phase and this movement could happen at different times for the students. Therefore, it was necessary for the teacher to be adaptive with the learning and differentiate the tasks (Frey et al., 2017). The first learning phase had a strong subject-specialist teacher component where the goal for the teacher was to provide the context and background to the chosen area of study, to evaluate the knowledge students currently had on the area of study and to differentiate the learning accordingly to the individual student needs. The second learning phase (Figure 11) moved students into the deep learning and started to look at what the potential problems and/or solutions were for the issue that was the focus of the learning. The learning at this point was to develop critical thinking skills within the student by having them explore potential solutions based on the learning developed in Phase 1 and with further student-led inquiry. The third learning phase was the transference of learning and focused on students applying the knowledge they had gained and choosing the information they thought was relevant for a new piece of work (learning artefact) or for a project. During the transference of learning, students took the knowledge learned, created something new, and shared their project or new piece of work with the learning community. The purpose was to move students from just receiving information or knowledge towards a deeper level of learning and create new knowledge for their community. This transformation occurred by developing the students' critical thinking, skills and key competencies, as well as beginning to understand their own values and assumptions.

Figure 12

Learning phases based on Hattie and Donoghue three phases of learning (Hattie & Donoghue, 2016)



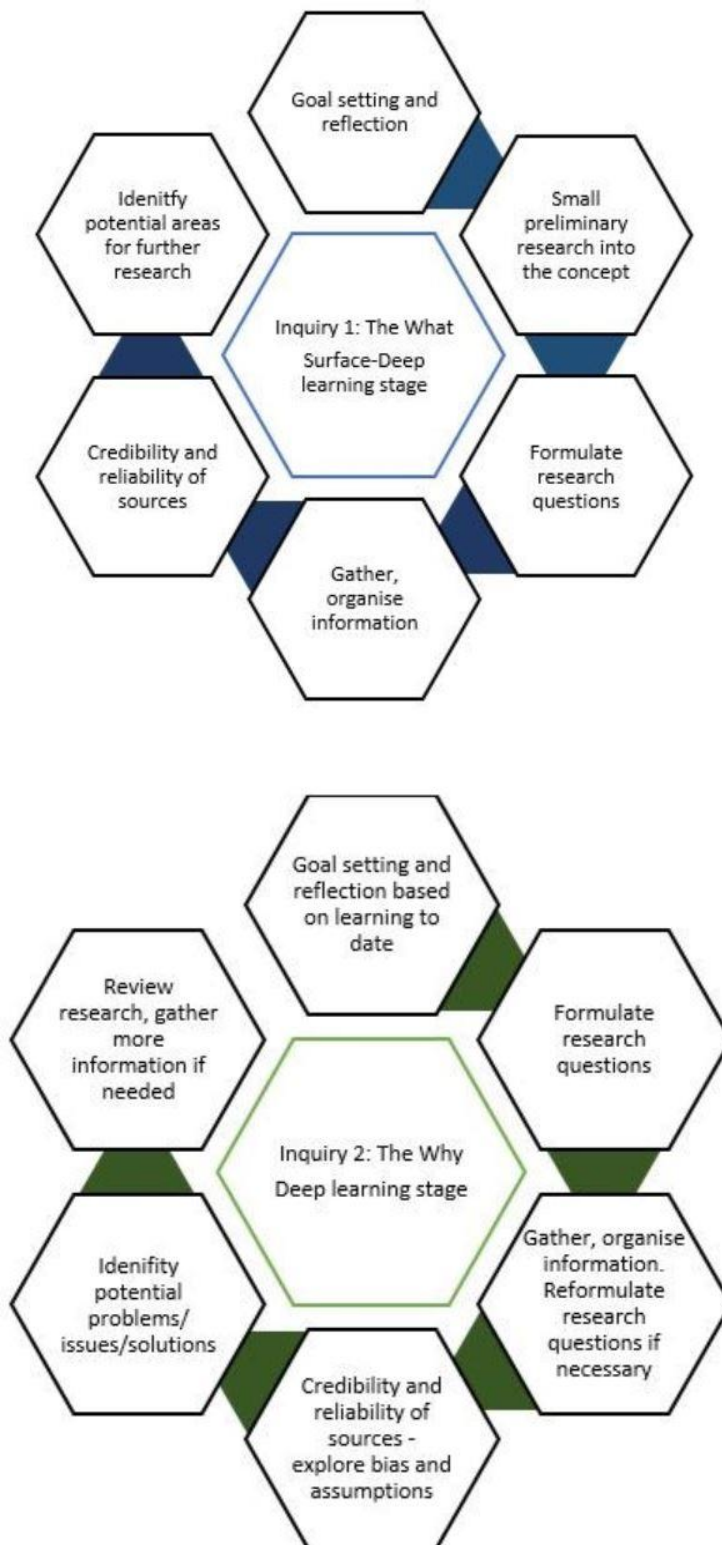
Starting the unit of learning with teacher-directed learning in Learning Phase 1 was important, as the teacher was framing the concept that was subject to the learning taking place. The learning in Phase 1 was about students beginning to understand the concept of the unit, for example, 'What is Climate Change?' This information can be communicated by the teacher, and through a range of activities. Learning Phase 2 was to have students develop critical thinking skills. We wanted students to have the ability to think critically about the information they were receiving. Critical thinking was important for students to be able to make informed judgements. This was achieved through a variety of methods such as, observation, analysis,

interpretation, evaluation, inference, explanation, problem-solving and decision making. A vast amount of information was readily available, but we wanted students to be able to discern and think critically about not only what they are hearing or seeing, but to think critically about their own ideas, opinions and beliefs. The third learning phase was to enable students to synthesise the information learned. It was about taking elements of what they had learned and creating something new with that learning. By using the knowledge gained and creating something new, they needed to engage with that knowledge at a deeper level. Throughout the project stage, students were actively engaged in their learning as they applied knowledge and skills gained throughout Phase 1 and Phase 2 of the learning process.

5.2.5 Learning Phases 1 and 2: student-led inquiries

The Connected Curriculum Learning Design Framework work required students to move from surface learning to deep learning (see Figure 12). Students undertook two inquiries, representing Phase 1 and 2 within each unit of learning, as a pedagogical approach for moving students from surface to deep learning. In Section 2.3, student-led inquiry was explained as being agentic; where the student investigated a chosen problem or issue to construct their own learning and meaning. The first inquiry, representing Phase 1, was about understanding the issue and tended to be less detailed than the second inquiry. As with the Specialist-subject Teacher-Directed Hexagon, I created two visuals (Figure 13) to assist teachers to build on Phase 1, as illustrated in Figure 12, with understanding key components of student-led inquiry. The purpose of the first inquiry was to address surface learning while the second inquiry was to have students move into deep learning by critically thinking about the chosen issue or problem (Phase 2). The Year 9 Connected classes used concept-based learning with the United Nations SDGs as the real-world concepts. Students with the first inquiry looked at the ‘What’ of the concept, for example, ‘What is Poverty? or What is Climate Change? or What is Sustainability?’ The teacher initially drove the learning through a variety of activities before the students engaged in the first inquiry. The purpose of the second inquiry was for students to go deeper with their learning and understanding, to explore the ‘why’ of the issue, the potential problems and/or solutions. During the first inquiry, students were attempting to think critically about the issue or concept.

The student-led inquiries were a method for students to drive their own learning with a high degree of agency based on a real-world issue or problem. It “*gives students flexibility in the learning content, chance to show what they are interested in or like to do and think how this would relate to problem-solving*” (Social Studies teacher, Questionnaire, 2020). Learning Phase 1 often has strong parameters put in place by the teacher with a teacher-guided student-led inquiry. Students may have looked at ‘what is poverty’. During the teacher-directed learning, students could complete a small project or activity to demonstrate understanding of the concept of poverty beyond a definition written in their own words. It could be a poem, a short speech such as a Pecha Kuccha, a visual representation such as a static image or stop animation. If students completed a small project or learning artefact at this point, it was useful if it fitted into the larger project towards the end of the unit. This ensured a relevancy for what the students were doing as well, not just in their understanding but also in how the learning will be pulled together.

Figure 13**Student-led inquiries 1 and 2** (adapted from Boyd & Hipkins, 2012)

The second learning phase contained a student-led inquiry, which was more student-directed as they worked on an inquiry based on their interest within the issue or problem. Once students had a good understanding of the issue, they worked through a more structured research inquiry process. Focus questions were developed between the students and teachers. How the research was conducted was done in a variety of ways, from students working in groups or independently, or the class could work on different aspects and then bring their knowledge together. For example, Group A, looked at ‘what is child poverty’, Group B, looked at ‘What is housing poverty?’ and, Group C looked at the ‘Poverty Cycle’. The questions were generally formulated around being able to define the issue or problem, with the goal of students being to articulate in their own words the issue or problem.

The second inquiry was similar to the first. The focus shifted from understanding what the issue or problem was about to understanding ‘why’ the issue or problem was relevant or to try to find a solution to the issue or problem. The second hexagon in Figure 13 outlines the foci of the second inquiry. At this point, the students had an idea of what the project was going to be. This inquiry was about building on their understanding and developing their knowledge further. When formulating the research questions, the students needed to understand who the audience was for their completed project to ensure they pitched the information appropriately.

A key difference with this inquiry was that students sought to identify potential problems and/or solutions. This was based on the research information they had gathered or through their own ideas. From there, students needed to review the research they had gathered in relation to their focus questions and ensure they had enough coverage to address their questions

The English teacher commented that, in their professional judgement, “*Students get a deeper understanding of the topics and there is the potential for a higher level of achievement, particularly in the final task as students have one product focus but all the learning is from three subjects*” (Questionnaire, 2020). Teachers were “*extremely confident*” (Science teacher, Questionnaire, 2020) that the students were meeting the achievement objectives and learning outcomes for their learning area. These were set at the start of the unit and were on the lesson sequence template, which meant they were referred to weekly in the face-to-face planning meetings. The science teacher observed that “*if they do not get a skill in science class, they will get it in English or Social Studies*” (Questionnaire, 2020). The English teacher agreed but went on to say that meeting the learning and achievement objectives had been “*done in a responsive*

way – listening to student feedback around topics/tasks has been really helpful in fine tuning our connected program” (Questionnaire, 2020).

Students were provided with a template where they could cut and paste the research information. The next step was to take the research information and, in their own words, describe how it linked to the questions. The student research process was about looking at what were reputable sources and gathering information. The student-led research process was guided by providing students with reputable websites and sources. Teachers helped students understand the reliability, usefulness and credibility of the sources. Getting students to think critically about where the information was from, and the purpose of the information, was essential. As students gathered their research, they needed time to organise and evaluate the information they had gathered to see where there may have been gaps in the information. What information were they missing? Had they gathered from a variety of sources or just one? Was the research balanced? Depending on the learning goals for the students, the class or learning topic would depend on the focus of organising the information. They needed to ascertain if all areas of the research template needed to or had been completed. Through the research process, students were encouraged to develop their learning in relation to what they found relevant about the issue or problem.

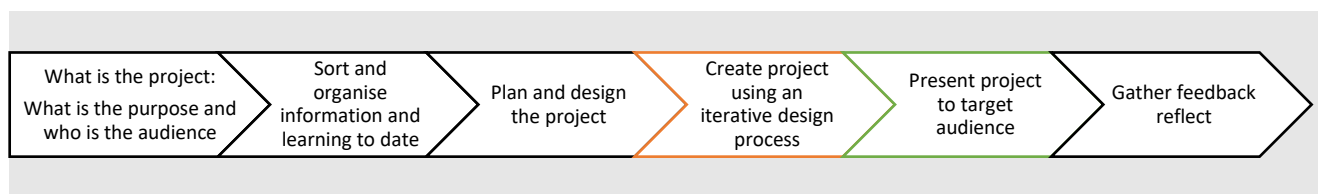
5.2.6 Learning Phase 3: projects and learning artifacts

Learning Phase 3 started with a final project where students brought their learning from both inquiries and the teacher-directed learning, applied the learning, and created something new (learning artefact); this was the transference of learning for students, which was the focus of Learning Phase 3. Project-based learning as a pedagogy is not new to education, having been around for over 50 years. It is possible to go back as far as Confucius and Aristotle, who both advocated ‘learning through doing’. John Dewey, over 100 years ago, was also an advocate for education to be an active process, “Education is not preparation for life; education is life itself” (Dewey, 1916, p. 239). Students then presented this learning to peers or a relevant audience to further the knowledge of the community (Knowledge Building). These projects or application of learning activities had the intention of allowing students to take what they had learned about an area they were interested in, and enabled students to take their learning and turn it into a new piece of work, that demonstrated critical thinking and engagement with their learning. There was a strong focus on students using relevant, transferable skills, as well as looking at past reflections to set clear goals.

The purpose of Learning Phase 3 was to inform or educate an audience, which was a method of Knowledge Building. Students presented potential problems and/or solutions to an issue or shared why an issue was important. This was done in a variety of creative ways, from creating a documentary on poverty to building a sustainable city through Minecraft or a 3D model, using cardboard. It was to design a course of social action to create change. Projects required teachers to have a strong understanding of what the final product was that students were creating, and to put in place clear systems to help students through the process. This was achieved through checklists, deadlines, feedback, breaking down of tasks into manageable pieces. There were a series of steps students needed to move through, regardless of the product, as shown in Figure 14.

Figure 14

Project-based learning process for Connected Curriculum Learning Design Framework



The projects or new learning artefacts were problems and/or solutions, focused with the key objective of demonstrating the application of learning by the student. From the design process and project management to completion, there were several skills students needed to be able to use. The Science teacher found that

Big projects...were really valuable to do especially at this kind of junior level, because they teach skills outside of the curriculum. I think having a cross-curricular kind of base you have more directions you can go in with those big projects...you can activate people's interest; if you're not interested in science maybe you might be interested in Social Studies stuff, and then be more engaged in a science class if you're bringing them both in. (Interview, 2019)

These projects often had an element of technology which could be connected to the Digital Curriculum, especially computational thinking. These projects were usually placed at the end of the learning unit. It was an opportunity for students to take their learning, what they had found interesting from the student-led inquiries and teacher-directed learning to create a new learning artefact (Section 2.2.1). In Term 1, 2020, for example, students had to create a

documentary on Space. Clear criteria gave students opportunities to share their knowledge on learnings, for example, the Space Treaty, government systems or their understanding of camera angles. In Term 3, 2019, students built a sustainable city from cardboard, having prototyped in Minecraft Edu. These projects were scenario-based and had been a highlight for the teachers and the students. The English teacher wrote in the final questionnaire, *“I really like how these end assignments 'pull together' all the connected learning areas and I think it's cool for the students to see how their connected subjects could work in the real world”* (2020). The opportunity to work through a project, take what they had learned and synthesise it into a new learning artefact, created a deeper level of learning and understanding. These projects were not assessed as end of unit tests, but teachers still gathered information on where students were with their learning. When watching the documentaries, the English teacher noted learning, transferable skills or techniques that needed continued work, such as the pace and clarity a student spoke at.

It was important that students were given enough agency and were not micromanaged by the teacher. This was difficult for teachers as they wanted all students to achieve success. It was important to understand that failure was not always a negative outcome. Teachers, when first taking students through a project in the Connected class at the school involved in this research were often worried about incompleteness. However, an incomplete project could be just as big a learning opportunity as a completed project. There were several reasons why students did not complete a project, such as poor time management, losing data, poor project design, and absences to name a few. It was important that each teacher worked with the students to guide them through the process and helped to solve problems at key points. Failing fast was a positive skill to learn and was common in design thinking. The student's ability to learn how to fail fast could ultimately bring greater success as they solved issues and problems that arose. The reflection at the end of the unit was incredibly valuable. It allowed students to spend time identifying what worked well and where there was room to improve.

Project-based learning or creating new learning artefact that showed the transference of learning and application of knowledge in Phase 3 challenged the students and the teachers. Over the course of the last year and a half, teachers had designed systems that enabled students to work through the projects. Checklists and timelines had been invaluable, whether designed by the teacher or students, as the monitoring allowed students to work through a series of steps. At key points during any project, students needed to get teacher sign-off before progressing to

the next stage. Without the sign-off, students would jump to the final activity without the planning, research, and development of ideas. At the conclusion of the projects, there was an opportunity to share their projects with other students and/or teachers outside of the Connected class. At the start of the project, students would know how and to whom they are presenting.

There were challenges with project-based learning for teachers who had never used this pedagogy. Inevitably, there were several questions that arose with project-based learning, such as, 'What happens if a student doesn't finish it?' As stated previously, there were many reasons why a student did not finish - from losing work online to poor time management. What was important was the learning that could come out of this design process for the student and that success was not necessarily a completed project. From my own experience of project-based learning, I found it quite daunting in the sense I had to empower the students to take control of their learning and, in a way, relinquish control as a teacher. There was often a 'turning to custard' moment when I was not sure if it would come together, but it always did. I have since described this feeling as 'becoming comfortable with the ambiguity of learning'. It was imperative that there were strong scaffolds in place for students to follow, but that allowed the students agency with their learning. It was also important that teachers understood this was as much about students learning about themselves and how they learn, as it was about the content the project sat within.

A challenge for me, as the coordinator of the teachers involved in the Connected class, was making this process comfortable for them and their students. There was a degree of ambiguity, and I would talk to the teachers about becoming comfortable in the ambiguity. This was done by supporting teachers to focus on the design of the projects, such as timelines, clear instructions and checklists. Sometimes the teachers decided to distribute these to students on computer through Microsoft OneNote, Microsoft Teams Assignments or on paper. When using paper, the students would have a folder, and these were moved between the teachers. Teachers over the first few terms worked together and with the students to come up with systems that worked for them and by the second year were familiar to all. This was achieved through clear communication between the teachers sharing their own concerns, trialling different methods and feeding back to each other. The process of collaborating on the systems that best suited their students, in conjunction with the students, meant that as students and the teacher gained experience overtime, the students were able to move more smoothly through the projects.

5.2.7 Goal setting and reflection

Throughout the unit of learning, students had opportunities to actively reflect and set goals. These goals were in relation to the topic or activity at hand or focused on developing a transferable skill, for example, managing their time. Students needed to have the time and space to reflect on how they worked through an inquiry. They looked at what they would like to improve on and then to reflect on this and set future goals. By helping the students to understand how they learn, we were able to empower the students to take responsibility for their learning. Reflections from students were a powerful tool for the teachers to gather information on the learning experience for students. From there, teachers could adapt the teaching and learning programs based on this student feedback.

Students began by looking at their recorded reflections and goals from their previous unit of work. Based on this, the students set their own personal goals for the inquiry. It could have been organising their time more effectively or contributing to groups. These goals were based on the key competencies with the goal of helping students to understand ‘how’ they learn.

The small research task in Learning Phase 1 was to get an idea of what the ‘issue or problem’ was. How this student inquiry was designed was based on the student’s ability with inquiry learning. Some students needed considerable teacher-guided support while others already had developed the skills to be more independent. This small research task was about understanding the issue in more detail and allowing students’ time to explore not only the issue, but also where their interests lay.

During Learning Phase 3, when the project or learning artefact was completed and presented, students and teachers had the opportunity to reflect on the learning and the transferable skills. This was not a rushed step in the learning process but was equally as important. The Science teacher said, “*One of the most important single science skills, is being okay with making mistakes and then learning from those mistakes without compromising judgement*” (Interview, 2019). Students spending time on reflection enabled them to be able to understand what areas they needed to work on in relation to their learning, such as what learning to build on for the next project as well as to celebrate success in their learning. These reflections were done in a variety of ways - from class discussions to completing forms online or writing in their Class OneNote (digital class book). Over time, their reflections became more detailed as they became more familiar with the process. The goal setting became more specific over time as they realise that they could work on one or more small areas rather than a broad

general area. The Social Science teacher found that three reluctant students, after three terms of working with reflections and goal settings, *“actually performed and presented something without assistance ... they built that skill of being able to trust themselves to do it and mark where they fit”* (Interview, 2019). The goal setting and reflections were specific to certain subjects. The transferable skills, by their very nature, crossed over each subject area and students worked on a transferable skill, such as self-regulation or collaboration, for a significant part of the school year.

5.2.8 Evaluating student learning

In the Connected classes, the expectation was that Year 9 and Year 10 student learning was evaluated as they progressed through the units of learning, not through end-of-topic tasks or assessments. The focus was on gathering information on what students already knew and where they needed to develop further. How teachers evaluated student learning and provided next steps varied between departments. Subject-specialist teachers needed to follow their department guidelines and listen to their Head of Department. For example, in Social Studies, rubrics were developed and used to help students understand the success criteria, both for the achievement objective and for skills, such as research and perspective writing. This information was recorded in the school’s management system software.

A series of generic rubrics on skills, such as paragraphs and research, were developed collaboratively among the teachers involved in the Connected classes. For example, rubrics were designed which focused on specific skills, such as paragraphing, researching, graphs and perspectives. This provided consistency across the learning areas. All teachers in the connected classes had access to these rubrics through the online ‘Connected Teachers Team’, which is part of the Microsoft suite of online software tools. While the rubrics were generic in nature, the student and/or the teacher adapted them. Teachers were expected to tailor these rubrics to the learning taking place to the specific task. The aim of these rubrics was to provide the student with a clear indication of the criteria for the student to understand the learning taking place. By clearly showing what was expected and the different steps, students had a ‘road map’ on where they were at and where they could go. Initially, the Science teacher found evaluating student learning in this manner to be a personal challenge but, *“really appreciated the frameworks that we’ve looked at in the Connected learning environment and I’ve applied them to some other classes as well.... I found the way we’ve been assessing really good”* (Science teacher, Interview, 2020). By making the evaluation of learning explicit for students,

they worked towards building their knowledge and skills by clearly understanding the learning outcomes. Rubrics for key learning activities were expected to be discussed with students prior to the task. Students self-reflected on where they were at and where they wanted to go. From this point, goals were set.

Figure 15 shows examples of skills rubrics used in the Connected class and in the Social Studies department. Teachers were encouraged to make these specific to the task and developed with the students as the Science teacher said “*the rubric styles... I find really good*” (Interview, 2020). Teachers and students needed to spend time going through these and looking at what each step meant. Prior to a task, a teacher asked students where they thought they were at and what they were striving for. If the teacher and student had a different perspective, the student was asked to provide evidence. In order to have these learning conversations, there needed to be a positive relationship between the teacher and student. The teacher had, at times, taken the evidence and discussion from the student and said, “Yes, you’re right,” and continued the learning conversation. At other times, the student realised that there was still more learning that needed to be done and had greater clarity on their next steps. These learning conversations empowered the student to have a high degree of agency over their learning and put the student at the heart of the learning rather than the assessment or content. This was where the ‘value added’ for the student was seen.

Evaluating student learning was informal or formal, but it was necessary to monitor progress and informed the next steps in teaching and learning. The Social Studies teacher, for example, used regular feedback (usually online) to measure the progress the students were making (Social Science teacher, Interview, 2020). It took time for students to understand and use the rubrics, but the teacher emphasised that this was a tool being used to show students their progression and as goal setting and reflection tools to evaluate student progress (Social Science teacher, Interview, 2020). The emphasis was on the need for ongoing information on learning, for both students and teachers.

Table 7

Research gathering and skills interpretation rubrics

RESEARCH GATHERING

RESEARCH GATHERING	AT LEVEL	ABOVE	EXTENDED
Sources to choose from: Maps, Graphs, Movies, Photos, Blogs, Articles, Newspapers, Websites,	I can find a variety of sources and store this in a bibliography list. I can identify whether this is a primary or secondary source I can highlight the most important areas related to the key questions	I can find a variety of sources that is relevant to my study and store this in a bibliography I can identify whether this is a primary or secondary source I can identify if this source is reliable or not And my information shows a deep insight ... And I can identify my strengths and weaknesses in my research through an evaluation ... And can draw and form conclusions about the information

SKILLS INTERPRETATION

SKILLS INTERPRETATION	AT LEVEL	ABOVE	EXTENDED
This can be Graphs, maps, history roads, time lines, picture interpretation, reading analysis	I can identify what the information is showing us with links to the evidence I can create a graph/map or skills based activity individually. Most conventions are accurate.	I can identify what the information is showing us with links to evidence. Can explain the reasoning behind the skill eg. trend, pattern, positive, negative outcome Can create a graph/map or skill individually. All conventions are correct.	...and I can show insight in my conclusions by: linking to big ideas or concepts making insightful generalisations from the information I have can predict what the future may look like

Teachers had a range of tools they used to establish where students were at and what their next steps were. In the Connected classes, students would usually complete an activity at the start of the unit to establish their current knowledge and learning needs. As the learning progressed, teachers used rubrics with students to provide clarity on where they were at and what they were striving for. These rubrics were co-designed between the students and

teachers, and students could peer assess each other too. Often students reflected on their previous pieces of work, inquiries or projects and set goals accordingly. The teacher also used quizzes and discussions to ascertain what the student knew and needed to know. The Social Studies teacher could see that the achievement and learning objectives were being met as *“I evaluate students throughout the term through skills tasks but through quizzes, research and through summaries in class. I am giving them feedback and feed forward when they are completing tasks”* (Questionnaire, 2020). Presentation of student projects provided an opportunity for students to see not only their final project, but to also celebrate the learning. From here, students set goals for their next project. A standout example of this in 2020 was, *“students spending time evaluating on their summaries on Space explorers and discussing the positive and negatives of this. Students who would normally not present were willing too”* (Social Studies teacher, Questionnaire, 2020). When teachers realised that as they were evaluating student learning over time, they did not have to make sure the final project was an assessment. *“I really like how these end assignments (projects) pull together all connected learning areas, and I think it’s cool for students to see how their connected subjects could work in the real world”* (English teacher, Questionnaire, 2020).

5.2.9 Value added

Value added is a term used for measures the impact of the teaching and learning program on the student. How do we know the teaching and learning program has ‘added value’ to the student? This means educators and the students themselves need to understand what they currently know and where they are moving. During the industrial age, education focused on rote learning and the transmission of knowledge from teacher to student (Section 2.1). This style of learning could easily be assessed through an end-of-topic or unit test - testing that the students knew the information that had been provided by the teacher or book. This did not mean that they had learned anything. They might have already known the information or guessed correctly. The need for students to thrive in an agile world, where the world has become more problem-based, has meant the skills and knowledge students needed had changed (Section 2.2). How a student functioned on a traditional test was increasingly not an accurate indication of their skill or understanding, but rather a test of memory.

Value-added requires teachers to know and have evidence of where students were at with their learning, their next steps and how they had improved (Section 2.4.2). Students needed to be part of these learning conversations. They, too, needed to understand how they learn, what they

already knew, and the pathway forward. The teachers in the Connected class in general felt that students developed a much deeper understanding, getting a *“sense of how the curriculum skills work together in real life ... there’s a really deep understanding of how the subjects fit together... there is also a saturation of skills”* (English teacher, Interview, 2020). In an ideal world, anyone would be able to walk into a classroom, and ask any student, “What are you learning? Why? Where are you at? and, What are your next steps and how do you know?” as students should understand the learning taking place. It was necessary for the teacher to be transparent with the learning taking place to enable the student to understand where they were at with their learning and their learning next steps.

Students needed to understand what they were trying to learn, understand or improve on. They needed to understand that there were high expectations, and these could be communicated through the school vision and values. Students needed to be challenged in a way that they could experience success and were motivated to learn, understand and improve. It was interesting that the English teacher said, *“It is not helpful to have a challenge that is so far out of reach or is too easily attainable”*. Students needed to have agency-ownership over their learning, but also needed to make sure their learning goals were appropriate. This was achieved through learning conversations, goal setting and reflection. These learning conversations helped students understand how they were going and how further improvement could be achieved. Rubrics, as mentioned, were a useful method in helping students understand the criteria for learning. Feedback must be timely and useful.

I found it useful to change the vocabulary from assessment to evaluating learning. This was because an assessment tends to be linked to a one-off exam or test at the end of the learning cycle. Evaluating learning indicated a continual process. We evaluated what students knew and learned throughout the cycle of the learning. Students also evaluated their learning progress, which empowered the student and helped to provide motivation. Learning conversations took place throughout the unit of work and links were made between units of work. This helped students to understand the short-term and long-term goals with their learning.

5.2.10 Curriculum achievement objectives

It was the professional responsibility of the teacher of the specialist subject to ensure achievement objectives were met. Students received feedback/feedforward based on

the specialist-subject department systems and in line with the expectations of the Head of Department of that subject area. The Heads of Department for English, Social Studies and Science were all part of the Connected classes. I felt that it was important for the Heads of Department to be involved in the Connected classes for several reasons. The Heads of Department needed to ensure the curriculum was covered, to develop ways to evaluate student learning, to be able to understand the needs of the teachers within their department who teach curriculum integration and were using pedagogy, such as project-based learning, and to understand that integrated learning did not ‘water’ down their curriculum. It was the role of Middle Leaders to ensure that teachers within their departments had support and supported each other in developing learning programs, resources, and tools for evaluating students to ensure the subject curriculum needs were covered.

5.3 Summary

The findings in Chapter 5 have examined the research gathered in relation to developing a pedagogical framework to design and deliver a Connected program across three subject areas (English, Science and Social Studies). In this case study, the Connected Curriculum Learning Design Framework addressed not only the specialist-subject teacher knowledge, without watering down the specialist subject, but also used a range of innovative pedagogies to move students from surface-to-deep-to-transference phases of learning. The innovative pedagogies included student-led inquiries and student projects. These pedagogies also provided an opportunity for students to develop 21st-century skills, such as collaboration and creativity, illustrated by the research carried out for Phase 3. The combinations of a range of pedagogies with the Specialist-subject Teacher-Directed Learning Hexagon ensured that there was no reliance on one pedagogy, for example, a student-led inquiry. Student-led inquiry on its own had a small effect size (Hattie, 2017). By using a range of innovative pedagogies, the students were better able to develop through the learning phases. In Phase 1, the students moved from surface-to-deep learning; at Phase 2, students worked in the deep learning; and, in Phase 3, learning progressed to the transference phase where students were able to apply their learning to a new context. Students were encouraged to develop metacognitive skills with a focus on detailed goal setting and reflection. The Connected Curriculum Learning Design Framework required teachers to move away from the end-of-topic assessments to a value-added framework where learning was evaluated over time. The Connected Curriculum Learning Design

Framework was a significant outcome of this research, as it provided a roadmap that could be adapted to any learning context for teachers wanting to know how to connect curriculum across subject areas.

Chapter 6: Findings – Implementation and Teacher Collaboration with the Connected Class

6.1 Introduction

Chapters 4 and 5 have described how the Connected curriculum came to be (Chapter 4) and the design of the Connected Curriculum Learning Design Framework (Chapter 5). Chapter 6 addresses the research question on the how the teachers delivered a Connected curriculum. This chapter discusses the implementation of the Connected Curriculum Learning Design Framework, the importance of a strong Community of Practice to support teachers with change, the planning of the learning taking place, and lesson sequences. Questionnaire and interview data were used to capture the experiences of the teachers involved in this action research. The goal with Chapter 6 was to provide a clear picture of how the teachers implemented the Connected Curriculum Learning Design Framework and their experiences. It was the experiences of the teachers delivering a Connected curriculum where I am a participant as well as the researcher.

6.2 Community of Practice

This section addresses the implementation of the Connected Curriculum Learning Design Framework in the Connected class. To implement the Connected class program, a Community of Practice approach was taken. The purpose of Community of Practice was to provide support for the teachers in the design and implementation of the program as well as to share their experiences and develop their own practice with connecting curriculum across three subject areas.

6.2.1 Structure and roles of the Community of Practice

The structure and roles within the Community of Practice for the face-to-face meetings were negotiated in the very first meeting. The role of the Connected coordinator was designed to keep an oversight of all the Connected classes with the responsibility of providing advice and

guidance on the program. It was not to lead the meetings for the Connected class in this research. When this Community of Practice began, I was aware of the power dynamic potentially leading this Community of Practice and the participatory aspect of the research. Considering this, the Connected coordinator took the role of scribe for the face-to-face meetings. This was to capture the ideas and to start writing up the collaborative documents, which were seen as “*highly important*” (Social Studies teacher, Interview, 2020). It did not necessarily mean those ideas were acted on, but they were recorded. It was then the three participants decided on who was leading these face-to-face meetings and who was the teacher leading this Connected class as a point of contact. The three teachers decided that the form teacher for the class would be the lead teacher. The rationale was that this fitted with the current school system of the form teacher being the first point of contact for teachers and parents/caregivers. The English teacher who was the form teacher also had the additional role of specialist classroom teacher and had more experience in collaboration and curriculum integration than the other two teachers. This reinforced the decision by the teachers to place the English teacher as the lead teacher. The final agreement all teachers made was that they would ensure they advocated for subjects that were not their own. This enabled opportunities to create conversations that fostered understanding. If the English teacher was asking the Science teacher what they needed, then they were developing their understanding of the subject area, providing space for that subject area specialist to share their thoughts and building trust.

6.2.2 Community of Practice

Teachers who had come on board to teach the Connected class had to commit to being involved in one face-to-face meeting a week. From the very outset, these meetings were Communities of Practice rather than general team meetings. Teachers at the first meeting were informed that these face-to-face meetings were to be positive, solution-based, meetings where teachers could co-create the units of learning, share their experiences, and seek solutions for any issues that were raised. Developing a strong Community of Practice was the driving system for collaboration among the teachers involved in the Connected classes. This trust and communication took time; the English teacher at the end of the third term of working in the Connected class and in the first interview (2019) said:

Getting used to your teaching partners takes time. When you are coming from a traditionally siloed planning environment, trying to work with other people and

sometimes they're very different personalities to you. I would feel like I was being clear, but it would become evident that I had missed some great things that were in my mind that I hadn't communicated and vice versa.

To overcome this communication barrier, it was important for the teachers to have vulnerable conversations during the face-to-face meetings: *"Hang on, I haven't quite got this, this is not clear in my head. Can you go over that again? What do you mean by this, have I got it completely wrong?"* (English teacher, Interview, 2019). The Social Studies teacher in their 2020 interview echoed this sentiment: *"Do make friends or, if not, good relationships with your colleagues who are doing it with you. Ask them questions or vice versa ... if you're not sure ... just being open to having some flexibility around what you're willing to do."* As the coordinator of the Connected classes, I tried to ensure we had time during the face-to-face meetings just to talk, not about the class necessarily, but to talk about how everyone was and what they had been doing. Giving time to have some personal conversation was a strategy to try to build collegiality. Having an integrated program based on collaboration with other teachers was an aspect the teachers enjoyed, because *"Having more brains thinking about ideas I think is brilliant.... It's just a monumental relief not to have come up with everything out of my own head"* (English teacher, Interview, 2019). It was during the discussion and designing the programs that teachers began to understand the other subject areas and what they brought to the learning.

During the face-to-face meetings, teachers had the opportunity to gain a better understanding of the other subject areas because:

It was just very difficult when you have a whole new topic that you haven't taught before, and you need to understand why science is teaching this and how does mine link to that. Understanding that was really essential. (Social Studies teacher, Interview 2019).

The Community of Practice at the beginning felt

a bit muddy for a while, while the three of us kind of worked together to get a collective view.... If people just, did it my way, things would be much better and we could get on with this... but on reflection, it's an arrogant way of thinking because the other two had other things that they were doing that I could learn from as well. (English teacher, Interview, 2020)

Trust took time to build, with teachers needing to see that others in the Community of Practice were willing to share, be vulnerable and do their part. For the English teacher this took about “*six months into the whole process, I started to relax when we had some good discussions around scaffolding*” (Questionnaire, 2020). The Social Studies teacher felt that the Community of Practice was successful because they had a shared vision and this was something new and it was “*okay to trial things*” and that it was a “*a little bit hard at the start*” (Interview, 2020). The consensus among the teachers was for the Community of Practice to work well, there was a need for teachers to be flexible and have a willingness to try something new. The term I used with the teachers was ‘getting comfortable with ambiguity’ and trusting that with communication face-to-face and online that each teacher was doing their part.

6.2.3 Leading the Community of Practice

The face-to-face meetings always started with a general discussion between the teachers not related to the class or learning to build the relationship between the teachers. When the discussion did move onto the Connected class, it started with how the class had been since the previous meeting. Were there any students of concern and why? Which students had been working well and needed extending, or which students needed support, or who were the quiet students and how were they doing? The coordinator initially led this line of questioning, but after a term, the English teacher led. This ensured the conversation did not encourage deficit thinking and that all students were discussed, not just the loudest student. When teachers were discussing students of concern, they discussed the student involvement in their work, their behaviour, potential reasons, and strategies moving forward over the next week. The English teacher who was not only the most experienced teacher, but in her role as Specialist Classroom Teacher was working at providing teachers across the school with consistent school-wide strategies for behaviour management. The English/form teacher had a bigger picture of the class as they were hearing from other subject teachers and communicating with parents/caregivers. The English teacher was able to disseminate pastoral and academic information about the students to the Science and Social Studies teachers in these meetings. The teachers then provided a collaborative approach to managing students in the week ahead, whether it was where students were seated or how to approach a situation. This collaboration was invaluable especially for the other two teachers: “*It’s actually the behaviour management tips and stuff that we learned together which was quite good, reinforcing the rules (school)*”

between the three of us” (Social Studies teacher, Interview, 2019). Often, in teaching, it can be isolating. Having support and a collaborative approach was therefore welcome:

[W]e have our own target kids that we feel we need to keep our eyes on, so knowing if they aren't as engaged, or struggling or needing some sort of support, then I think that (the face-to-face meetings) was quite a good way to keep tabs. (Social Studies teacher, Interview, 2019)

The English teacher (form teacher) found the face-to-face meetings provided an opportunity for discussion on teaching skills, especially as the Science teacher was in their second year of teaching and the Social Studies teacher was still relatively new.

It was a combination of not just getting your head around the integrated program but being relatively new teachers thinking about the level of scaffolding and just good solid teaching skills...you can't have good integration unless you've got good solid teaching practices. So, it's not necessarily a new way of running the classroom. It's using tried and true stuff through a slightly different lens. (English teacher, Interview, 2020)

The role of the form teacher in leading the face-to-face meetings, with their level of experience, was critical in leading the Community of Practice. It provided rich discussion on supporting students with their learning, but also supporting the teachers with their practice.

6.2.4 Planning the learning

The teachers worked collaboratively in their teams to design and deliver the curriculum. The planning document (see Appendix F) had gone through several iterations before the teachers settled on the current version. Each teacher took responsibility for ensuring the coverage of the achievement objectives, as outlined in the New Zealand Curriculum, for their subject area. They also evaluated students based on these objectives. This curriculum program relied on one teacher in front of the students at a time and required clear communication between all three teachers to ensure the smooth delivery of the curriculum. To achieve this, teachers were aware from the beginning what the commitment was to being part of this program. It was necessary to meet face-to-face, once a week (individual class teachers) to discuss what had taken place, and to plan with where the learning was going, as well as to actively engage in the Microsoft Teams platform. They also had to complete the learning sequence and planning regularly, as this provided clarity for the teachers with what each was doing. Finally, they attended regular PLD meetings in 2019 with all other teachers

involved in the Connected classes. The intention was to continue these PLD meetings throughout 2020. Due to the impact of Covid-19, these meetings were moved to Term 4. The teachers used synchronous and a synchronous method to plan the teaching and learning programs.

6.2.5 Synchronous planning and communication

All teachers involved in the Connected class said how important the regular face-to-face meetings were. At the start of the year, these would take an hour and sometimes a bit longer, but by the end of Term 1 2020, after working together for more than a year, it would take approximately 30 minutes. These meetings had the primary purpose of knowing what students had done, where they were at, and the next step was for them. The secondary purpose of these meetings was to allow time for just general discussion with the purpose of this being the building of positive professional relationships.

The face-to-face meetings were initially about learning what curriculum integration, and project-based learning was. It was also about supporting the teachers through the ambiguity of teaching in an unfamiliar way. As the Science teacher said, “[T]here is more to it than just getting a couple of teachers together in a room and just see[ing] where your curriculum matches up” (Interview, 2020). It took time for everyone involved to understand what works effectively and how his or her curriculum and the pedagogy fit. It took time to build the trust necessary to understand what each teacher needed to feel comfortable with the learning plan, and to know that each teacher was doing his or her part. As the program progressed, the planning became faster as teachers developed a collaborative planning guide that worked for each of them, and more time was given to discussing the learning needs of students in relation to the planning.

6.2.6 Asynchronous planning and communication

Microsoft Teams was the online learning platform used by the school as part of the Microsoft Office 365 package. A Microsoft Teams team was created (Connected Teachers Only), which was for those involved with teaching the Connected classes. Each Team had a ‘general’ channel with an area for conversation, and files. Subsequent channels were created to give teachers their own class channel. Files were used within the class channel to organise planning and resources. Figures 15 and 16 are screenshots from the Connected Teachers Only Microsoft

Team. Figure 16 shows the Connected Teachers using the ‘post’ function. This was the place links to resources were placed or quick questions asked and answered.

Figure 15

Microsoft teams and posts

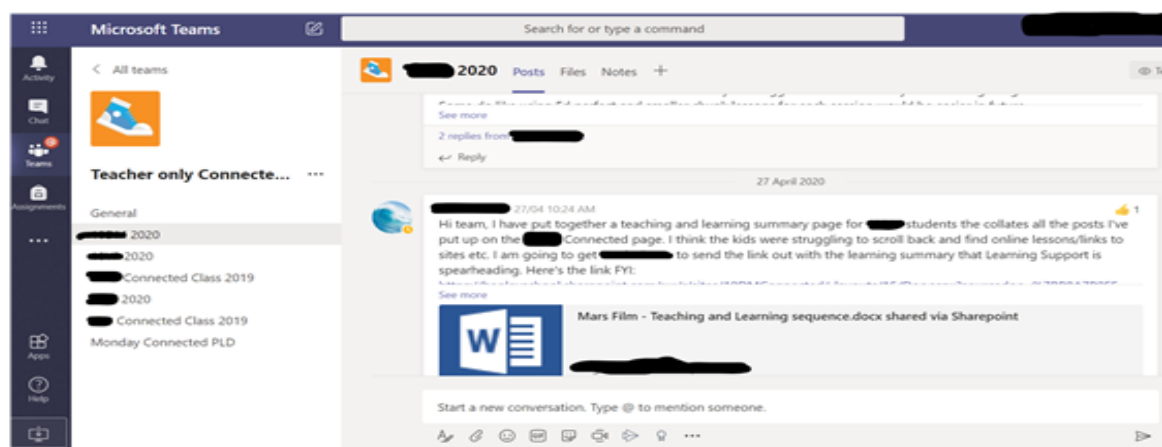
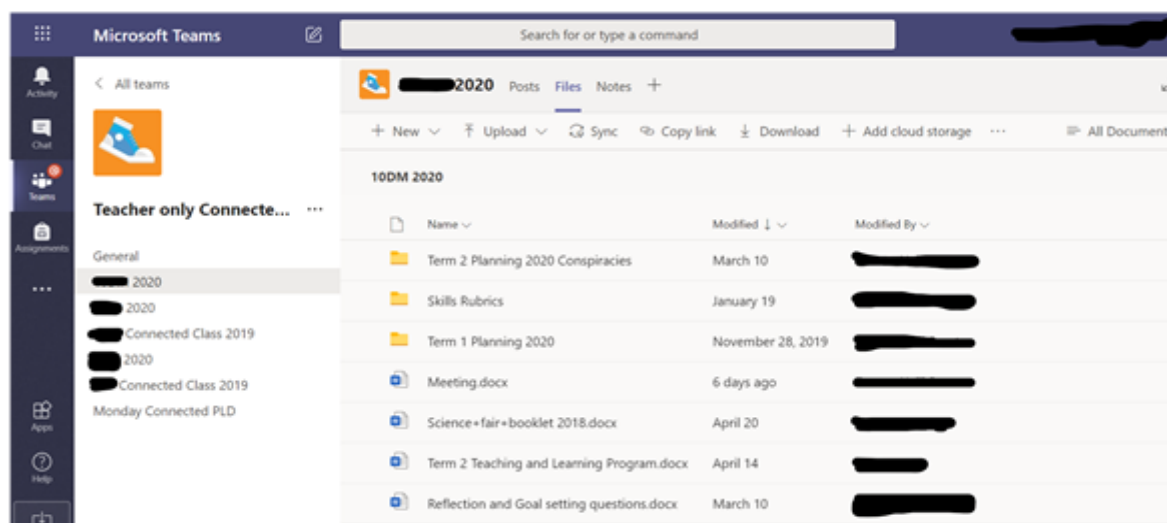


Figure 16 shows the ‘files’ section which was where all the planning documents were found and collaborated on. The Teachers Only Connected Team means that everyone who was a member of the Team, not just their own class group, could access, edit, copy and retrieve documents or information. This was to facilitate the sharing of resources, ideas and planning. Often during face-to-face meetings, teachers would start working on a shared unit plan and then complete the document at a time convenient to themselves. All three teachers commented on the one-shared planning document being essential to collaboration. This document was broken up into the separate subject areas in both the learning sequence and achievement objectives. This was to ensure all subjects could cover what they needed to.

Figure 16

Microsoft teams and files



6.2.7 Unit planning

Teachers worked together to create a unit plan prior to the delivery to students, which was responsive and relevant to the students and allowed for student agency and differentiation. A lesson sequence was completed as the unit unfolded. This allowed the learning to be responsive to the students. It also allowed current events happening in the world to be incorporated into the teaching and learning programs. It also helped the teachers involved, to see what students had done across all classes, how they could build on the previous learning, and next steps.

The unit plan document used was divided into key sections and is illustrated in Table 7: The sections included New Zealand Curriculum Achievement Objectives (AOs), Digital Outcomes, Transferable Skills, Ideas, and Teaching and Learning Sequence.

Table 8**Collaborative unit plan template for the Connected class**

Curriculum			Key Student Learning Activities		
English AOs	Science AOs	Social Science AOs			
Transferable Skills	Transferable Skills	Transferable Skills	Digital Learning Curriculum		EOTC/OTHER Speaker:
			<u>Designing and Developing a Digital Outcomes Progress Outcome 2</u>	<u>Computational Thinking Progress Outcomes</u>	
			eLearning Tools		

The first step was for teachers to discuss and work out which achievement objectives they would like to cover. The transferable skills were different for the different teachers and specific to the students based on student goals and needs. These transferable skills were the six developed by the school and reported to parents throughout the year. These transferable skills link to the five key competencies in the New Zealand Curriculum. The Digital Technology Outcomes were explicit to help teachers identify and work towards meeting these outcomes. The final box in the unit plan allowed teachers to think how this could link the learning to outside the classroom or bring experts into the classroom.

This document was the first step in working out and ensuring the requirements of the New Zealand Curriculum were met. Often there would be a discussion a few weeks prior to a new unit of work to see what the students and the teachers were interested in learning for the next unit. When the Covid-19 pandemic reach New Zealand and schools were shut, but working online from home, this document and the skills the teachers had gained through collaborative planning, both synchronously and asynchronously, meant the shift to working by distance was almost seamless. When school was set to reopen, the teachers and myself, as coordinator, had a discussion, and decided to start a new unit of work. Students were interested in conspiracy theories, and this seem like a natural progression from the study on Space.

Teachers started to look at current events and conspiracy theories around 5G and Covid-19. When events in the United States of America erupted with the killing of a black African American by police, this was readily integrated into the planning. Students explored bias, racism, and how these issues could be used to fuel and underpin conspiracy theories. This agility to be responsive to what was happening in the world, as well meeting the questions and needs of students was incredibly important. As a result, the planning needed to be responsive. By having a clear understanding of the achievement objectives and skills first, then overlaying the content, it allowed for this agility.

6.2.8 Learning sequences

The learning sequence was a working document and was key to ensuring a smooth delivery of the program. The learning sequence was used at each planning meeting and was responsive to what was being covered across all classes (Figure 18). It was not unusual to hear one teacher say, *“From what you have said you have covered.... I think I will change from what I had planned and go deeper into this”* or *“[T]he students having been asking about ... how can ‘we’ incorporate this?”* (Coordinator of Connected class meeting observations, 2019, 2020). This flexibility and communication were important because it built not only trust with what each teacher was doing but also allowed for more student agency. A completed template for the planning can be seen in Figure 17 (blank unit plan template can be seen in Appendix F).

Figure 17

Collaborative planning for Connected class

Planning notes:			
Science	English	Social Science	
Iterative design (experiments) How people get into space? Why do we care who owns space? What do we need to survive on Mars? <ul style="list-style-type: none"> • Air <ul style="list-style-type: none"> ○ Gas, states of matter • Foods <ul style="list-style-type: none"> ○ Properties of living things ○ Acid/base chemistry • Radiation protection <ul style="list-style-type: none"> ○ Types of radiation ○ Periodic table 	The Martian – film study (film techniques/Themes/Author Purpose/pilot vs. Theme] [was a serial novel) Hidden Figures? Debates? Find a good debating model. Genre study; Hard sci-fi vs. Soft sci-fi? *get Liz to create a 'space' book list	Time line of people who went to space Ethical dilemmas – rocket Elon Musk vs countries <u>Doco</u> – space x race Perspectives – is space travel a waste of money or necessary Budgeting Treaty – space laws / treaty in <i>Antarctica</i> / NZ	
Documentary content	Science	English	SS
Or Tourism advert for living on Mars	How do we get into space - physics (action/reaction), chemistry (chemical reactions) Why does it matter who owns space (dangers of orbit, resources, tungsten rods from space) What is in space (planetary systems, asteroids, <u>etc</u>) https://what-if.xkcd.com/ Difficulties/opportunities about living on Mars/in space	Author purpose, film techniques, scriptwriting, planning a documentary. Unfamiliar texts (written, series - <u>[Assession, Dr Who, doco]</u> , music video with space themes, songs, poems); various 'space' themed texts. (Socratic Circle – http://www.teachertalk.org/professional-development/strategy-guides/socratic-seminars-2060028e9)	What treaties exist? Treaty of Waitangi how do we ensure look after our indigenous rights Space treaty – rules and laws Different government systems Why should we go to space? Companies vs Countries ambitions. https://www.theverge.com/2016/9/27/1381790/spacex-event-video-elon-musk-mars-mission-video-super-cut Budgeting and planning a trip – space tourism

In the lesson sequence example in Figure 17, we can see that the teacher planning was simple bullet points. Teachers discussed the lesson sequence each week at the face-to-face meetings and the sequence was used as a guide to ensure everyone understood what was happening in the other class. Student work was delivered through Microsoft Teams using the Assignments or the Class OneNote spaces.

6.3 Enablers and constraints

The final research question asked what the enablers and constraints were during delivery of an integrated program. The three teachers were asked in both the interviews and questionnaires what they saw as enablers and constraints for delivering the Connected program. The purpose of this question was to unpack what some of the challenges were for the teachers involved in order to provide guidance for others in education.

6.3.1 Enablers

There were several key enablers to the design and implementation of the Connected program. These included: time, teachers developing an understanding of other subject areas, developing student agency, a strong Community of Practice, the role of the Connected coordinator, and the role of the form teacher. It was essential for teachers to collaborate on their planning (Figure 18) regularly to ensure clarity about the learning taking place. The collaborative planning in Figure 18 was a live document which teachers used regularly to share with the other teacher what they were planning to teach based on what was discussed in the meetings. Teacher would update the collaborative planning document after the lesson to inform the other teachers if anything had changed from the initial plan.

Figure 18

Collaborative planning: lesson sequence exemplar from Connected class

Lesson sequence (add rows)				
Week	Lesson	English	Science	Social Studies
1	1			
	2			
	3			
2	1			
	2			
	3			

Connected Learning			
Week 6	Monday/Thursday <ul style="list-style-type: none"> Identify key themes Name and identify film techniques and their effect Camera shots/angles What does the audience learn from the shot? Create a film strip with different camera shots Close viewing: potato scene Friday <ul style="list-style-type: none"> Tone/mood 	Food – Plant and how they work/grow Lab – variegated leaf iodine test	How are laws and policies made in the world: Government systems practices – interesting laws around the world Start investigating differing systems and choosing a topic for their research next week
Week 7 Rocket Lab man visiting	Monday: Talk with Tom Rocket – in the Annex Thursday: <ul style="list-style-type: none"> Describe how themes are shown Write a formal essay/paragraph Plan a media product (inquiry) Friday (assembly)	Give out Inquiry on Monday Food – Acid and base, what plants need to grow Lab – acid/base reactions	Research systems
Week 8 Planning moving into editing Inquiry Given out in Science Planning week	Monday Finish paragraphing	Radiation – periodic table, how to work it Lab – investigate elements Introduce booklet and groups – Monday. Pick groups based on governmental system.	Working on government systems inquiry
Week 9 Editing moving into filming	Inquiry booklet: Editing/filming	Radiation – what it is, how to protect from it, how it damages, how RTG in The Martian works Lab – work on presentation	plan script

6.3.2 Time

The most valuable commodity for teachers teaching an integrated curriculum was ‘time’. There was a lot for teachers to learn regarding delivering an integrated curriculum from the concept-based curriculum, student-led inquiry to project-based learning. Teachers needed ‘time’ to come up with tools and systems to work effectively together. The Senior Leadership Team of

the school in this case study recognised this need by providing me, as the coordinator, with four hours a week for the purpose of designing, implementing, and supporting the Connected classes (Section 4.2.1). As the coordinator of the Connected classes, I facilitated a meeting at the end of two years of running the program. Teachers said it took three consecutive units of learnings (approximately 30 school weeks) to become comfortable with the Connected Curriculum Learning Design framework and six months to feel confident with the teachers they were working with. As time progressed, especially after 18 months of working together and using the Connected Curriculum Learning Design Framework, the teachers needed less planning time and support. Teachers and Heads of Department were asked to view their subject through a different lens and to change and/or develop their teaching practice. It took ‘time’ to design the program, which focused on student-led inquiry and project-based learning. At first, it all seemed quite difficult, and it took more time to plan. All teachers went through a period of ambiguity while they learned how to collaborate with each other, how to view their curriculum area in a different light, and how to design the learning programs. Teachers needed to be aware, from the beginning, of the investment in time involved. However, as teachers became familiar with this way of designing and delivering an integrated program, this process became faster. Teachers also saw time being used ‘differently’ in these classes.

Time within the classroom was used differently to a siloed (single subject) approach to learning. As the teachers had a coordinated and connected approach to the learning that took place, the teachers shared the responsibilities for teaching learning skills and content relevant to the unit of learning. In a meeting with the Connected teachers, the teachers commented on how they waited for the face-to-face meeting before getting in too deep with the planning as the other teachers often had good ideas or by understanding what was happening in the other classes, they could build on the knowledge students currently had. This was evident when the English teacher found that the students had watched a documentary on the New Zealand Suffragette Movement in Social Studies and the English teacher learned the women’s right to vote went to a referendum when it did not first pass:

We were watching a documentary on the women’s Suffragette Movement in New Zealand. I didn’t realise that this went to a referendum vote when it didn’t first pass. The students all knew what a referendum was due to the specialist-subject learning they had been doing in Social Studies. (English teacher, Connected teachers’ meeting, 2020)

The English teacher built their own understanding during the meeting and was then able to reinforce students' prior learning in Social Studies and go deeper with the discussion in English.

Teachers discussed, in the face-to-face meetings, what skills they were going to use. One teacher taught an introductory session and another teacher/s developed and built on it. Teachers commented on the *“skills being taught in one class to present content knowledge taught in another”* (Science teacher, Questionnaire, 2020). This prevented a doubling up of information for students and instead changed the surface level of understanding to a deep level of understanding: *“I think the depth of student learning has the potential to be deeper than single curriculum areas”* (English teacher, Questionnaire, 2020). The Social Science teacher, in their 2020 questionnaire, had a similar response: *“... students are learning more in relation to the topics than normal and I can see that in their projects.”* Students were then required to show evidence of the knowledge of skills in the project, which would be the transference of knowledge. The Science teacher wrote in the questionnaire that, in relation to transferable skills and subject skills, *“... if they do not get a skill in science class, they will get it in social studies or English”* (2020). The non-specialist-subject teacher covered surface level learning, which allowed the subject-specialist teacher to focus on a deeper level of learning. This created time for the subject-specialist teacher, as they did not need to do both. In the final questionnaire, teachers were asked to comment on how confident they were that the achievement objective and learning outcomes were met. All three teachers were unanimous in their response indicating that they were either *“extremely confident”* or *“very confident”* (Questionnaire, 2020).

6.3.3 Recognising the similarities between subject areas

The teacher questionnaires, conducted in 2019 and 2020, asked the teachers to comment on the positives or what enabled the teaching of a Connected curriculum. The teachers said that the curriculum emphasised the similarities between different areas of learning and encouraged holistic thought. It inspired creativity, critical thinking and developed good problem-solving skills. It allowed students to make more connections with their learning, knowing what they had learned from other subject areas and applied it to a project or body of learning. The English teacher wrote, *“I think it offers students the chance to see how subject areas are connected in the real world”* (Questionnaire, 2019). This comment came from all the teachers

of this class. The teachers found that the students received a broader understanding of the topic and were able to make deeper connections between ranges of skills.

In English, if the students focused on the research questions and what made a good research question, the Social Studies teacher was then able to reinforce and build on this learning in the same week. Based on discussions at meetings and collaborative online planning, the teachers felt confident of the coverage of skills taught in the other classes. The Science teacher found that *“students achieve a broader understanding on a topic and can better understand how to make connections between varied skills”* (Questionnaire, 2020). This sentiment was echoed by the English teacher: *“I think students get a deeper understanding of topics and there is potential for higher levels of achievement ... particularly our final inquiry tasks, as students have one product [project] focus but all the learning from three different subjects”* (Questionnaire, 2020). The face-to-face meetings were an opportunity to discuss the class, and students individually. If a student was a challenge, struggling, or needed further extension, this was addressed almost immediately. As the form teacher was also a Connected Teacher, they were able to provide advice and guidance or additional information to the other two teachers as they collaborated on integrated learning. This level of communication meant that over the nine hours of combined learning for that week, there was a consistent approach by the three teachers.

6.3.4 Partnership: student agency and teacher autonomy

In general, the teachers felt that students had a ‘great deal’ of agency when compared to the traditional classes. The reason was that there was a *“greater change of student agency due to the scope of choice and regular group work”* (English teacher, Questionnaire, 2020). The Social Studies teacher found *“everyone is more willing to engage in topics ... they could pick areas of interest”* (Questionnaire, 2020). The teachers themselves felt they had a high degree of agency in how much they integrated the subject at any one time. The English teacher wrote, *“It’s ok to teach specific English skills outside the connected/integrated topic or teach English skills under a common topic or theme, right through to teaching English skills as part of a fully integrated inquiry”* (Questionnaire, 2020). The teachers were always the subject specialists and could make professional judgements on how to integrate their subject. Seeing curriculum integration as a continuum that teachers could move along, gave them the agency and confidence to adjust their level of integration based on the needs of the teacher and students. This was where communication was vitally important.

In the teachers' planning, the subjects were clearly identifiable to ensure we were covering each subject area. Students were told of the achievement objectives and learning outcomes, but not explicitly labelled by curriculum subject. We took on board the feedback from students and started to identify, in the key tasks for students, what aspects belonged to which subject. Teachers also verbally communicated how the learning connected to the different subjects. NCEA is New Zealand's official secondary school qualification. The school involved in this research at the time did not offer integrated NCEA subjects. Students needed to understand about different specialist subjects and how they were connected. This was an important part of the learning process with making the learning visible for students (Hattie, 2012).

6.3.5 Communication

As the teachers became more confident with the meetings, they seemed to develop a clear structure to the face-to-face meetings. These meetings started with a check-in on the classes in general. I would take notes and start with how the class has been over the past week, which students were struggling, who were working well, who were the students who had significantly changed over the past week. These questions focus more on behaviour management and getting to know the students. If a student was struggling, the three teachers shared their thoughts and then created a plan for the next week. This developed a united approach by the three teachers over nine hours of the student's timetable. Teachers communicated through Microsoft Teams as to how the student had been in their class. The teachers were solution focused and not deficit thinking when approaching these challenges. Some solutions were around the scaffolding of the task, who the student was working with, the approach to behaviour management, contacting home, discussion, or goal setting with the student.

The form teacher provided additional insight on the students concerned and heard any additional information from the other teachers. The discussion was always solution-focused with teachers agreeing as to how to proceed. From there, the teachers discussed the students who were working positively, students who were consistently working well or students who had improved and provided specific examples. After a discussion about students, the conversation shifted to their learning. Teachers opened the online learning sequence and provided a summary of previous teaching tasks and the learning plan for the next week. It was during this part of the conversation that the teachers explored and identified further ways to connect the learning. For example, with the Science Fair activity, the English teacher said she

would work with the students on their writing, and how they presented it while the Social Science teachers was working with students on graphing and displaying data. This left the Science teacher to ensure all experiments were conducted and followed up with students one-to-one.

The communication and integration of the learning, *“if done well, it can relieve 'doubling up' of teaching skills”* (English teacher, Questionnaire, 2019). This meant that research was covered in English, Science, and Social Studies consistently and with different teachers building on the skill of research. The Science teacher found that this was a good system for *“using skills in one class to present content knowledge in another”* (Questionnaire, 2020). This was due to the clarity each teacher had over who was teaching what and building on the students' prior learning from the other classes. This system, as the English teacher said, *“can offer students a learning experience that focuses on some kind of practical, meaningful outcome, giving an authentic learning context. In theory this should increase student agency”* (Questionnaire, 2019). The Social Studies teacher commented that one of the clear positives was:

I think I've felt better relationships ... because I know what they're (students) capable of, because I know what their interests are. I feel like I have a deeper understanding of what they seek in the topic. Whether it's more Science related, or more Social Studies related, and through that I can kind of picture what they're kind of wanting out of all this. I definitely think there's also been a positive in that the students have more of an understanding of why the topic is so important overall, especially the Space one we've just been doing. (Interview, 2020)

The teachers preferred the face-to-face meeting to be during the day rather than after school. In 2019, the teachers met after school on a Thursday, whereas in 2020, the teachers met during a shared non-contact period on a Tuesday morning. The meetings were entered into Kamar (School's Learning Management System) and appeared on the teachers' weekly timetables. Talking with the teachers, having the meeting earlier in the week was a preference. The shared non-contact time was made possible by talking with the person in charge of timetabling. It is not always possible to have three teacher timetables aligned. These teachers were only teaching one Connected class and if they were teaching more than this, then it seriously affected their non-contact time.

6.3.6 Strong Community of Practice

A strong Community of Practice, with high trust and strong communication, was key. Clear communication was essential during the weekly face-to-face meetings, which were fundamental to the success of the program and reinforced through Microsoft Teams. All teachers found that the face-to-face meetings were critical in designing and delivering the Connected program. This communication between the teachers at the weekly face-to-face meeting focused on the skills, task design (pedagogy and curriculum), students' learning needs and behaviours.

The structure for the Community of Practice was also a clear enabler. All the teachers involved had a positive approach to any challenges that arose because of the structures in place. They were solutions-orientated when working out how to overcome any challenges. The hardest part was at the start of the year in Term 1 and into Term 2. The teachers worked through the ambiguity of not having used this pedagogical approach. Teachers gained experience in curriculum integration, project-based learning, student inquiry, and how to work together while keeping the students at the heart of the learning. The planning template had several iterations to meet the needs of the teachers before settling on the version in this research (see Appendix F). The coordinator needed to be responsive to the needs of the teachers. One teacher articulated early on in 2019, the importance of the need to know the endpoint and to backward map the learning. Another teacher needed a clear structure and found that the possibility of too much flexibility would create stress. The teachers needed to feel supported and with a framework they could start with in order to build trust in the other teachers to do their part. As trust developed, teachers became more confident in sharing ideas and experiences. The planning moved from backward mapping to brainstorming a concept and then ideas on how to proceed. A comment by a teacher in their 2020 interview, after working with the class for five terms said:

[W]e know some things that don't work, and we know some things that do. There is more to it than just getting a couple of teachers together into a room and just seeing where your curriculum lines match. It has taken a little bit for me to figure out how to do that somewhat effectively. My idea of curriculum integration is more complete and complex than it was earlier [in 2019]. (Science teacher, Interview, 2020)

The teachers "enjoyed working as a team" (Science teacher, Questionnaire, 2020), sharing the positives and negatives. By Term 2 of 2019, teachers were saying things

like, “*I’m not sure I understand*” or “*I don’t feel too confident with how to evaluate student learning*” (Questionnaire, 2019). Whenever this vulnerability was communicated, time was spent providing support for developing understanding among one another.

It was important that in these meetings, the specialist-subject teacher advocated for their subject. The Science teacher, who was a second year beginning teacher in 2019, said his advice to other beginning teachers was to ensure

You advocate for your subject in the context of the Connected learning cluster... figure out what makes your subject special or what is taught best by your subject, or what is taught best in the context of your subject and make that stuff really stand out when you’re planning and teaching. (Interview, 2020)

This advice was just as valid for more experienced teachers. At the start of 2019, I spoke to the teachers about advocating not just for their subject, but by asking the other subject specialists, “what they need”. This awareness of the other subjects helped to build the knowledge of the teachers of other subject areas. This was because they would seek to understand ‘why’ the learning was necessary for that subject. I noticed at the Connected teacher meeting in Term 3, 2020 that the Science teacher said, “*In English, I need the student to understand...’ at which the English teacher said, ‘Yes, tell me what I can do’*” (coordinator Connected class meeting observation, 2020). This was in the context of students learning language to prepare for the Science Fair and illustrated how teachers worked together for students.

The guidelines for the Connected Teachers Community of Practice were established at the start of the year because I felt that we needed to have a clear structure to build on. As the coordinator of the Connected classes, I saw my role in facilitating the teachers with their planning and delivery. I was aware that I was only the teacher of one of the classes and that the teachers of the other classes would understand their students’ needs in more detail. I saw my role as the coordinator was providing guidance in the understanding, planning, and delivery of the integrated program. My knowledge and understanding were based on my research from the literature review as outlined in Chapter 2.

The meetings at the beginning of 2019 took approximately an hour but over 18 months dropped to 20 minutes. I believed that having an hour dedicated a week to face-to-face meetings meant that the teachers were not rushed, and they continued to build a rapport with the other teachers. When the meetings were an hour long, often this allowed teachers to discuss what was happening in their departments, share their department professional development

meetings or conversations about their day or week. This helped to build relationships among the teachers and helped create a positive Community of Practice.

6.3.7 Coordinator for the Connected classes

Having a coordinator of the Connected program was a clear enabler for the program. In this case study, there were three Connected classes; two in Year 10 and one in Year 9. Teachers at this school taught the same class for two years, Year 9 and Year 10. By having three classes, we worked on building a strong program, but also worked on building teacher capabilities, ensuring that more teachers had the opportunity to teach in the Connected classes. In 2021, the Connected Classes program was further developed with Mathematics wanting to be included. The role of the coordinator was to provide advice and guidance with connected learning, facilitating the discussion between the teachers, but not dictating the direction of the learning programs. The role included ensuring consistency across the classes, that the learning sequence was up to date, that there was clarity in the curriculum design, to problem-solve, to offer ideas on potential ways to connect the subjects and listening to the needs of the teachers.

The school had provided me with time, by releasing me from one of my classes rather than financial remuneration, such as a management unit. This was an example of how a Senior Leadership Team assisted teachers with delivering change. This support of time was a challenge for the Senior Leadership Team as it affected staffing and created a cost. This gift of time was far more valuable as I would facilitate the meetings and professional development. I also created the draft forms for the unit plans, student inquiry documents, and other resources that the teachers built upon. The teachers felt that having a coordinator helped with ‘monitoring of the progress’ and ‘helped the communication flow’. The role of the coordinator was to provide support for teachers in the face of ambiguity. This was a new experience for the teachers and necessary, especially in the first year. Teachers needed to gain experience and confidence in the process of working collaboratively to deliver a curriculum that was concept- and skills-driven. The role of the coordinator meant there was someone overseeing ‘the big picture’ and providing support in the curriculum design. It provided an objective opinion in the face-to-face meetings by listening to all the participants and presenting ideas or solutions.

6.3.8 Form teacher involvement

At the start of 2019, I suggested that the form teacher be the person to guide the group of teachers for this class. My rationale for the form teacher being the lead in the group was based

on several reasons. The form teacher of the class involved in this research had the school role of Specialist Classroom Teacher. As part of her role as Specialist Classroom Teacher, she guided the beginning and new teachers to the school. In the past, she has taught across departments at this school, as well as having experience as an intermediate teacher. Finally, the form teacher was the point of contact and connection between the teachers, students, and family.

6.3.9 Student transferable skills

The learning design for the Connected classes strived to be skills driven. At this school, transferable skills were reported to parents two to three times a year. It was interesting and affirming that all the teachers involved in the Connected classes found the writing of reports easier. It was easier for teachers, for example, to comment on a student's ability to collaborate or self-regulate because the student inquiries and projects were focused on developing transferable skills in conjunction with developing their knowledge. Developing student transferable skills was harder to measure than curriculum skills with the English teaching finding that

the best stuff [learning] is the hardest stuff [learning]. I think we're teaching such great transferable skills, not just curriculum skills ... We are trying to prepare these young people to be really good functioning, intelligent, thinking human beings when they leave school. That's got to do with managing themselves and goal setting... You can say it but there is no hard evidence. So, that's a bit of a challenge. (English teacher, Interview 2020)

6.4 Constraints

The constraints were identified using questionnaires, interviews, and during Connected teacher meetings. In general, the constraints were addressed through a solutions-based approach. As the teachers and I met regularly, many potential issues were addressed while still small. The teachers were also constantly listening to students, getting feedback from them, and then being responsive in addressing the issues. Two broad areas were identified in relation to constraints; firstly, that the students found the subjects not easily identifiable, and secondly, the need to develop teacher capabilities.

6.4.1 Subjects not identifiable

The main constraint identified by all teachers came from student feedback; that they were doing too much of the “*same thing*” (Science Teacher, Interview, 2019). This feedback came through earlier in the year (2019). At face-to-face meetings, the Connected teachers and I discussed the student feedback. Through this discussion, I found that because we were trying to integrate the subjects at the transdisciplinary level, students could not identify the different subject areas. This on the one hand was a success, however, it also became a constraint. The Science teacher was particularly “*surprised at how the students seemed to be bored or annoyed at having the same topic all the time*” (Interview, 2019). We realised we had successfully integrated all three subjects when student feedback said that they didn’t know, “*what was English, what was Science, or what was Social Studies*” (Face-to-face meeting, 2019). The students, however, wanted to identify their learning in this way. The challenge was the students’ perceptions of what high school learning was all about, and how it differs from Primary and Intermediate school. The Teachers found that after talking with students that one of the things they looked forward to or described as high school being different to Primary and Intermediate schools were the different subjects. Despite opting into the Connected learning, they still wanted to ‘see’ the subjects.

Students wanting to ‘see’ the subject was especially relevant for science. Students seemed to have a perception when coming to high school that Science was experiments. The Science Connected Teacher said that students thought Science was what they saw on television, in the movies or online. The English and Social Studies teachers commented that as they both had experience in teaching both English and Social Studies, that they had the confidence to talk to students about the learning and connect it to the other subject. Nevertheless, they did not have the same confidence or understanding of the Science Curriculum and science capabilities. Moving into 2021, the teachers were going to spend more time understanding the other subject areas they were connected with to overcome this constraint.

6.4.2 Staff capabilities

Staff capabilities could be a constraint. It took time to develop the capabilities of teachers and was often best achieved through practical experience rather than just attending a course. Another way was to be explicit during the recruiting process. The Deputy Principal of Staff Wellbeing said,

When I'm hiring people, we do give this [Education] brief – it goes out and so does our mission statement and values and it's just saying to them, "What's your collaboration experience?" There're not many people out that are applying for jobs here that have strong collaboration experience. There are some people who call collaboration planning with another teacher, but there's nobody who's really doing the kind of connectedness that you've got going in the class. (Interview, 2019)

The school had consciously not forced teachers into a particular method of teaching, instead allowing

People come to it in their own time. You can speed that time up by good observations of people who are doing it well, the right kind of spaces, which we're suffering from at the moment; and actually, making sure you've got good leaders who are prepared to keep their minds open and try collaboration. True collaboration, not just planning the curriculum because we share a class... it's real collaboration. (Deputy Principal of Staff Wellbeing, Interview, 2019)

The Connected teachers all discussed the need for teachers new to this method of teaching and learning to understand that in the beginning, it is difficult and ambiguous. It was difficult for established teachers who had units or lessons that had been used and adapted over time to understand that they needed to change their approach to planning. Teachers needed to change from having units planned weeks in advance to working with other teachers and the students to design learning programs that were relevant and agentic. During the process of the unit of learning and collaboration, teachers needed to be flexible in their thinking and planning and as one Connected teacher said, "not married an idea" but flexible to change their thinking and adjust their lesson planning. The constraint in the building of the teacher capability was that, as all Connected teachers said, myself included, it took two to three cycles of the Connected Curriculum Learning Design Framework for a teacher to become comfortable with the process, build trust, and communication with the teachers they were working with.

6.5 Summary

The findings of this research have detailed the rationale and implementation for the Connected class as well as how the school has encouraged and supported change. This chapter has provided a detailed account how the teachers of Connected class implemented the Connected

Curriculum Learning Design Framework I created as part of this research. It has provided an analysis of the relevant data gathered on how teachers have used this framework to design and implement learning programs for Year 9 and Year 10 students. Considerations for a school designing and implementing change has been examined in detail.

Chapter 7 provides a rich discussion and summary of how one school created an environment responsive to change for future-focused learning. This included exploring the steps the school had taken with the Education Brief to uncover what the school had done and the changes they wished to make moving forward. This was then analysed through the aspects of Character and Culture, systems, pedagogy and curriculum. In the following chapter, Sections 7.3 and 7.4 address the enablers and constraints of delivering a Connected program based on the experiences of teachers designing and teaching in the Connected class.

Chapter 7: Discussion

7.1 Introduction

The intention of this research was to identify practical steps on how to create and implement a future-focused Connected curriculum in Years 9 and 10. The research questions in this case study were: (1) How did the Senior Leadership Team create an environment where teachers could deliver a future-focused curriculum that included curriculum connection across three subjects; (2) How did the teachers implement a future-focused Connected curriculum in a traditional high school; and, (3) What were the enablers and constraints when implementing a Connected curriculum? This research identified four key components to the organisation and delivery of learning at high school. These components were Systems (to ensure the day-to-day running of a school) Pedagogy, Curriculum, and Character and Culture. A key finding in this research was the importance of the Character and Culture of the school as underpinning the school system, pedagogy, and curriculum used to deliver the teaching and learning. The discussion chapter focused on the four components, Character and Culture, Systems, Pedagogy, and Curriculum, as the findings suggested each component is interrelated. However, that main finding was that we can infer that the most important component, when managing change, is a school's understanding of their own Character and Culture, which will determine the changes and potential success of significant changes implemented.

7.2 Character and Culture

A key document in this research, that explicitly examines the school's Character and Culture, was the Education Brief. The research findings indicated that a key part of successful significant change was the explicitness in reviewing and understanding the school's past and current Character and Culture. The findings illustrate in Chapter 4 that it was the special character of the school, and the people within the school, that created a unique Character and Culture; in essence, each school has its own microcosm. Accordingly, it appears it was necessary for Senior Leaders to consider the unique context of the people within their own school when implementing change. For example, applying a curriculum model from a different

school and implementing it with no adaptation for the new context would have limited, if any success.

However, the understanding of the Character and Culture of the school involved in this research needed to broaden beyond the special character to take into consideration the roles of the people within the organisation. A significant finding within the Character and Culture of a school was the understanding of the capabilities of teachers to undertake change and develop their professional practice. The capabilities of teachers to manage change, learn new pedagogical approaches, and willingness to try new approaches to the curriculum was the result of the school's Character and Culture. A school's understanding of what teachers currently understood to be good practice, and where teachers needed to develop their expertise in innovative curriculum design was a key consideration by the Senior Leadership Team involved in this case study. An understanding of teacher capabilities was part of the responsibility of leaders to "provide the conditions, environment, and opportunities for others to be creative" (Stoll & Temperley, 2009, p. 66) when designing and creating an innovative curriculum and pedagogy. This study found that the school involved in this research used two key methods to develop teacher capabilities and foster innovation; these were the use of pilot programs and the roles of Middle Leaders using a leadership Community of Practice with all Heads of Department leading change within their own subject departments.

7.2.1 Pilot programs

The school in this research used pilot programs to foster innovation and to provide a way for teachers to 'experiment' with new curriculum ideas and pedagogical approaches to learning. As the School Principal identified (Section 4.2), the use of pilot programs successfully evolved into a mechanism that enabled teachers to drive change to create responsive, innovative, curriculum and pedagogical approaches. The Deputy Principal of Curriculum had noticed that within the school these pilot programs created a mindset with teachers that fostered innovation among staff. Staff were encouraged, regardless of position, to 'try' something new. The Senior Leadership Team recognised teaching staff as the professionals they were and encouraged teachers to learn about the latest research, whether through academic readings or professional development, to design courses that best meet the needs of the student, thereby creating 'pockets of change' within the school (Section 4.1).

7.2.2 Relational trust

As the Principal said in the interview in 2019, the Senior Leadership Team did not want to “mandate change” but instead have those teachers willing to drive the change to do so (Section 4.1). When teachers feel trusted to try new approaches, it was more likely that changes to curriculum, pedagogy or a system would be more harmonious. This was particularly so when there were high levels of relational trust between staff and students. One of the findings was the belief in the significant role Middle Leaders played in creating change. Leadership meetings, which historically had been heavily administrative, had a new purpose as a Community of Practice. Middle Leaders helped drive change within their own departments by forming communities of practice at a department level, such as the Community of Practice for the Connected classes.

Relational trust among the teachers was also a key factor in creating an environment where teachers were willing to be vulnerable as they shared their practice, not only what had worked but what had not (Section 6.2.2). Relational trust was seen in several ways from teachers noticing that they wanted to discuss planning with the other teachers to the recognising that it took time them to fully trust their colleagues (Section 6.2.2). One teacher, in their first interview, commented that it took time to build relational trust in the Community of Practice among the teachers in the Connected classes. Initially the teacher felt vulnerable in their own ability and discussed their concern at not feeling “*equipped*” with the necessary knowledge on curriculum integration. As the year progressed, the teachers developed in confidence as they built trust in their colleague’s ability to do their role, and as a group of teachers, they built a “*collective view*” to connect the curriculum. Both the teachers and I observed that the timeframe to build this trust was approximately six months (Section 6.2.2).

It was interesting, that the teachers involved in this research identified, regardless of teaching experience, six months as the time marker for trusting the teachers they were collaborating with and becoming familiar with the process of a Connected curriculum. When discussing this further during the teacher interviews, one teacher commented on the dream of having the opportunity to work in a Connected department space with teachers from a variety of subjects rather than in our individual subject departments. An observation I made during this research was that while teachers may know of each other, if a school like this one was siloed into subject areas, there were not a lot of opportunities for teachers to share practice and talk about their specific subject curriculum. In this case study, the teachers meeting face-to-face

and weekly, provided an opportunity to not just discuss learning but to build relational trust through the interpersonal dimension and to get to know each other (Edwards-Groves & Grootenboer, 2021b). As the coordinator, I provided space in the face-to-face meetings to build trust and provided opportunities to engage with each other in a more personal manner. One way I did this was to start the face-to-face meetings by asking how everyone was and providing time for teachers to chat on a more personal level before going into the teaching and learning aspects of the meeting purposefully to help build a connection between the teachers.

The Senior Leadership Team involved in this research took a longitudinal approach to creating change by enabling time to work on growing the relational trust and the capabilities of the teachers, which in turn changed the nature of the 'Character and Culture of the school. The school in this research made the decision not to mandate change, instead using, as the Principal said, a ripple effect in relation to creating change, where a teacher creating in one area caused a teacher in another area to try something new. This research aligned with the Principal's opinion that the pilot programs, such as the Connected class, had been hugely influential in changing the Character and Culture of the school to the extent that these pilot programs could explain changes in systems, curriculum, and pedagogy. These pilot programs changed the Character and Culture of the school by allowing teachers to create new courses, try new pedagogies and develop or change their own practice. All the teachers involved in the Connected classes, and the teachers who were a part of this research, developed stronger relational trust between each other, which provided them with the necessary support to create a change in using innovative pedagogies. The Character and Culture of the school has clearly progressed towards more teachers using a future-focused approach to teaching and learning, which has positively impacted student learning.

7.2.3 Character and Culture enablers

A highly functioning Community of Practice was critical to the success of the Connected classes. The findings showed that it took up to six months for teachers to feel fully comfortable and to build a foundation of relational trust (Section 6.2.2). It was necessary for the coordinator to consciously work on building time into the face-to-face meetings for teachers to just chat, learn about each other, learn how each other worked and to feel safe in communicating openly and honestly. The tone for these face-to-face meetings was set early, with teachers focused on solution-based approaches and advocating for the other subjects before their own. To advocate

for another subject area over your own in a discussion is to listen to the needs of that subject and to be open to learning about the other subject areas (Wenger, 2000).

The role of the coordinator of the Connected curriculum was an additional role of responsibility for me above that of the Head of Department. Management units (Section 4.2.) came with not only a monetary component but also a time allowance. In discussion with the Senior Leadership Team, it was time that was needed to be able to design, implement and support the teachers involved. This research found that it was the Senior Leadership Team's willingness to provide to coordinator with the time, at a cost, (Section 6.3.7) that was a key enabler for the success of this program. The coordinator was able to not only be involved in both communities of practices, but attend the project presentations by students, draft the student-led inquiries and project tasks, and continue to research curriculum integration and how it applied to this school's context. The role of the coordinator provided consistency across the Connected classes and prompted teachers with new perspectives on curriculum design when necessary.

To shift the school towards a future-focused curriculum, it was necessary for the Senior Leadership Team to provide opportunities for teachers to develop their teacher knowledge base when they developed new/innovative pedagogical approaches. This required investing in teachers to build their competencies through opportunities to pilot programs and strong relational trust. Once the Character and Culture had been addressed to identify 'why', and 'where' to build greater capabilities within the staff, the Senior Leadership team could then examine the Systems and potential changes necessary to facilitate the change for the desired outcome.

7.3 Systems

This case study found that the ability of the Senior Leadership Team to change or adapt systems within a school was necessary to facilitate the needs of teachers wanting to try new approaches in the classroom. The systems within a school can often be a cause of tension or regarded as barriers in relation to creating change with the other three components (Chapter 4). The school involved in this research was willing to review, adapt, change and refine systems where necessary to create a future-focused school. This study found that there were three relevant systems to be considered: timetables or length of the lesson, staffing and potential overstaffing of a subject, and technology used for planning, teaching, and communication (Chapter 4). The

timetable and the staffing allocation within a school often drove the other systems. The timetable could be perceived as a difficult system and a barrier (Education Review Office, 2018). Historically within schools, once the timetable has been created, it often remains in place for a significant time. In this school, the same timetable had been in existence for 25 years.

7.3.1 Timetable

A key consideration for the school in this research, when implementing change, was that the Senior Leadership Team was willing to examine the potential constraints to change, specifically systems such as the timetable. By examining the system constraints, these constraints could be redesigned to enable teachers to deliver the Connected class, which used innovative pedagogies, such as project-based learning and student-led inquiries. In this work, as the coordinator, I requested double periods for teachers to give time to those wanting to include student-led inquiries and project-based learning. Longer periods of learning provided the opportunity for different pedagogies and for students to experience deep learning (Education Review Office, 2018). In the first year of the research, the English class had two double periods and in the second year, this changed to one double period and two singles due to timetabling constraints.

The English teacher found this change back to single periods incredibly frustrating and “*not time efficient*” and reminded the teacher of “*old fashioned teaching*” or transmission style of teaching (Section 6.3.2) (English teacher, Interview, 2020). The effect the timetable structure had on the teachers impacted on the pedagogical approaches that they took in the classroom. The English teacher would workshop with students in small groups, but when it came time for students to work on a project, such as building models, a double period was better suited to allow students to spend a significant period on the project. One way the teachers worked around the timetable system, or the issue of single timetables, was to organise projects when different subjects aligned, booking a classroom that was free for both teachers. In this way, the teachers changed over at the end of the first single period and the second period teacher would arrive, negating the need for students to move classrooms.

7.3.2 Staffing

The Deputy Principal of Curriculum identified the challenge in an established school of how to shift teachers from a traditional approach to teaching and learning to more innovative

pedagogies. The response of the school in this research was to allow teachers to experiment with different models to see what worked best for them and the students to change thinking (Section 4.2). The school in this research wanted the ability to provide agency to the teachers to experiment with different models rather than impose certain pedagogical approaches (Section 4.2). The school was able to see that this teacher agency had had a ripple effect, where the teachers, saw a change from resisting trying a new approach to being willing to give a new pedagogical approach, based on the teacher initiative, a try (Section 4.2). This case study found that this school had a long-term approach to change and used an approach to provide agency for teachers to shift thinking, which after a couple of years in the opinion of the Senior Leadership Team was “*bearing fruit*” (Deputy Principal of Curriculum, Interview, 2019).

The Deputy Principal of Curriculum in this case study was aware of the need to build teacher capacity rather than just expecting it to happen. To build teacher capability, it was necessary to resource time for the co-ordinator of the Connected classes by reducing the teaching load. This is necessary in the short term whilst the teachers gained the necessary skills, knowledge and experience. Resourcing teachers, such as myself (middle leader) by reducing teaching workload, was seen as an investment by the Senior Leadership Team involved in this case study in order to build teacher capability and drive the desired change for this school (Section 4.2.1). In this school, the Senior Leadership Team felt it was worthwhile to resource the Connected classes and did this by removing one class (four periods a week) from my workload (Section 6.3.7) for one year. The implication of this investment in time was that the school had to employ another teacher to cover my class for the year. This, in turn, created overstaffing and came at a financial cost to the school (Section 4.1). However, the reduction in teaching load was valuable to the school in this research as it helped build teacher capabilities in innovative pedagogies and curriculum design by providing the time for the coordinator of the Connected classes to develop the Connected Curriculum Learning Design Framework for these classes (Chapter 5) and supporting the teachers involved.

7.3.3 Technology

Teachers involved in this research found technology to be a crucial component of collaborating with each other. During the face-to-face meetings, it was necessary for someone to capture what was said and record this either in the meeting minutes or in the collaborative online documents (Section 6.2). The face-to-face meetings included a brainstorm of ideas and unless these ideas were captured when the meeting ended, it could be unclear what the next step was.

The advice from one of the participants was to ensure that not only minutes were taken but also to ensure someone captured the planning discussion in the shared template, even the ideas that might not be used in the end (Section 6.2). The research was restricted to using the online learning management of the school and all the teachers involved had a solid level of technological confidence in relation to using the Microsoft Teams platform. This research found that using a platform, like Microsoft Teams, was an effective tool for planning the teaching and learning programs and for communication.

Additionally, the online communication through Microsoft Teams was effective in enabling teachers to communicate with each other. It was essential, in the opinion of the teachers, to be able to not only meet face-to-face but also to be able to plan, ask questions, share ideas and provide teaching resources using an online platform, with the learning sequence the most essential online document (section 6.3.1, figure 18). Teachers could then work synchronously and asynchronously on shared tasks or planning documents (Section 6.2). The online platform enabled teachers to stay informed and to address any questions quickly, with the Microsoft Chat function as a helpful way to maintain day-to-day contact (Section 6.2.6). Furthermore, teacher participants found using an online platform for communication was useful for teachers and students to communicate with each other, as well as a place for accessing learning tasks, rubrics, and as a repository for student work. Student work was easily marked using Teams Assignments and feedback was provided to the students straight away. The technology was useful in helping students manage their learning when working on projects. The teachers in this research found checklists posted online a “*winning idea*” and effective method for students to self-manage their learning (Social Studies teacher, Interview 2019).

Gaining student feedback on the Connected learning regularly took place using online student questionnaires. Teachers brought these questionnaires to meetings and as a group; we adapted the teaching and learning based on student voice. Online questionnaires were used to capture student voice in the planning of next learning units or for feedback on the Connected program. A crucial piece of feedback that students provided early in the research was that the students felt like they were doing the same thing in each class, which was becoming repetitive or boring (Section 6.4.1). While the literature (Fraser, 2013) had commented on the concern teachers had with the watering down of subjects, there was no studies with the student voice that found integrated learning being too much the same or boring. This feedback from students

prompted a change in the Connected learning program. Initially, the goal had been to design learning that was fully integrated at a transdisciplinary level based on student and teacher feedback. This prompted me to examine ways to integrate subjects and, yet, have subject content and skills still identifiable to both students and teachers. The change in focus based on this feedback led me to design the Connected Curriculum Learning Design Framework (Section 5.2) where the subjects were easily identified, and learning moved across the integrated curriculum continuum (See Figure 7).

The understanding of Systems, by the Senior Leadership Team of the school involved in this research, meant that they were able to manipulate the systems without creating too much day-to-day change for the staff and students in general. The change in the timetable system was necessary to make it more functional for change to happen at the classroom level. The school in this research had had the same timetable system for 25 years and essentially operated two timetables, one at junior level and another for senior level. By changing the timetable system and creating one timetable, junior classes could now have double periods. The school in this research looked at how to be strategic with the staffing of the connected program to ensure teacher workload could support the pilot program without overloading myself as the coordinator. These system changes then had the impact of allowing more time for innovative pedagogies, such as student-led inquiry and project learning.

7.3.4 System enablers and constraints

A system was designed to satisfy specified requirements for a particular outcome. When creating an environment for change, this research found that existing systems in place were constraints and needed manipulation to provide the enablers for an alternative outcome, which was to create and deliver innovative curriculum. The constraints for teachers, in delivering the Connected Curriculum Learning Design Framework, were mitigated as much as possible by the teachers involved, as well as by the Senior Leadership Team, depending on the situation. The Senior Leadership Team made a significant effort to adjust systems within the school to enable teachers to develop their pedagogical approaches and understanding in order to design a future-focused curriculum for the students. The key enablers for delivering a Connected program were time; for teachers to learn and develop new pedagogical approaches; to build relational trust with other teachers; a highly functioning Community of Practice to co-design the learning programs and develop knowledge of different curriculum subjects; and a coordinator of the program. The coordinator had a reduced teaching load for the first year to

compensate for an increase in workload and face-to-face meetings during the teaching day each week.

Time is both an enabler and a constraint. In the first year of this research, the teachers met once a week after school. The non-teaching contact periods did not align for the three teachers and myself. Teachers, on occasion, needed to cancel these meetings when other commitments came up. Teachers themselves said that the face-to-face meetings were essential for the smooth running of the program (Section 6.3.6). During the weekly meetings, the students and their learning over the past week were reviewed. Any issues with any of the students would be problem solved, teachers would discuss problems and solutions, and planning for the learning ahead would take place. At the end of the first school year, the teachers involved wanted a shared non-contact time to meet during the week. I took the need for this shared time for face-to-face meetings to the Senior Leadership Team and looked at the timetable to help make this happen in the second year. In the second year, the teachers and I did share a non-contact period early in the week and this became our face-to-face meeting time. The face-to-face meeting period appeared in the teacher's timetable on the KAMAR system. The rationale for putting this meeting in the timetable was to give weight to the meeting, making it permanent. The issue described provides an example of how a system was adapted from a constraint to an enabler when the Senior Leadership Team asked, listened and problem-solved for their staff. The findings clearly identified that the teachers needed and valued the face-to-face meeting to the extent that they felt these meetings should be a non-negotiable component of being involved with the Connected classes. The teachers and the coordinator saw the face-to-face meetings as essential. It meant that regular support was provided to the teachers as they developed skills in a new pedagogical approach using the Connected Curriculum Learning Design Framework.

7.4 Pedagogy

To deliver a future-focused curriculum where students could develop 21st-century knowledge and skills as well as the necessary specialist-subject knowledge and skills required innovative pedagogies, such as student-led inquiry and projects. The researcher found, through reviewing the literature, that no one method of teaching excelled above the rest, but it was, in fact, the use of multiple pedagogies integrated throughout the teaching and learning unit that enabled students to develop their own knowledge and 21st-century skills (Hattie, 2012; Ministry of

Education, 2019; OECD, 2005). The teachers involved in this research and I understood the knowledge and skills being taught and learned required active participation from the students, especially if they were to develop a metacognitive understanding of how they (as students) had learned something.

7.4.1 Framing of knowledge

To become future-focused with the design and delivery of curriculum, the Senior Leadership Team examined the purpose of education and the potential future direction (Young, 2013) of the school in two specific ways. Firstly, the Education Brief (Section 4.1) provided a review of the current and past structures of the delivery of the curriculum. Secondly, the Deputy Principal of Curriculum challenged the Middle Leaders of this school to think differently about knowledge, how the New Zealand Curriculum was organised, and to explore what students needed to succeed in the 21st-century knowledge-based society (Section 4.3.2). The Deputy Principal's approach was like what Kress (2000) and Young (2013) argue for in terms of the need to question what knowledge students need for the future and to create a curriculum and pedagogical response.

What knowledge and skills students need to learn can be framed in a variety of ways and the norm in New Zealand, including in the school the current research took place in, has been to shape secondary education around learning areas (Ministry of Education, 2007) which are based on disciplines (Hipkins, 2017). The reframing of knowledge away from disciplines to a focus on a concept-based curriculum to support learning around real-world issues, contexts and problems was a challenge I wanted to undertake this research, based on Beane's (1996) theory of curriculum integration. The teachers involved in this research, shared the same concerns identified by Drake (1998) that curriculum integration could potentially lead to a 'watering down' of the specialist subject. This study engaged with the reframing of knowledge around a concept-based curriculum. When I reviewed the literature, I found that an integrated curriculum required students to have agency with their learning to solve an issue or problem (Erickson, 2012). A concept-based curriculum was a natural next step in the design of the Connected Curriculum Learning Design Framework (see Figure 10, Chapter 5) as teachers used a variety of pedagogical approaches to deliver a future-focused curriculum with an authentic context (Section 5.2.4). Framing the knowledge in ways that enabled teachers to design learning programs that gave equal weight to pedagogical content knowledge and skills, 21st-century skills, as well as conceptual knowledge and skills. This was all while ensuring that students

developed deep learning of the three subject areas. I decided to use a concept-based curriculum, based on (2009), that each subject could hook into, ensuring the learning taking place is skills driven rather than content driven. The reframing of knowledge around authentic issues or problems helped to create a course where the specialist-subject content was not driving the learning. The Connected Curriculum Learning Design Framework (Figure 10) designed through this research became the pedagogical model for delivering the curriculum for this case study.

One surprising outcome of this study was around the teachers' understanding of curriculum integration. I had expected that the teachers involved in the conclusion of the data-gathering stage of this research would all share a clear definition of curriculum integration, but this was not the case. The multiple understandings of curriculum integration amongst the teachers in this research was like what Fraser (2000) found about the varied understanding among educators of a definition for curriculum integration. One teacher in this research saw curriculum integration as *“students learning skills relevant to a specific curriculum strand by studying a broad topic across multiple class”* (Science teacher, Questionnaire, 2020). This was similar to what another teacher said in his/her final questionnaire in 2019, *“When more than one curriculum area's teaching and learning is explicitly planned for”* (English teacher, Questionnaire, 2020). While these two teachers have very briefly identified similar broad aspects of curriculum integration, such as 'learning across subject areas', in their understanding of curriculum integration, a clear definition had not emerged. The lack of a shared definition between these two teachers could be due to the brief nature of their response to the question. In contrast, the third teacher articulated their understanding of curriculum integration in relation to the Connected Curriculum Learning Design Framework (Section 5.2), as being student agentic, drawing from different curriculum areas, and building skills and knowledge that connect to the wider world. All teachers understood the Connected Curriculum Learning Design Framework and the different components. However, I had hoped that all teachers would be able to articulate in the final questionnaire, in detail, about curriculum integration in relation to how knowledge was framed.

7.4.2 Connected Curriculum Learning Design Framework

This research found it is necessary for teachers to develop and use a pedagogy that is different to teaching in 'silos, especially when using a concept-based curriculum. As the Science teacher said, *“There's more to it than just getting a couple of teachers together in a room and just*

see[ing] where your curriculum lines match-up” (Interview, 2020). It goes deeper, connecting the curriculum requires teachers to share knowledge and subject knowledge, to create a learning program that puts skills at the front. The intention of the Connected Curriculum Learning Design Framework, which was designed and implemented as part of this research in this school, was to provide a pedagogical model that could be a vehicle for structuring teaching and learning programs. The Connected Curriculum Learning Design framework, based on literature (see for example, Beane, 1996; Drake, 1993; Dumont et al., 2010; Erickson, 2012), could provide a ‘how to’ for teachers in delivering an integrated program.

When designing the pedagogy for the Connected classes, as the researcher, I wanted to ensure the model developed as part of this research moved students through the three learning phases, surface learning, deep learning and the transfer of knowledge and skills (Hattie & Donoghue, 2016; Hattie & Yates, 2013). These three levels of learning are identifiable in the Connected Curriculum Learning Design Framework (Figure 10) where students’ learning moves through two student-led inquiries and a project, supported by the Specialist-Subject Teacher-Directed Hexagon (Figure 12). Beyond moving students from surface-to-deep-to-transference of learning, I wanted to provide a mechanism for students to create adaptive expertise (Dumont et al., 2016). To some extent, students developed creating adaptive expertise during the ‘transference of learning stage’ of the Connected Curriculum Learning Design Framework (Figure 10) using projects. One teacher commented in their questionnaire how they liked how the projects pulled together the learning from across the subject and they thought it was exciting for students to see how the different subjects connected and saw this connection in a real-world context (Section 5.2.6). Students during the projects were able to apply what they believed to be meaningfully learned knowledge and skills flexibly and creatively to their projects (Dumont et al., 2016). Using three phases of learning (Figure 11) combined with specialist-subject teacher-directed learning (Figure 12), enabled the students to take new knowledge to critically think about and synthesise the knowledge by creating a new learning artefact, such as a documentary or model, in Learning Phase 3 (Figure 11).

I found it necessary to create the Specialist-Subject Teacher-Directed Learning Hexagon (Figure 12) to address the concerns the teacher participants had about the watering down of subject area knowledge and skills (Section 5.2.3). The Specialist-Subject Teacher-Directed Hexagon was to provide teacher participants with a visual image (Figure 12) of all the necessary skills and knowledge students required for a unit of learning. This was to assure

teachers that as they moved through the three phases of learning that each teacher was responsible for ensuring delivery of their specialist-subject knowledge and skills to students as well as 21st-century skills and concept-based knowledge and skills. The teachers used their professional judgement to decide the appropriate content or skill necessary in the learning cycle.

7.4.3 Reflection and goal setting

The teachers of the Connected classes had, over the two years, worked to help students understand ‘how they learn’ through reflection and goal setting. This was a shift from teachers assessing student learning at the end of a learning unit. Evaluating learning over the length of the unit was embedded in the unit of learning. Students were provided with multiple opportunities to develop and demonstrate their learning with the goal of using a value-added approach to the learning (Kennedy et al., 2011). By setting goals, reflecting on these and understanding their next steps, teachers found that students were active participants in their learning (Section 5.2). During the Connected face-to-face meeting, I observed conversations around goal setting. The teachers in this research found that significant time was needed for students to develop their reflections and goal setting. These reflections and goals were integrated into the learning units, not just at the end. One teacher commented that she created a differentiated task and encouraged students to talk with her if they felt they had been given the wrong task. A learning conversation happened between the student and teacher where the student needed to articulate where they thought they were at, evidence of past work and why they wanted a more challenging task. These conversations came about, as students understood the learning goals and next steps in their learning. The use of rubrics with the learning tasks, as discussed by Moskal (2000), had been key for students understanding what they were learning and what their next steps were (Section 5.2.9). The use of reflection and goal setting helped to put the learner at the centre and the use of differentiated tasks and rubrics that made the learning explicit helped to stretch the student (*High Impact Teaching Strategies: Excellence in Teaching and Learning*, 2017).

7.4.4 Transferable skills

Through conducting this research, I found that educators needed to rethink the ‘what’ and ‘how’ of learning and assessment, as argued in Dumont et al. (2016). This research found that designing learning programs that built adaptive expertise provided an opportunity for the

integration of 21st-century skills, such as self-regulation, into units of learning. The students' ability to develop self-regulation was seen by teachers in this research, especially during the project design phase (Section 5.2.6). Initially, students struggled to break down a project and manage timelines. When the teachers noticed this, they created a series of checklists that students worked through independently. As students gained experience in this area, the students created their own checklists and plans to self-regulate their learning.

In the Connected classes, the teachers were working in partnership with students to design their learning programs, using reflection, goal setting and rubrics, so that students and teachers could build a shared language to what these skills looked like and where students sat with their own abilities. Having three teachers working together to develop this shared understanding, provided consistency across the learning week for students - with both the concept curriculum and with the specialist-subject curriculum. It was the pedagogical design that sat behind the learning and teaching activities that facilitated the students to develop their transferable skills.

7.4.5 Pedagogy for Connected class: enablers and constraints

Time moved differently in the Connected classes as compared to a single-subject class, which the findings found to be a clear enabler in moving students from surface-to deep-transference of learning. The findings showed that the specialist-subject teacher, in their opinion, spent more time in the deep learning state of their subject area compared to a non-connected class. Normally, a teacher would have three or four periods a week with a class to cover the learning from surface to deep and, if time, transference. In a Connected class, the teachers worked together to design the learning with students having a total of 11 periods over the week. The English teacher found that she did not always have to cover the context and specialist-subject skills and knowledge. The Science and Social Studies teachers covered much of the surface level context learning, providing more time for the deep learning. Social Studies often provided the surface learning for science, for example, when studying climate change. The Social Studies teacher could provide surface learning of the greenhouse effect with the Science teacher being able to go straight into the deep learning. The teachers found that by using the unit plan with lesson sequence that they could trust the other teachers to "do their bit". The lesson sequence and use of the three Learning Phases (Figure 10) meant the teachers knew when to focus on the key specialist-subject skills and knowledge in more depth. The length of the timetable period was important for teachers. A 50-minute period was a constraint, as it did not

provide the teachers or students with time to work on student-led inquiries or when students were involved in projects. Double periods became the preference for teachers in this research as they had shifted their pedagogical approach from one that was teacher-centred to one that was student-centred. Schools or educators wanting to adopt a similar approach to curriculum integration or connecting curriculum at a secondary level, should consider and develop systems to support these enablers.

7.6 Summary

This chapter has focused on three key areas (Character and Culture, Systems and Pedagogy) necessary for a school to shift from a traditional mode of instruction to being future-focused. To design and implement changes in systems and pedagogy, it is necessary to understand the ‘Character and Culture’ of the school. The school in this research wanted to move to a future-focused pedagogy and needed to identify and support teachers in creating this change. When a Senior Leadership Team understand who they are creating this change for and how to build teacher capabilities, it is then possible to see what systems can be changed or developed to facilitate a change in pedagogy, such as in this research that led to the creation and implementation of the Connected Curriculum Learning Design Framework.

The teachers and leaders in the school in this case study, recognised that we live in a knowledge-based society (Stukalina, 2010) and that not only do educational institutions need to provide students with the ability to develop and create knowledge, but we also need students to be able to navigate and instigate change. We want students to be able to interact in a connected world, become critical thinkers that take responsibility for their actions and lead humanity towards a bright and sustainable future. This is a huge challenge for educators and those in education. There is no roadmap on the ‘right’ way to design and create a curriculum that achieves this. New Zealand, with its flexible curriculum, is in an enviable position to create curriculum based on the students in front of the teacher and in line with the individual schools’ Character and Culture. Current systems within schools, such as timetables, staffing, and siloed subjects, need to change to facilitate new and innovative pedagogies for learning.

As schools and teachers have developed their understanding of how students learn, and the skills students need in a knowledge-based economy, new innovative pedagogies have emerged. The Connected Curriculum Learning Design Framework provides teachers, outside

of this research case study, a framework to adapt this pedagogical approach to design and implement a future-focused curriculum within their own context. Moving from a traditional approach to teaching and learning to a future-focused curriculum, requires an understanding of who is delivering this change, what systems within a school need to change in order to provide the opportunity for teachers to create innovative, relevant learning programs that fulfil the learning needs of students. This research found it imperative that schools have a clear understanding of the unique Character and Culture of the school. A school that has a coherent plan based on what the school currently does in relation to systems, curriculum, and pedagogy, and understands their unique Character and Culture, can then design and move towards implementing a future-focused curriculum

Chapter 8: Conclusion

8.1 Introduction

The aim of this thesis has been to examine how one urban high school in New Zealand, was able to transition from a traditional mode of instruction to future-focused education. The approach that this school took was to empower the teachers and to create an environment where teachers could design and trial innovative pedagogical approaches for learning that promote the vision of the New Zealand Curriculum and are in-line with the school's unique 'Character and Culture'. The Senior Leadership Team had a high level of relational trust in their teachers to design and deliver a future-focused approach to curriculum integration. The school involved in this case study was striving to create an environment where teachers can equip students with the knowledge and skills that are future-focused, where students can, as mentioned in Chapter 1,

Understand different perspectives and worldviews, interact respectfully with others, and to take responsible action toward sustainability and collective well-being.... Students need support in developing not only knowledge and skills but also attitudes and values, which can guide them towards ethical and responsible actions. At the same time, they need opportunities to develop their creative ingenuity to help propel humanity towards a bright future. (OECD, 2019, p. 5)

To be future-focused is to understand that educators need to take a more complex view of knowledge, understanding that today's students need to be equipped to create new knowledge for our communities - from a local to national to global level with skills and values that benefit humanity and our environment. For students to grow and flourish, we need to encourage and create opportunities for teachers to redesign learning programs based on research, understand knowledge and skills, and with a curriculum grounded in a strong pedagogy.

8.2 Creating a future-focused school

This research has found that coherency on the future direction of the school is of fundamental importance when moving from a traditional mode of instruction, primarily focused on single-subject curriculum areas with transmission modes of teaching, to a future-

focused school. Coherency within the school in this case study was created by having a strong understanding of the Character and Culture of the school. That happened by first identifying and understanding the past and current systems, the curriculum, and the pedagogy in place. It was evident from the interviews with the Senior Leadership Team that they were coherent in their understanding of the school's past, and in the future direction of the school. Each senior leader could elaborate on what the future direction of the school was and how this related to their individual portfolios. The use of leadership meetings for Middle Leaders to build a strong Community of Practice was an effective vehicle to communicate and develop the professional learning of Middle Leaders to implement the school's strategic goals.

The strategic goals of the school in this research, were based on the Education Brief which outlined the future aspirations and described what a future-focused school could look like. The Education Brief for this school identified the direction the school wanted to move in, from moving away from a siloed subject approach to the connection between subjects and a focus on transferable skills. Having an Education Brief document that explored the Character and Culture, systems, pedagogy, and curriculum that maps the school's past and outlines the aspirations for the future, enabled all members of the school to have a coherent understanding of the school's past, current and future direction. With the school involved in this research, as soon as 'pockets of change' were created and new programs trialled along with a new timetable, this Education Brief quickly became outdated. The school in this research decided, in 2022, to review its Education Brief to reflect on changes that has taken place and to ensure relevancy of the future direction of the school. The Educational Brief at this school, clearly identifies the history of the school, its systems, curriculum, pedagogy, and special character. In my opinion, based on this research, it is necessary for schools to review the Education Brief document at least every two to three years. This is to review and evaluate changes that have been made and to ensure the future direction is still relevant. The Education Brief, in conjunction with the school's strategic goals and five-year plan, is a valuable document as it synthesises the school's past and the future aspirations for teaching and learning.

Section 2.5 discusses three components for schools to take into consideration for responding to change - Systems, Pedagogy and Curriculum. However, this research revealed a fourth key component, Character and Culture. This research found that the Character and Culture component of the school is key in the changes that were implemented in the other three components. The Character and Culture of the school is about the people within that school

community, and essentially all the variables that make a particular school unique and can have significant impact on the systems, pedagogy and curriculum. Therefore, a program implemented in one school cannot be duplicated, without adaptation, in another school. However, based on this research it would be beneficial for the Education Brief document to include the Character and Culture of the school as it currently stands when looking at the future direction.

8.3 Design and implementation of a Connected class

When designing a new way of delivering the curriculum, it is necessary to think about the ‘why’ and then the ‘how’. When I designed the Connected Curriculum Learning Design Framework for the Connected classes, using a concept curriculum based on 21st-century pedagogy, I wanted to ensure that students and teachers had high levels of agency to create a power-sharing model. The learning taking place in the Connected classes would enable students to not only develop surface and deep knowledge, but also be provided with the opportunity to transfer that knowledge into a new learning artefact. The use of two student-led inquiries to move students from surface-to-deep learning followed by a project for application/creation of a learning artefact, facilitated the move from deep learning to transference. The student-led inquiries and project/application of learning artefacts are effective ways of differentiating the needs of students and creating strong student agency. Skills-based learning, with a strong focus on ‘value-added’ learning through rubrics, goal setting and reflection, was to help students understand how they learn (metacognition) and what the students’ next learning steps were.

Student learning needs are a combination of 21st-century skills and specialist-subject knowledge and skills. Students need to prepare for a high school qualification, such as NCEA, and learning beyond high school in whatever form that takes. It became apparent early in the research that students wanted to learn and be able to see their learning in the three different subjects, Science, English and Social Studies, as well as learning that was integrated (Chapter 6, Section 4). Creating a learning program that allowed connection between subjects and moved along the integration curriculum continuum, based on the needs of the student, rather than sitting at one end of the continuum, allowed for the best of both worlds.

The negotiation of the learning design was the area teachers needed to collaborate on. The collaboration by teachers to design learning programs was instrumental to the success of

the learning unit. Teachers needed to develop a strong Community of Practice where they could not only share the success, but to also be vulnerable with their interactions when things were not going as planned, or in acknowledging where their practice needed to develop. Teachers, who have taught in isolation to other subjects, are used to the autonomy of designing their learning units as to how each teacher approaches their planning, and curriculum design can be different. When collaborating, as well as adapting their own methods and processes, it was a matter of being mindful of what the needs were for the teachers they were working with.

8.4 Implications

The findings presented in this thesis have several contributions and significance to knowledge for schools wanting to become future-focused and for preparing students with the knowledge and skills necessary to succeed in a world where change, and exponential change, can be a challenge. The first is the importance of schools understanding their ‘Character and Culture’, which is based on the people and community of the school as it is and how it has been. Secondly, the Education Brief is a significant document for capturing the four key aspects of a school, Character and Culture, pedagogy, curriculum and systems. A comprehensive Education Brief becomes the guiding document when designing the strategic plan and future direction of the school. Thirdly, the Connected Curriculum Learning Design Framework is a pedagogical structure teachers can follow, informed by research and literature to design connected learning programs for students. Finally, the importance of the teacher Community of Practice for developing teacher capabilities, sharing practice and collaborating on teaching and learning units of work.

8.4.1 Character and Culture

The Character and Culture of a school includes such factors as location, staff capabilities, the relational trust amongst the staff, the physical design of a school, the number of staff and students, and the diversity of the students to name a few. A school wanting to make curriculum change needs to explore the capabilities of the teachers to ensure they have the time and professional development necessary to implement the change. Systems, such as the timetable, aids in the ability of teachers to have time in their lessons for project-based activities.

Character and Culture apply to the individual classroom context, not just school wide. If a teacher wants to make changes to the way they design and deliver learning, it is necessary for the teacher to explore the variables of the situation. What is the current Character and Culture of the class? Will students trust the teacher with the change? What are the teacher's current capabilities? When designing and implementing the Connected classes at the school in this research, I needed to ensure the teachers felt as comfortable as possible with the ambiguity this change brought about. The weekly face-to-face meetings meant I could provide support and information in real-time. I also wrote up the draft units of learning or inquiry topics to provide a framework for teachers to work on. As teachers gained experience and trusted their own expertise, they were increasingly able to take on this role. Having a clear understanding of the Character and Culture, and the ability to explore the variables within any given situation, provides clarity in how to design and implement the necessary change.

8.4.2 Education Brief

The contributions and significance of this research were found in the approach by the school in how they enabled teachers to redesign the curriculum and use different pedagogical approaches. The school, in this research, wanted to have subjects that were connected and developed 21st-century skills and this desire was articulated in the Education Brief. While the Education Brief did not yet provide an approach the school was going to take, or how they would achieve this, the Education Brief did articulate the current systems within the school, the desired future direction of the school, and the need to create change.

The school's desire to create a future-focused approach in the Education Brief recognised their understanding that connecting the curriculum at high schools for students in Year 9 and Year 10, required a different methodology. It was not just about teachers looking at how their subject areas connected, but rather understanding the science of learning to design a new pedagogical approach for the students within their school that coherently connected to the school's culture, systems, and curriculum. The process of developing a new pedagogical approach, which was informed by the latest research and connected to the national and school curriculum, took time and support. Teachers could collaborate on teaching programs with three key phases of learning that connected the curriculum and delivered the program of learning successfully with one teacher in front of the class at a time. This school's commitment was to create a different approach to learning for students that connected across subject areas and was written in the school's Education Brief. What this Connected curriculum

looked like was not in the Education Brief. However, the team involved in writing this document, through exploring the schools' current systems and curriculum, were able to identify areas that needed to change or become agile to allow for the potential of creating a new way of delivering the curriculum.

8.4.3 Connected Curriculum Learning Design Framework

A significant contribution to knowledge was the creation of the Connected Curriculum Learning Design Framework shown in Figure 10. This framework considered both the student-centred approach, based on students gaining and developing knowledge within and across subject areas, and 21st-century skills. The intention of the Connected Curriculum Learning Design Framework was not to solely create a full integration of subject areas, where subjects cannot be individually identified. Instead, it created a model where integration occurred yet each subject with its subject-specific skills and content was still identifiable as shown in Figure 10. The Connected Curriculum Learning Design Framework used pedagogical approaches of student-led inquiry and projects that moved students from surface-to-deep-to-transference of learning as illustrated in Figure 11.

The subject-specialist teacher ensured specialist-subject knowledge and skills were still designed by the teacher into the learning programs. The specialist-subject teacher used their professional judgement and had the autonomy to move the learning around the hexagon (see Figure 12) as necessary. Teachers could decide where to locate the different areas of hexagon in the learning programs. Students could develop their key competencies or 21st-century skills through student-led inquiry and projects.

Moving to a learning design that had three distinct phases and used student-led inquiry and project-based learning, took all teachers involved in the research time to become comfortable. The feedback from the teachers involved in the Connected classes, indicated that teachers needed to give it more than just one attempt as they felt it took until the third unit of learning to fully understand and feel comfortable with the process. A different school wanting to implement the Connected Curriculum Learning Design Framework may need to have a longer lead in time or, if integration is familiar to all staff, a shorter lead in time.

Several variables played into the school involved in this research as far as Character and Culture are concerned, but teacher capability and the relational trust among the teachers involved was a key factor to consider. Most of the teachers at Year 9, at the school involved in

this research, follow the students through and teach them in Year 10. This has had a positive effect with teachers knowing the students at Year 10 and both students and teachers understanding the learning cycles. A large portion of our students come from schools already using student inquiry, some project-based learning and have had experience with rubrics, goal setting and reflection. In relation to the Character and Culture of this school, the students understood some of the innovative pedagogical approaches used by the teachers. It was a matter of teachers understanding what students already knew and how to develop their understanding of these processes in relation to Connected Curriculum Learning Design Framework.

8.4.4 Teacher Community of Practice

The strength of the teacher Community of Practice in this research was significant to ensuring the success of the Connected classes at this school. The Community of Practice had a blended approach and prioritised the face-to-face weekly meetings. Teachers had opted into teaching the class involved in this research and all three had a willingness to learn. It was the teachers' willingness to share their thoughts, ideas and needs, which contributed to the creation of the relational trust within the Community of Practice. The teachers were willing to say when they were having concerns or the needs they had with planning. All the teachers communicated effectively online and all three of the teachers involved made sure to do what they said they would do. Having teachers with a variety of experience in teaching and with a variety of experience with curriculum integration, meant that knowledge and experience was shared amongst the teachers. In my role as the coordinator of the Connected classes, I was present at each meeting to offer advice and guidance. The school provided me with four hours a week to support the creation and development of this program. With this time, I would do initial resource gathering and started the writing of resources or student-led inquiries. The role of the coordinator was not to facilitate or run the meetings or programs, but to support the teachers and to ensure the learning programs moved students through the surface-to-deep-to-transference of learning. The coordinator also provided ideas, and resources on projects and project design, to ensure reflections and goal setting were integrated into the learning programs, and that teachers evaluated over time rather than assessing learning at end of units. The teachers all felt that having someone oversee the different Connected classes, provided not only support but also consistency with the approach and design of learning. Teachers had a shared language and experience to build on. It also meant that as teachers developed their

understanding and skills, they could assist with developing the capacity of teachers who wanted to connect with the curriculum across subjects.

8.5 Limitations of the study

This section reflects on the limitations of the study, which used one school in the research as a case study. While schools across New Zealand have similar systems and processes for strategic planning and the desire to be future-focused on their approaches to teaching and learning, this research has found that the Character and Culture of the individual school contained the variables that enabled the strategic plan, and systems, curriculum and pedagogy to respond to change effectively. The Education Brief, developed as required by the Ministry of Education as part of the process for the design and building of new school buildings, has demonstrated the clarity necessary for a school to understand their own unique Character and Culture. A limitation of this research, due to only one school being used in this case study, was the lack of comparison of Education Briefs designed by schools and as a result their ability to make and respond to change.

Firstly, the design of the Connected Curriculum Learning Design Framework was designed for, and implemented, within one school. This was based solely on the teachers' experiences. The Connected Curriculum Learning Design Framework was created in response to the teachers and the students within the teachers' classrooms at one school. The focus has been on the teacher experiences and the development and implementation of the framework. The study did not gather student experiences or student achievement. This would be worth exploring further as an area of research.

Secondly, the small number of teacher participants' perspectives on the constraints and enablers of designing and implementing the Connected Curriculum Learning Design Framework. This research focused on three teachers' experiences for designing and implementing of a Connected curriculum. While the school involved in this research had two classes in 2019, only one class was part of the research, as there could have been a power imbalance with using the class I taught as part of this research, as well as being the coordinator of the Connected classes. The perspectives of the teachers were limited to the context, along with the Character and Culture, of this school.

8.6 Recommendations for future research

Schools across New Zealand have been experimenting, trialling and adapting the curriculum to provide students with the best learning possible to prepare them to succeed in an ever-changing world. This research has focused on how one co-educational school in the South Island of New Zealand, was trying to transition from a traditional mode of instruction to a future-focused curriculum. This research has seen the creation of a new Connected Curriculum Learning Design Framework as a practical guide for teachers to use or adapt when designing learning across subject areas. The experiences of three teachers in designing and implementing a Connected curriculum and working in a community of practice has been examined in detail. Future research in the curriculum design of connected learning is necessary to ensure teachers balance the science of learning and pedagogical subject knowledge and skills.

Further research of high schools, and how they transition from a traditional mode of instruction to a future-focused curriculum, is also necessary. Conducting further research in this area would enable schools to share information and experiences to learn from one another and to make decisions based on sound research. Further research across several different schools into the design, creation, and value of an Education Brief that is updated regularly to inform the direction of the school, based on the past and current Character and Culture of a school is necessary. The Education Brief was the document that informed the strategic plan and vision of the school involved in this research. As change is implemented in a school, whether it be systems, curriculum, or pedagogy, the Education Brief or a document that focuses on the Character and Culture of a school, needs to be adapted and developed, based on these changes and in response to the changes, over time, in the Character and Culture of a school. Further research in this area would create a better understanding of how different high schools can become future-focused.

The Connected Curriculum Learning Design Framework was developed and trialled with the school involved in this research. Further research of this learning model in other schools would provide valuable information for the design, implementation, and student success of this form of curriculum connection. This research focused on the teachers' experiences and perspectives of the constraints and enablers in one school. It would be beneficial to conduct further research into the student perception and achievement in four key areas. Firstly, the perceptions students have about high school and the desire for students in this research to be

able to 'see' the individual subjects in the learning. Secondly, the Connected Curriculum Learning Design Framework as pedagogical approach for Māori and Pasifika students. Thirdly, using the Connected Curriculum Learning Design Framework as a pedagogical approach for students to develop transferable skills and value-added learning within this framework. The fourth key area, where this model could be used or adapted for curriculum connection, is with senior students studying NCEA assessment. NCEA, while it allows for curriculum integration, is still predominantly assessed as individual subjects.

For schools to implement the Connected Curriculum Learning Design Framework and to design the learning contexts specific to the Character and Culture of their school, I recommend the position of a Connected Curriculum Coordinator, with a dedicated time allowance. Based on this research, it was necessary for a teacher to co-ordinate and ensure the consistency of the Connected Curriculum Learning Design Framework and program across classes while ensuring agency for both teachers and students. Each Connected class should develop teaching and learning programs based on the students in front of them. However, the pedagogical approach should be consistent. My role as the coordinator was, essentially, to ensure a consistent approach to the methodology/pedagogy behind the learning tasks as well as supporting the teachers. As part of this recommendation, based on this research, it is necessary to create the role for a Connected Curriculum Coordinator and provide the Connected Curriculum Coordinator with four hours in their first two years and then adjust as necessary. In New Zealand, teachers in their first two years are provided with an additional non-teaching allowance. Much like beginning teachers have time for the first two years of their teaching, I believe, based on this research, that teachers who are new to connecting the curriculum and using the Connected Curriculum Learning Design Framework, need to be provided with time. They need time during the school day to have one hour a week for face-to-face planning and collaboration in the community of practice. Depending on how many Connected classes teachers are delivering and the teachers experience, would determine the time needed.

8.7 Summary

Traditionally, schools are viewed as institutions slow to change. With a future that is constantly changing, exponential growth in technology, and the need for innovation and creativity to solve problems, the world has become a knowledge-based society. We need students to learn how to create knowledge and build knowledge, all while developing their own capabilities with 21st-

century skills. Schools need to become future-focused to prepare students to respond to this change. Teachers and those involved in education can no longer view learning as the transmission of information from one person/source to another. Instead, it is time that teachers provided learning experiences, that integrate subject knowledge and skills, with the skills to succeed in the 21st century to meet the demands of the workforce.

This research has used action research with a participatory component and presented as a case study to understand how one school endeavoured to change from a traditional mode of instruction to a future-focused approach. The school involved in this research, designed and implemented change by having a clear understanding of the school's Character and Culture, which then informed the school's systems, pedagogy, and curriculum. There were two significant outcomes of this research. Firstly, the need for schools to have an explicit understanding of not only the school's systems, pedagogy, and curriculum, but the Character and Culture of the school. Understanding the Character and Culture, which takes into account what the school has historically done in relation to systems, curriculum, and pedagogy but also an understanding of the school's current Character and Culture and the ability of teachers to design and deliver the change necessary. The second significant outcome was the creation of the Connected Curriculum Learning Design Framework. The Connected Curriculum Learning Design Framework, used in conjunction with practical planning documents, provided a method for moving students through the three phases of learning. The innovative pedagogies that facilitated these three phases of learning included student-led inquiry, and project-based learning centred on a concept-based issue or problem. The three teacher participants of this research and myself collaborated on how to design the teaching and learning programs through the development of lesson sequences, face-to-face planning, asynchronous planning, and feedback from students, which explored the enablers and constraints of delivering a Connected teaching and learning program.

My reason for undertaking this research was to provide educators with a practical method for designing teaching and learning programs that connected subject areas through the experiences of teachers on how they collaborated to deliver this learning. The teacher participants in this research have achieved this through a strong Community of Practice, where the teachers shared not only successes, but also concerns. The teacher participants committed to weekly face-to-face meetings and spent time online ensuring they worked as part of a team to design and deliver a Connected curriculum. The teachers became familiar with pedagogies,

such as student-led inquiries, and new pedagogies to their own practice including project-based learning and evaluating student learning over time. Importantly, the teachers involved had to develop and build knowledge and understanding of concept-based learning to design and deliver the teaching and learning program, where previously they had delivered a subject content-based curriculum. The Senior Leadership Team involved in this research had purposefully created an environment that facilitated change by clearly understanding the Character and Culture to inform their systems, curriculum, and pedagogy. A key aspect of developing an environment for change by this school was building teacher capabilities across all roles within the school and encouraging teachers, regardless of role, to design and run pilot programs that provided students with a future-focused curriculum.

References

- Argyris, C. (2002). Double-loop learning, teaching, and research. *Academy of Management, Learning & Education*, 1(2), 206–218.
<http://www.jstor.org/stable/40214154>
- Alismail, H. A., & McGuire, P. (2015). 21st century standards and curriculum: Current research and practice. *Journal of Education and Practice*, 6(6), 150–154.
www.iiste.org
- Arrowsmith, S., & Smith, B. (2015). Curriculum integration in New Zealand secondary schools. *Set: Research Information for Teachers*, 1, 58–66.
- Arrowsmith, S., & Wood, B. (2014). Curriculum integration in New Zealand secondary schools: Lessons learned from four “early adopter” schools. *Set: Research Information for Teachers*, (1), 58–66.
- Bassett, M. (2016). The role of middle leaders in New Zealand secondary schools: Expectations and challenges, *Waikato Journal of Education Te Hautaka Mātauranga o Waikato*, Volume 21, Issue 1: 2016,
- Baum, F., MacDougall, C., & Smith, D. (2006). Participatory action research. *Journal of Epidemiology and Community Health* (1979), 60(10), 854-857. <https://doi.org/10.1136/jech.2004.028662>
- Beane, J. A. (1993). Problems and possibilities for an integrative curriculum. *Middle School Journal*, 25(1), 18-23.
- Beane, J. A. (1995). Curriculum integration and the disciplines of knowledge. *Delta Phi International, Kappa*, 76(8), 616–622.
- Beane, J. A. (1996). Curriculum integration: Proceeding with cautious optimism on the shoulders of giants! *Middle School Journal*, 28(1), 6–11.
- Beane, J. A. (1997). Curriculum integration: Designing the core of democratic education. Teachers College Press.

- Beane, J. A. (2013). A common core of a different sort: Putting democracy at the center of the curriculum. *Middle School Journal*, 44(3), 6–14.
<https://doi.org/10.1080/00940771.2013.11461850>
- Benade, L. (2017). *Being a teacher in the 21st century: A critical New Zealand research study*. Springer. <https://doi.org/10.1007/978-981-10-3782-5>
- Bennett, C. (2016). Assessment rubrics: Thinking inside the boxes. *Learning and Teaching: The International Journal of Higher Education in the Social Sciences*, 9(1), 50–72. <https://doi.org/10.3167/latiss.2016.090104>
- Berrien, M. T. (1964). *Education in New Zealand*. (NO.1964 no 34). Washington: U.S. Dept. of Health, Education and Welfare, Office of Education.
- Bevan-Brown, J. (2005). Providing a culturally responsive environment for gifted Maori learners. *International Education Journal*, 6(2), 150–155.
- Binkley, M., Erstad, O., Herman, J., Raizan, S., Ripley, M., Miller-Ricci, M., & Rumble, M. (2019). Defining 21st-century skills. In P. Griffin, B. McGaw, & E. Care (Eds.), *Assessment and teaching of 21st-century skills* (pp. 17–66). Springer.
- Bishop, R. (2003). Changing power relations in education: Kaupapa Māori messages for “mainstream” education in Aotearoa/New Zealand. *Comparative Education*, 39(2), 221–238. <https://doi.org/10.1080/03050060302555>
- Bishop, R. (2010). Effective Teaching for Indigenous and Minoritized Students. *Procedia - Social and Behavioral Sciences*, Volume 7, 2010, Pages 57-62.
- Bishop, R. (2015). Chapter 7 Freeing Ourselves: An Indigenous Response to Neo colonial Dominance in Research, Classrooms, Schools, and Education Systems. In Denzin, N. K., & Giardina, M. D. (Eds.). (2014). *Qualitative inquiry outside the academy*. Taylor & Francis Group.
- Bishop, R. (2019). *Teaching to the North-East*. NZCER Press
- Black, P., McCormick, R., James, M., & Pedder, D. (2006). Learning how to learn and assessment for learning: A theoretical inquiry. *Research Papers in Education*, 21(2), 119–132. <https://doi.org/10.1080/02671520600615612>

- Bolstad, R., & Gilbert, J. (2012). Supporting future-oriented learning & teaching: A New Zealand perspective. New Zealand Council for Educational Research.
<http://www.educationcounts.govt.nz/publications/schooling/109306>
- Boyd, S. (2013). Student inquiry and curriculum integration: Ways of learning for the 21st century? (Part B). *Set: Research Information for Teachers*, 1, 3–11.
doi:10.18296/set.0362
- Boyd, S., & Hipkins, R. (2012). Student inquiry and curriculum integration: Shared origins and points of difference (Part A). *Set: Research Information for Teachers*, 3, 15–24. <https://doi.org/10.18296/set.0386>
- Bransford, J. D., Brown, A. L., & Rodney R. (Eds.), (2000). *How people learn: Brain, mind, experience and school*. National Research Council.
- Brough, C. (2008). Student-centred curriculum integration and the New Zealand curriculum. *Set: Research Information for Teachers* (Wellington), (2), 16-21
<https://doi.org/10.18296/set.0503>
- Brough, C. (2012). Implementing the democratic principles and practices of student-centred curriculum integration in primary schools. *The Curriculum Journal*, 23(3), 345–369. <https://doi.org/10.1080/09585176.2012.703498>
- Brown, C., Daly, A., & Liou, Y.-H. (2016). Improving trust, improving schools. *Journal of Professional Capital and Community*, 1(1), 69–91
- Bruer, J. T. (2016). Where is educational neuroscience? *Educational Neuroscience*, 1, 1–12. <https://doi.org/10.1177/2377616115618036>
- Cardno, C., & Bassett, M. (2015). Multiple perspectives of leadership development for middle-level pedagogical leaders in New Zealand secondary schools. *Journal of Educational Leadership, Policy and Practice*, 30(2), 30-38.
<https://doi.org/10.3316/informit.265350587913623>
- Charteris, J., & Smardon, D. (2018). "Professional Learning on Steroids": Implications for Teacher Learning Through Spatialised Practice in New Generation Learning Environments. *Australian Journal of Teacher Education*, 43(12).

- Choi, W. (2020). Bringing student choice to assessment | IB Community Blog. The International Baccalaureate Blog. <https://blogs.ibo.org/blog/2020/05/22/bringing-student-choice-to-assessment/>
- Cochran, K. F., DeRuiter, J. A., & King, R. A. (1993). Pedagogical content knowing: An integrative model for teacher preparation. *Journal of Teacher Education*, 44(4), 263–272. <https://doi.org/10.1177/0022487193044004004>
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education* (6th ed.). Routledge.
- Darling-Hammond, L. (2006). Constructing 21st-century teacher education. *Journal of Teacher Education*, 57(3), 300–314. <https://doi.org/10.1177/0022487105285962>
- Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, 24(2), 97–140.
- Davies, B., & Bansel, P. (2007). Neoliberalism and education. *International Journal of Qualitative Studies in Education*, 20(3), 247-259. <https://doi.org/10.1080/09518390701281751>
- Department of Education and Training. (2020). *High impact teaching strategies: Excellence in teaching and learning*. Victoria State Government.
- Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. MacMillan.
- Dick, B. (2015). Reflections on the SAGE Encyclopaedia of Action Research and what it says about action research and its methodologies. *Action Research*, 13(4), 431–444. <https://doi.org/10.1177/1476750315573593>
- Dowden, R. A. (2007) Curriculum integration for early adolescent schooling in Aotearoa New Zealand: Worthy of a serious trial: A thesis presented in partial fulfilment of the requirements for the degree of doctor of education at Massey University, Palmerston North, New Zealand
- Dowden, T. (2010). Curriculum integration in Aotearoa New Zealand : Rediscovering the potential of student-centred curriculum design in the middle years. *Australian Journal of Middle Schooling*, 10(2), 4-10.

- Dowden, T. (2014). Challenging, integrated, negotiated and exploratory curriculum in the middle years of schooling : Designing and implementing high quality curriculum i ntegration. *Australian Journal of Middle Schooling*, 14(1), 16-27.
- Drake, S. M. (1993). *Planning integrated curriculum: The call to adventure*. Association for Supervision and Curriculum Development.
- Drake, S. M. (1998). *Creating integrated curriculum: Proven ways to increase student learning*. Corwin Press.
- Drake, S. M. (2007). *Creating standards-based integrated curriculum: Aligning curriculum, content, assessment, and instruction*. Corwin Press.
- Drake, S. M., & Burns, R.C. (2004). *Meeting standards through integrated curriculum*. Association for Supervision and Curriculum Development.
- Dumont, H., & Istance, D. (2010). Analysing and designing learning environments for the 21st century. In H. Dumont, D. Istance, & F. Benavides (Eds.), *The nature of learning: Using research to inspire practice* (pp. 19–34). OECD Publishing.
<https://doi.org/10.1787/9789264086487-3-en>
- Dumont, H., Istance, D., & Benavides, F. (Eds.). (2016). *The nature of learning: Using research to inspire practice. Practitioner guide*. OECD Publishing.
<https://www.oecd.org/education/cei/50300814.pdf>
- Education Review Office (ERO). (2017a). Modern Learning Environments. Education Review Office. <https://ero.govt.nz/our-research/modern-learning-environments>
- Education Review Office (ERO). (2017b). The School Trustees Booklet: asking the right questions. <https://ero.govt.nz/sites/default/files/2021-05/School-Trustees-Booklet.pdf>
- Education Review Office (ERO). (2018). *Leading innovative learning in New Zealand schools*. Education Review Office, Te Tari Arotake Mātauranga.
- Edwards-Groves, C., & Grootenboer, P. (2021). Conceptualising five dimensions of relational trust: Implications for middle leadership. *School Leadership & Management*, 41(3), 260–283.
- Edwards-Groves, C., Grootenboer, P., & Ronnerman, K. (2016). Facilitating a culture of relational trust in school-based action research: Recognising the role of middle leaders. *Educational Action Research*, 24(3), 369–386.
- Eisner, E. (1992). A slice of advice. *Educational Researcher*, 21(5), 29–30.

- Engel, S. (2011). Children's need to know: Curiosity in schools. *Harvard Educational Review*, 81(4), 625-645. <https://doi.org/10.17763/haer.81.4.h054131316473115>
- Erickson, H. L. (2002). *Concept-based curriculum and instruction: Teaching beyond the facts*. Corwin Press.
- Erickson, H. L. (2007). *Concept-based curriculum and instruction for the thinking classroom*. Corwin Press.
- Erickson, H. L. (2012). Concept-based teaching and learning. *IB position papers*. http://www.ibmidatlantic.org/Concept_Based_Teaching_Learning.pdf
- Erickson, H. L., Lanning, L. A., & French, R. (2017). *Concept-based curriculum and instruction for the thinking classroom* (2nd ed.). Corwin Press.
- Fleck, C. (2019). *Creating a connected curriculum*. Ministry of Education. <https://nzcurriculum.tki.org.nz/Curriculum-resources/NZC-Online-blog/Creating-a-connected-curriculum#collapsible3>
- Fogarty, R. (1991). Ten ways to integrate curriculum. *Educational Leadership*, 49(2), 61–65.
- Fraser, D. (1999). "They Keep Asking Questions and Want To Know More": Enhancing Students'(and Teachers') Learning through Curriculum Integration.
- Fraser, D. (2000). Curriculum integration: What it is and what it's not. *Set: Research Information for Teachers*, 3, 34–37.
- Fraser, D. (2013). Curriculum integration. In D. Fraser, V. Aitken, & B. Whyte (Eds.), *Connecting curriculum, linking learning* (pp. 18–33). NZCER Press.
- Fraser, D., & Paraha, H. (2002). Curriculum integration as treaty praxis. *Waikato Journal of Education*, 8, 57–70. <https://hdl.handle.net/10289/6257>
- Frey, N., Fisher, D., & Hattie, J. (2017). Surface, deep, and transfer? Considering the role of content literacy instructional strategies. *Journal of Adolescent & Adult Literacy*, 60(5), 567–575.
- Friere, P. (2005). *Pedagogy of the Oppressed*, 30th anniversary addition, translated by Myra Bergman Ramos. Continuum, New York

- Gallagher, A., & Thordarson, K. (2018). *Design thinking for school leaders: Five roles and mindsets that ignite positive change*. Association for Supervision & Curriculum Development.
<https://ebookcentral.proquest.com/lib/canterbury/reader.action?docID=5437456>
- Grow Waitaha. (2022). <https://www.growwaitaha.co.nz/>
- Gudmundsdottir, S., & Shulman, L. (1987). Pedagogical content knowledge in social studies. *Scandinavian Journal of Educational Research*, 31(2), 59.
- Guskey, T. R. (1986). Staff development and the process of teacher change. *Educational Researcher*, 15(5), 5–12. <https://www.jstor.org/stable/pdf/1174780.pdf>
- Hattie, J. (2003, 22–25 August). *Teachers make a difference: What is the research evidence?* [Conference session]. ACER Research Conference, Melbourne, Australia.
https://research.acer.edu.au/research_conference_2003
- Hattie, J. (2005). What is the nature of evidence that makes a difference to learning? Using Data to Support Learning. Research Conference 2005.
https://research.acer.edu.au/cgi/viewcontent.cgi?article=1008&context=research_conference_2005
- Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. Routledge, Taylor and Francis Group.
- Hattie, J. (2015). Mapping learning environment evaluation across the design and education landscape: Towards the evidence-based design of educational facilities. Terrains 2015 <https://rest.neptune-prod.its.unimelb.edu.au/server/api/core/bitstreams/d6fb9076-4e0b-57a7-8cbb-512be075d9b4/content>
- Hattie, J. (2017). *Hattie effect size list: 256 influences related to achievement*. Visible Learning Plus. <https://visible-learning.org/wp-content/uploads/2018/03/VLPLUS-252-Influences-Hattie-ranking-DEC-2017.pdf>
- Hattie, J. A., & Donoghue, G. M. (2016). Learning strategies: A synthesis and conceptual model. *Science of Learning*, 1(1), 1–13. <https://doi.org/10.1038/npjscilearn.2016.13>
- Hattie, J. A., & Yates, G. C. R. (2013). *Visible learning and the science of how we learn*. <http://www.scopus.com/inward/record.url?eid=2-s2.0-84909119698&partnerID=tZOtx3y1>

- Hayden, H. E., Rundell, T. D., & Smyntek-Gworek, S. (2013). Adaptive expertise: A view from the top and the ascent. *Teaching Education (Columbia, S.C.)*, 24(4), 395-414. <https://doi.org/10.1080/10476210.2012.724054>
- Hipkins, R. (2017). *Weaving a coherent curriculum: How the idea of 'capabilities' can help*. New Zealand Council for Educational Research.
- Hinde, E. T. (2005). Revisiting curriculum integration: A fresh look at an old idea. *Social Studies (Philadelphia, Pa : 1934)*, 96(3), 105-111.
- Hobsonville Point Secondary School. (2017). *Specialised learning*. <https://hpss.school.nz/specalised-learning>
- Imms, W. (2018). Innovative learning spaces: Catalysts/agents for change, or just another fad? In *School Space and its occupation*, 107-118. Brill.
- Jellyman, P. (2015). *Models of curriculum integration in New Zealand secondary schools*. Sabbatical Report Term 2, St Dominic's Catholic College, Auckland.
- Kaplan, L. S., & Owings, W. A. (2013). *Culture re-boot: Reinvigorating school culture to improve student outcomes*. Corwin Press.
- Kennedy, K., Peters, M., & Thomas, M. (2011). *How to use value-added analysis to improve student learning: A field guide for school and district leaders*. Corwin Press.
- King, A. (1993). From sage on the stage to guide on the side. *College Teaching*, 41(1), 30-35.
- Kleickmann, T., Richter, D., Kunter, M., Elsner, J., Besser, M., Krauss, S., & Baumert, J. (2013). Teachers' Content Knowledge and Pedagogical Content Knowledge: The Role of Structural Differences in Teacher Education. *Journal of Teacher Education*, 64(1), 90-106. <https://doi.org/10.1177/0022487112460398>
- Kress, G. (2000). A curriculum for the future. *Cambridge Journal of Education*, 30(1), 133-145. <https://doi.org/10.1080/03057640050005825>
- Lai, K. W., Trewern, A., Pullar, K., Bolton, C., Campbell, M., Yuill Proctor, T., & Zaolum, T. (2014). *Designing knowledge building communities in secondary schools*. Teaching and Learning Research Initiative. [http://www.tlri.org.nz/sites/default/files/projects/TLRI_WingLai_Summary\(v2\).pdf](http://www.tlri.org.nz/sites/default/files/projects/TLRI_WingLai_Summary(v2).pdf)

- Le Metais, J. (2007). Critique of The New Zealand Curriculum: Draft for Consultation 2006. Le Metais Consulting, England. [file:///file/Userst\\$/tep12/Home/Downloads/le-metais%20\(1\).pdf](file:///file/Userst$/tep12/Home/Downloads/le-metais%20(1).pdf)
- Li, L. C., Grimshaw, J. M., Nielsen, C., Judd, M., Coyte, P. C., & Graham, I. D. (2009). Evolution of Wenger's concept of community of practice. *Implementation science*, 4(1), 1-8.
- Linamaria Arroyave (Lina Maria) Valdivia (2021). Teacher collaboration, Advice Networks and school climate. [file:///file/Userst\\$/tep12/Home/Downloads/Valdivia-2021-thesis.pdf](file:///file/Userst$/tep12/Home/Downloads/Valdivia-2021-thesis.pdf)
- Loewenberg Ball, D., Thames, M. H., & Phelps, G. (2008). Content Knowledge for Teaching: What Makes It Special? *Journal of Teacher Education*, 59(5), 389–407. [Content Knowledge for Teaching](#)
- Loughran, S. B. (2005). Thematic Teaching in Action. *Kappa Delta Pi Record*, 41(3), 112–117.
- Maton, K. (2009). Cumulative and segmented learning: Exploring the role of curriculum structures in knowledge-building. *British Journal of Sociology of Education*, 30(1), 43–57. <https://doi.org/10.1080/01425690802514342>
- McDowall, S., & Hipkins, R. (2019). *Curriculum integration: What is happening in New Zealand schools?* New Zealand Council for Educational Research. <https://www.nzcer.org.nz/system/files/Curriculum%20Integration%202018-2019.pdf>
- McTaggart, R. (1991). Principles for participatory action research. *Adult Education Quarterly*, 41(3), 168–187.
- McNiff, J. (2013). *Action research: Principles and Practice* (3rd ed.). Taylor & Francis Group. <https://ebookcentral.proquest.com/lib/canterbury/reader.action?docID=1143676>
- Mills, G. (2007). *Action research: A guide the for the teacher researcher* (3rd ed.). Merrill Prentice-Hall. https://blackboard.otago.ac.nz/bbcswebdav/pid-1564037-dt-content-rid-11332844_1/courses/EDDC9_2016/Mills 2007.pdf

- Ministry of Education. (2005). *Report on the findings of the 2004 Teacher Census*. Demographic and Statistical Analysis Unit, Data Management and Analysis Division, Ministry of Education.
- Ministry of Education. (2007). *The New Zealand Curriculum*. Learning Media. http://nzcurriculum.tki.org.nz/the_new_zealand_curriculum
- Ministry of Education. (2011a). Intent: Ministry of Education statement of intent 2011/12–2016/17. Wellington.
- Ministry of Education. (2011b). The New Zealand School Property Strategy 2011-2021. <http://mlenewzealand.weebly.com/uploads/1/9/6/6/19662659/schoolpropertystrategy201121.pdf>
- Ministry of Education. (2012a). Effective leadership / Leading change / Secondary middle leaders / Curriculum resources. Kia ora: NZ Curriculum Online. <http://nzcurriculum.tki.org.nz/Curriculum-resources/Secondary-middle-leaders/Leading-change/Effective-leadership>
- Ministry of Education. (2012b). *Opportunities plus innovation: Education renewal in Greater Christchurch*. <http://shapingeducation.govt.nz/wp-content/uploads/2012/09/opportunity-education-renewal-Sep12.pdf>
- Ministry of Education. (2012c, October). *Views of Knowledge*, Issue 12. <https://nzcurriculum.tki.org.nz/Curriculum-resources/NZC-Updates/Issue-26-October-2012/Views-of-knowledge>
- Ministry of Education. (2017a). *Flexible learning spaces in schools: Education in New Zealand*. <http://www.education.govt.nz/school/property/state-schools/design-standards/flexible-learning-spaces/>
- Ministry of Education. (2017b). *Innovative learning environments*. <http://ile.education.govt.nz/>
- Ministry of Education. (2019). *Local curriculum design*. www.education.govt.nz
- Ministry of Education. (2020a). *Future focus principle*. The New Zealand Curriculum Online. <https://nzcurriculum.tki.org.nz/Principles/Future-focus-principle> [accessed July 23, 2021].

- Ministry of Education. (2020b). *Coherence principle*. The New Zealand Curriculum Online. <https://nzcurriculum.tki.org.nz/Principles/Coherence-principle#collapsible3>
- Ministry of Education. (2021a). *Refreshing the New Zealand Curriculum: Education in New Zealand*. <https://www.education.govt.nz/our-work/changes-in-education/curriculum-and-assessment-changes/new-zealand-curriculum/>
- Ministry of Education. (2021b). *The statement of National Education and Learning Priorities (NELP) and the Tertiary Education Strategy (TES)*. <https://www.education.govt.nz/our-work/overall-strategies-and-policies/the-statement-of-national-education-and-learning-priorities-nelp-and-the-tertiary-education-strategy-tes/>
- Ministry of Education. (2021c). *Education infrastructure school design guidance documents*. <https://www.education.govt.nz/school/property-and-transport/projects-and-design/design/design-standards/education-infrastructure-design-guidance-documents/>
- Ministry of Education. (2022a). Curriculum and Assessment Changes. <https://www.education.govt.nz/our-work/changes-in-education/curriculum-and-assessment-changes/>
- Ministry of Education. (2022b). Why the New Zealand Curriculum is Changing. <https://curriculumrefresh.education.govt.nz/why-new-zealand-curriculum-changing>
- Ministry of Education. (2022c). Aotearoa's New Zealand Histories. <https://aotearoahistories.education.govt.nz/>
- Ministry of Education. (n. d.). *Property programme: Shaping education – future direction*. <http://shapingeducation.govt.nz/2-0-future-direction-of-education/property-programme> [accessed February 21, 2017).
- Moskal, B. M. (2000). Scoring rubrics: What, when and how? *Practical Assessment, Research, and Evaluation*, 7(1), 3. <https://doi.org/10.7275/a5vq-7q66>
- Education Act 1989 No 80 (as at 26 March 2020), Public Act 156AA Process for establishing designated character schools. <http://www.legislation.govt.nz/act/public/1989/0080/latest/DLM7269397.htm>
- [Name of school] (2017). Education Brief (Issue February).

- New Zealand Government. (nd) Innovative Learning Environments. TKI.
<https://elearning.tki.org.nz/Teaching/Innovative-learning-environments>
- New Zealand Government. (2008). Framework to Draft: 1993–2006 (archived). TKI.
<https://nzcurriculum.tki.org.nz/Archives/Implementation-packs-for-schools/NZC-support-material/Framework-to-Draft-1993-2006>
- New Zealand Government. (2022). Education. Archives New Zealand.
<https://www.archives.govt.nz/research-guidance/research-guides/education>
- New Zealand School Trustees Association (NZSTA). (n.d.). *A parents' guide to the Board of Trustees*.
- New Zealand Qualifications Authority. (2017). *How NCEA works*.
<http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/understanding-ncea/how-ncea-works/>
- Organisation for Economic Co-operation and Development (OECD). (2005). Glossary of Statistical Terms. <https://stats.oecd.org/glossary/detail.asp?ID=6864>
- Organisation for Economic Co-operation and Development (OECD). (2018a). *The future of education and skills education 2030*. [https://www.oecd.org/education/2030/E2030-Position-Paper-\(05.04.2018\).pdf](https://www.oecd.org/education/2030/E2030-Position-Paper-(05.04.2018).pdf)
- Organisation for Economic Co-operation and Development (OECD). (2018b). *Oslo Manual 2018: Guidelines for collecting, reporting and using data on innovation* (4th ed.). <https://www.oecd.org/science/oslo-manual-2018-9789264304604-en.htm>
- Organisation for Economic Co-operation and Development (OECD). (2019). *Well-being 2030 Action*. OECD Future of Education and Skills 2030: A series of concept notes. 146. https://www.oecd.org/education/2030-project/teaching-and-learning/learning/learning-compass-2030/OECD_Learning_Compass_2030_Concept_Note_Series.pdf
- Oxfam. (2015). *What is global citizenship?* Oxfam Education.
<https://www.oxfam.org.uk/education/who-we-are/what-is-global-citizenship>
- Pollock, K. (2012). 'Tertiary education - Universities before 1990', Te Ara - the Encyclopedia of New Zealand, <http://www.TeAra.govt.nz/en/tertiary-education/page-1> <https://teara.govt.nz/en/tertiary-education/page-1>

- Printy, S. M. (2008). Leadership for teacher learning: A community of practice perspective. *Educational Administration Quarterly*, 44(2), 187–226.
- Redding, S., & Corbett, J. (2018). The Center on School Turnaround. (2018). Shifting school culture to spark rapid improvement: A quick start guide for principals and their teams. [The Center on School Turnaround at WestEd]. San Francisco, CA: WestEd.
- Rios, J. A., Ling, G., Pugh, R., Becker, D., & Bacall, A. (2020). Identifying critical 21st-century skills for workplace success: A content analysis of job advertisements. *Educational Researcher*, 49(2), 80–89. <https://doi.org/10.3102/0013189X19890600>
- Rodriguez, V. (2012). The teaching brain and the end of the empty vessel. *Mind, Brain, and Education*, 6(4), 177–185.
- Rose, S., Spinks, N., & Canhoto, A. I. (2015). *Management research: Applying the principles*. Routledge.
- Scardamalia, M. (2002). Collective cognitive responsibility for the advancement of knowledge. *Liberal Education in a Knowledge Society*, 97, 67–98.
- Scardamalia, M., & Bereiter, C. (2006). Knowledge building and knowledge creation: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences* (pp. 97–118). Cambridge University Press.
- Scardamalia, M., & Bereiter, C. (2010). *A brief history of knowledge building: Une brève histoire de la coélaboration de connaissances*. <https://files.eric.ed.gov/fulltext/EJ910451.pdf>
- Scott, C. L. (2015). The futures of learning 3: What kind of pedagogies for the 21st century? *Education, Research and Foresight: Working Papers*, 1–21. <https://unesdoc.unesco.org/ark:/48223/pf0000243126>
- Shulman, L. S. (1987). Knowledge and Teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1–23. http://meridian.allenpress.com/her/article-pdf/57/1/1/2108782/haer_57_1_j463w79r56455411.pdf
- Stoll, L., & Temperley, J. (2009). Creative leadership: A challenge of our times. *School Leadership and Management*, 29(1), 65–78. <https://doi.org/10.1080/13632430802646404>

- Stukalina, Y. (2010). How to prepare students for productive and satisfying careers in the knowledge-based economy: Creating a more efficient educational environment. *Technological and Economic Development of Economy*, 14(2), 197–207. <https://doi.org/10.3846/1392-8619.2008.14.197-207>
- Tearney, F. (2016). *History of education in New Zealand* (Working paper 2016/03). McGuinness Institute. <https://www.mcguinnessinstitute.org/wp-content/uploads/2016/08/20161213-Working-Paper-2016%EF%80%A203-History-of-education-in-New-Zealand.pdf>
- Timperley, H., Kaiser, L., & Halbert, J. (2014). *A framework for transforming learning in schools: Innovation and spiral of inquiry*. Centre for Strategic Education.
- Tripp, D. (2005). Action research: A methodological introduction. *Educacao e Pesquisa (Education and Research)*, 3(31), 443–446.
- United Nations. (n. d.). *Do you know all 17 SDGs?* Department of Economic and Social Affairs. <https://sdgs.un.org/goals> [accessed July 28, 2020].
- Vavrus, M. (2008). Culturally responsive teaching. In T. L. Good (Ed.), *21st century education: A reference handbook* (Vol. 2, pp. 49–57). Sage.
- Von Pressentin, K. B., Waggie, F., & Conradie, H. (2016). Towards tailored teaching: using participatory action research to enhance the learning experience of Longitudinal Integrated Clerkship students in a South African rural district hospital. *BMC Medical Education* 16(1), 1-10.
- Webber, M. (2012). Identity matters: Racial-ethnic identity and Maori students. Set: Research Information for Teachers, (2), 20–27. <https://search.informit.org/doi/10.3316/informit.057671602059005>
- Wenger, E. (2000). Communities of practice and social learning systems. *Organization*, 7(2), 225–246.
- Wood, B. E. (2013). What is a social inquiry? Crafting questions that lead to deeper knowledge about society and citizenship. NZCER, Set 3., https://www.nzcer.org.nz/system/files/set2013_3_020_1.pdf
- Wylie, C. (2010). Focusing leadership on adult learning: The secondary school challenge. *Journal of Educational Leadership, Policy and Practice*, 25(1), 51-66. <https://doi.org/10.3316/informit.275340397896442>

- Wylie, Cathy. (2020). What does it mean to be a principal? A policy researcher's perspective on the last 30 years in Aotearoa New Zealand. *Journal of Educational Leadership, Policy and Practice*, 35. 41-58.
- Yin, R. (2014). *Case study research: Design and methods* (5th ed.). Sage.
- Young, M. (2013). Overcoming the crisis in curriculum theory: A knowledge-based approach. *Journal of Curriculum Studies*, 45(2), 101–118.
<https://doi.org/10.1080/00220272.2013.764505>
- Zainal, Z. (2007). Case study as a research method. *Jurnal Kemanusiaan*, 9, 1–6.
http://psyking.net/htmlobj-3837/case_study_as_a_research_method.pdf

Appendices

Appendix A: UC Ethics Committee approval letter



HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: 2019/40/ERHEC

11 October 2019

Tamara Yuill Proctor
School of Teacher Education
UNIVERSITY OF CANTERBURY

Dear Tamara

Thank you for providing the revised documents in support of your application to the Educational Research Human Ethics Committee. I am very pleased to inform you that your research proposal "A Case Study of How One High School Supports Teachers As It Transitions From a Traditional Structure of Curriculum to Curriculum Integration at Year 9" has been granted ethical approval.

Please note that this approval is subject to the incorporation of the amendments you have provided in your emails of 5th August, 27th September, and 10th October 2019.

Should circumstances relevant to this current application change you are required to reapply for ethical approval.

If you have any questions regarding this approval, please let me know.

We wish you well for your research.

Yours sincerely

pp. *R. Robinson*

Dr Patrick Shepherd
Chair
Educational Research Human Ethics Committee

Please note that ethical approval relates only to the ethical elements of the relationship between the researcher, research participants and other stakeholders. The granting of approval by the Educational Research Human Ethics Committee should not be interpreted as comment on the methodology, legality, value or any other matters relating to this research.

F E S

Appendix B: Participants' information letters and consent forms

Department: School of Teacher Education
 Phone: (03) 369-3708 (School Administrator)
 Email: tamara.yuillproctor@pg.canterbury.ac.nz



A case study of how one high school supports teachers as it transitions from a traditional structure of curriculum-to-curriculum integration at Year 9

Information Sheet for Senior Leadership Team

I am Tamara Yuill Proctor, a teacher at [Name of School] and an EdD student at the University of Canterbury. The purpose of this research is to gather information on the steps [Name of School] has taken to integrate the curriculum at Year 9 and design a future-focused curriculum. The study aims to research the experiences of teachers as they implement an integrated curriculum for one Year 9 class, 9DM. The purpose of the research is to provide evidence and experiences on curriculum integration that can be viewed as a case study to help inform other schools, teachers and educational institutions and organisations.

You have been approached to take part in this study because you are a member of the Senior Leadership Team.

If you choose to take part in this study, your position as a Senior Leadership Team member will involve participating in one interview on what steps you have taken and plan to take with designing a future-focused curriculum, the success, challenges and advice.

The interviews will be audio-recorded for further analysis. You will be provided with the opportunity to review the transcript for your interview.

Participation is voluntary and you have the right to withdraw at any stage without penalty. To minimise any risks to you, you can choose not to answer questions or stop the interview at any point. You may ask for your raw data to be returned to you or destroyed at any point. If you withdraw, I will remove information relating to you. However, once analysis of raw data starts on 15 April 2020, it will become increasingly difficult to remove the influence of your data on the results.

As a member of the Senior Leadership Team for [Name of School], who has a responsibility for the wellbeing of the teaching staff, I would like to make you aware of the measures in place to minimise any risks to the Teacher participants in this research study. To minimise

any risks to the Teacher participants, the same considerations regarding voluntary participation and the right to withdraw at any stage without penalty are offered. The teachers may also choose not to answer a question or stop the interview at any time. To minimise and manage the risk of the teachers not feeling that they are able to speak honestly about their experiences, the researcher will not lead the team meetings, with one of the other teachers in the team taking over as chair of the meeting. The Teacher participants are able to withdraw from the study at any stage and may ask for their raw data to be returned to them or destroyed until the point where the data are analysed. The Teacher participants have been provided with this information on the information sheet for Teachers.

The results of the project may be published in peer-reviewed journals or presented at conferences in the future, but you may be assured of the confidentiality of the data gathered in this investigation. The school and participants will not be identified by name and no details that may identify the school or participants will be used. To ensure confidentiality, you will be referred to by position e.g., Principal. Data will be saved on a password-protected computer, on an external hard drive that is kept in a locked drawer, and on the University of Canterbury server in electronic form with password protection. The only people who will have access to this data will be me and my supervisors at the University of Canterbury. The data will be stored for ten years after the completion of the thesis. All correspondence (online, via interview, and face-to-face) between staff members will be destroyed at this point. Data that has been gathered that form resources and templates as a result of the research will be kept indefinitely. A thesis is a public document and will be available through the University of Canterbury Library.

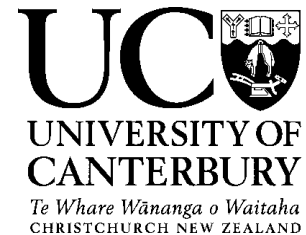
Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

The project is being carried out as a requirement for the Doctor of Education degree by Tamara Yuill Proctor under the supervision of Associate Professor Alison Arrow (alison.arrow@canterbury.ac.nz) and Dr Sandra Williamson-Leadley (sandra.williamson-leadley@canterbury.ac.nz). They will be pleased to discuss any concerns you may have about participation in the project.

This research project has received ethical approval from the University of Canterbury Educational Research Human Ethics Committee, and those participants should address any complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

Please complete the consent form if you understand and agree to take part in the study. Please return the consent form to Tamara Yuill Proctor in the provided stamped addressed envelope.

Department: School of Teacher Education
 Phone: (03) 369-3708 (School Administrator)
 Email: tamara.yuillproctor@pg.canterbury.ac.nz



A case study of how one high school supports teachers as it transitions from a traditional structure of curriculum-to-curriculum integration at Year 9.

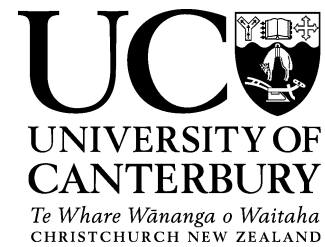
Consent Form for Senior Leadership Team

- I have been given a full explanation of this project and have had the opportunity to ask questions.
- I understand what is required of me if I agree to take part in the research.
- I understand that participation is voluntary, and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- I understand that any information or opinions I provide will be kept confidential to the researcher and researcher's supervisors: Alison Arrow and Sandra Williamson-Leadley. That any published or reported results will not identify the participants. I understand that a thesis is a public document and will be available through the UC Library
- I understand that all data collected for the study will be kept in locked and secure facilities and/or in password-protected electronic form and will be destroyed after ten years.
- I understand the risks associated with taking part and how they will be managed.
- I understand that I can contact the researcher, Tamara Yuill Proctor (tamara.yuillproctor@pg.canterbury.ac.nz) or supervisors Associate Professor Alison Arrow (alison.arrow@canterbury.ac.nz) and Dr Sandra Williamson-Leadley (Sandra.williamson-leadley@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Educational Research Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- I would like a summary of the results of the project.
- By signing below, I agree to participate in this research project.

Name: _____ Signed: _____ Date: _____

Email address: _____

Department: School of Teacher Education
Phone: (03) 369-3708 (School Administrator)
Email: tamara.yuillproctor@pg.canterbury.ac.nz



A case study of how one high school supports teachers as it transitions from a traditional structure of curriculum-to-curriculum integration at Year 9

Information Sheet for Teachers

I am Tamara Yuill Proctor, a teacher at [Name of School] and an EdD student at the University of Canterbury. The purpose of this research is to gather information on the steps [Name of School] has taken to integrate the curriculum at Year 9 and design a future-focused curriculum. The study aims to research the experiences of teachers as they implement an integrated curriculum for one Year 9 class, 9DM. The purpose of the research is to provide evidence and experiences on curriculum integration that can be viewed as a case study to help inform other schools, teachers and educational institutions and organisations.

You have been approached to take part in this study because you are a teacher of 9DM, one of the two integrated curriculum classes.

If you choose to take part in this study, your involvement as a:

- Class teacher of one of the Connected classes in this project will be to share your thoughts, planning, teaching and learning programs through:
 - face to face usual team meetings (1x1 hour a week for 10 weeks),
 - no more than ten professional development sessions (1 hour each) over Term 4 2019 and Term 1 2020,
 - two interviews (approx. 30 min each) beginning of Term 4 2019 and end of Term 1 2020,
 - two questionnaires (approx. 20 min each); and,
 - online communications through Microsoft Teams and Microsoft Chat as necessary.

All interviews and meetings will be audio-recorded for further analysis. You will be provided with the opportunity to review the transcript(s) for your interview, or your involvement in a meeting.

Participation is voluntary and you have the right to withdraw at any stage without penalty. You can choose not to answer a question and stop the interview at any point. If you decide not to participate in this research, your decision will in no way influence possible opportunities within the school. In order to minimise and manage the risk of you not feeling that you are able to speak honestly about your experiences, the researcher will not lead the team meetings, with one of the other teachers in the team taking over as chair of the meeting. You may ask for your raw data to be returned to you or destroyed at any point. If you withdraw, I will remove information relating to you. However, once analysis of raw data starts on 15 April 2020, it will become increasingly difficult to remove the influence of your data on the results.

The results of the project may be published in peer-reviewed journals or presented at conferences in the future, but you may be assured of the confidentiality of data gathered in this investigation. The school and participants will not be identified by name and no details that may identify the school or participants will be used. To ensure confidentiality, you will be referred to by your subject area e.g., teacher of science. Data will be saved on a password-protected computer, an external hard drive that is kept in a locked drawer, and on the University of Canterbury server in electronic form with password protection. The only people who will have access to this data are me and my supervisors at the University of Canterbury. The data will be stored for ten years after the completion of the thesis. All correspondence (online, via interview and face-to-face) between staff members will be destroyed at this point. Data that has been gathered that form resources and templates as a result of the research will be kept indefinitely. A thesis is a public document and will be available through the University of Canterbury Library.

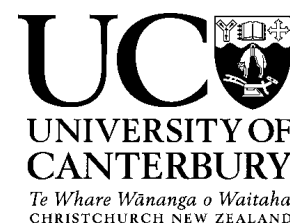
Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

The project is being carried out as a requirement for the Doctor of Education degree by Tamara Yuill Proctor under the supervision of Associate Professor Alison Arrow (alison.arrow@canterbury.ac.nz) and Dr Sandra Williamson-Leadley (sandra.williamson-leadley@canterbury.ac.nz). They will be pleased to discuss any concerns you may have about participation in the project.

This research project has received ethical approval from the University of Canterbury Educational Research Human Ethics Committee, and those participants should address any complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

Please complete the consent form if you understand and agree to take part in the study. Please return the consent form to Tamara Yuill Proctor in the provided stamped addressed envelope.

Department: School of Teacher Education
 Phone: (03) 369-3708 (School Administrator)
 Email: tamara.yuillproctor@pg.canterbury.ac.nz



A case study of how one high school supports teachers as it transitions from a traditional structure of curriculum-to-curriculum integration at Year 9

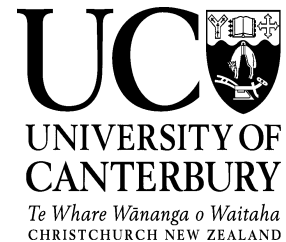
Consent for Teacher Participants

- I have been given a full explanation of this project and have had the opportunity to ask questions.
- I understand what is required of me if I agree to take part in the research.
- I understand that participation is voluntary, and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- I understand that any information or opinions I provide will be kept confidential to the researcher, and researcher's supervisors: Alison Arrow and Sandra Williamson-Leadley and that any published or reported results will not identify the participants. I understand that a thesis is a public document and will be available through the UC Library
- I understand that all data collected for the study will be kept in locked and secure facilities and/or in password-protected electronic form and will be destroyed after ten years.
- I understand the risks associated with taking part and how they will be managed.
- I understand that I can contact the researcher, Tamara Yuill Proctor (tamara.yuillproctor@pg.canterbury.ac.nz) or supervisors Associate Professor Alison Arrow (alison.arrow@canterbury.ac.nz) and Dr Sandra Williamson-Leadley (Sandra.williamson-leadley@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Educational Research Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- I would like a summary of the results of the project.
- By signing below, I agree to participate in this research project.

Name: _____ Signed: _____ Date: _____

Email address: _____

Department: School of Teacher Education
Phone: (03) 369-3708 (School Administrator)
Email: tamara.yuillproctor@pg.canterbury.ac.nz



A case study of how one high school supports teachers as it transitions from a traditional structure of curriculum-to-curriculum integration at Year 9

Information Sheet for Board of Trustees

I am Tamara Yuill Proctor, a teacher at [Name of School] and an EdD student at the University of Canterbury. The purpose of this research is to gather information on the steps [Name of School] has taken to integrate the curriculum at Year 9 and design a future-focused curriculum. The study aims to research the experiences of teachers as they implement an integrated curriculum for one Year 9 class, 9DM. The purpose of the research is to provide evidence and experiences on curriculum integration that can be viewed as a case study to help inform other schools, teachers and educational institutions and organisations.

You have been approached to take part in this study because you are a member of the Board of Trustees.

If you choose to take part in this study, your position as a Board of Trustee member of [Name of School] would involve you completing one questionnaire and one optional interview on the strategic plan for the [Name of School] and the purpose of redesigning the curriculum to be future-focused.

The interviews will be audio-recorded for further analysis. You will be provided with the opportunity to review the transcript for your interview.

Participation is voluntary and you have the right to withdraw at any stage without penalty. To minimise any risks to you, you can choose not to answer a question or stop the interview at any point. You may ask for your raw data to be returned to you or destroyed at any point. If you withdraw, I will remove information relating to you. However, once analysis of raw data starts on 15 April 2020, it will become increasingly difficult to remove the influence of your data on the results.

As a member of the Board of Trustees for [Name of School], who have a responsibility for the wellbeing of the teaching staff, I would like to make you aware of the measures in place to minimise any risks to the Teacher participants in this research study. To minimise any risks

to the Teacher participants, the same considerations regarding voluntary participation and the right to withdraw at any stage without penalty are offered. The teachers may also choose not to answer a question or stop the interview at any time. To minimise and manage the risk of the teachers not feeling that they are able to speak honestly about their experiences, the researcher will not lead the team meetings, with one of the other teachers in the team taking over as chair of the meeting. The Teacher participants are able to withdraw from the study at any stage and may ask for their raw data to be returned to them or destroyed until the point where the data are analysed. The Teacher participants have been provided with this information on the information sheet for Teachers.

The results of the project may be published in peer-reviewed journals or presented at conferences in the future, but you may be assured of the confidentiality of data gathered in this investigation. The school and participants will not be identified by name and no details that may identify the school or participants will be used. To ensure confidentiality, you will be referred to by your position e.g., BoT member. Data will be saved on a password-protected computer, on an external hard drive that is kept in a locked drawer and on the University of Canterbury server in electronic form with password protection. The only people who will have access to this data are me and my supervisors at the University of Canterbury. The data will be stored for ten years after the completion of the thesis. All correspondence (online, via interview, and face-to-face) between staff members will be destroyed at this point. Data that has been gathered that form resources and templates as a result of the research will be kept indefinitely. A thesis is a public document and will be available through the University of Canterbury Library.

Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

The project is being carried out as a requirement for the Doctor of Education degree by Tamara Yuill Proctor under the supervision of Associate Professor Alison Arrow (alison.arrow@canterbury.ac.nz) and Dr Sandra Williamson-Leadley (sandra.williamson-leadley@canterbury.ac.nz). They will be pleased to discuss any concerns you may have about participation in the project.

This research project has received ethical approval from the University of Canterbury Educational Research Human Ethics Committee, and those participants should address any complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

Please complete the consent form if you understand and agree to take part in the study. Please return the consent form to Tamara Yuill Proctor in the provided stamped addressed envelope.

Department: School of Teacher Education
 Phone: (03) 369-3708 (School Administrator)
 Email: tamara.yuillproctor@pg.canterbury.ac.nz



A case study of how one high school supports teachers as it transitions from a traditional structure of curriculum-to-curriculum integration at Year 9

Consent Form for Board of Trustees

- I have been given a full explanation of this project and have had the opportunity to ask questions.
- I understand what is required of me if I agree to take part in the research.
- I understand that participation is voluntary, and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- I understand that any information or opinions I provide will be kept confidential to the researcher and the researcher's supervisors: Alison Arrow and Sandra Williamson-Leadley, and that any published or reported results will not identify the participants. I understand that a thesis is a public document and will be available through the UC Library
- I understand that all data collected for the study will be kept in locked and secure facilities and/or in password-protected electronic form and will be destroyed after ten years.
- I understand the risks associated with taking part and how they will be managed.
- I understand that I can contact the researcher, Tamara Yuill Proctor (tamara.yuillproctor@pg.canterbury.ac.nz) or supervisors Associate Professor Alison Arrow (alison.arrow@canterbury.ac.nz) and Dr Sandra Williamson-Leadley (Sandra.williamson-leadley@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Educational Research Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- I would like a summary of the results of the project.
- By signing below, I agree to participate in this research project.

Name: _____ Signed: _____ Date: _____

Email address: _____

Department: School of Teacher Education
 Phone: (03) 369-3708 (School Administrator)
 Email: tamara.yuillproctor@pg.canterbury.ac.nz



TRANSCRIPTION CONFIDENTIALITY AGREEMENT

Thank you for your participation in the research project **EdD research “A case study of how one high school supports teachers as it transitions from a traditional structure of curriculum-to-curriculum integration at Year 9.”** Protecting the confidentiality of the research participants is essential and you are therefore asked to sign the following confidentiality agreement.

I, _____, agree to maintain full confidentiality regarding all verbal information and audio recordings received from the research team for the above project. Furthermore, I agree:

1. To hold in strictest confidence the identification of any individual and the content of any discussion that may be revealed during transcription
2. To not make copies of any audio files or computerised files of the transcribed focus groups, unless specifically approved to do so by the Research Team leader Tamara Yuill Proctor.
3. To store all audio files and materials in a password-protected computer or safe, secure location as long as they are in my possession.
4. To return all materials to Tamara Yuill Proctor in a complete and timely manner at the completion of transcription
5. To delete all electronic files containing study-related documents or audio files from my computer hard drive and any back-up devices on completion of transcription.

I am aware that I can be held legally responsible for any breach of this confidentiality agreement, and for any harm incurred by individuals if I disclose identifiable information contained in the audio files and/or files to which I will have access.

Name (printed) _____

Signature _____

Date _____

Appendix C: Interview questions for Senior Leadership

Interview questions

Interview questions will be an opportunity to expand on the information gathered in written questionnaire and information in the Hagley College Education Brief

Potential questions are:

- [Name of School] Education Brief. When and how was this developed? Who was involved? Are you looking at updating this? If so, when?
- [Name of School] Education Brief: This discusses a move from a traditional single-subject structure to a more integrated approach in the Brief described as project-based or thematic with an emphasis on transferable skills. What was the thinking behind this? When was this developed? What are your thoughts now on the direction of the Year 9/10 program?
- [Name of School] Education Brief discuss the desire to shift from teacher-focused programs to student-focused programs. What steps have you put in place to have teachers make this shift? Where do you think departments are with this shift? What steps are you putting in place? What have been some of the challenges and successes?
- Where is the school currently placed with the implementation of the [Name of School] Brief
- What processes and systems have you in place to review pilot programs, changes that are implemented in the strategic vision 2019?
- What are the next steps for [Name of School] to create a curriculum at Year 9/10 to building on the [Name of School] Mission of 'lifelong learning accessible to all'
- How would you like to see the curriculum delivered at [Name of School]?
- What advice do you have for other schools wanting to redesign the delivery of their curriculum?
- What would you do differently?

Appendix D: Interview questions for Board of Trustees

Board of Trustees (BoT)

- What role has the BoT had in the developing H [Name of School]'s vision document and strategic plan?
- How do you see 'learning' taking place at [Name of School]?

Appendix E: Interview questions and two questionnaires for Connected teacher participants

Teachers of the Connected class

Written Questionnaire

Questionnaire one

- What is your subject area?
- How long have you been teaching?
- Have you taught at another level besides High School? E.g. primary
- What is your understanding of curriculum integration?
- How did you come to be one of the teachers involved with this class?
- Have you collaborated with teachers before (within or across departments)? Explain
- If you have collaborated with teachers in the past, what systems or processes worked well?
- If you have collaborated with teachers in the past, what systems or processes did not work well?
- What systems or supports do you think are necessary for collaboration with teachers?
- What do you think is positive about curriculum integration?
- What do you think some of the negatives could be with curriculum integration?
- What questions do you have on curriculum integration?
- What systems for collaboration have worked well to date? Why
- What systems would you like to see implemented to ease collaboration?

Questionnaire two

- What is your understanding of curriculum integration?
- What systems or supports do you think are necessary for collaboration with teachers?
- What do you think is positive about curriculum integration?
- What do you think some of the negatives could be with curriculum integration?
- What questions do you have on curriculum integration?
- What is your understanding of the student experiences with curriculum integration?
- How have you as teachers collaborated on the planning of the learning taking place
- How have you evaluated the student learning?

- What systems have worked well for collaborating
- What systems would you recommend?
- How has your understanding of curriculum integration changed or developed over the course of delivering this integrated class
- What advice would you have teachers wanting to collaborate with teachers to deliver an integrated curriculum course?

In your professional judgement, please comment on

- student depth of learning
- student agency
- student highlights of the course and why
- stand-out examples of student learning

Interview Questions

Interview questions would tease out information from the questionnaires and would allow for further discussion. Interview would happen in Term 4 2019 and beginning of Term 2 2020 and can revisit previous discussions and answers.

Questions could be:

- What has been your experience so far with curriculum integration?
- What have the positives of teaching an integrated curriculum
- What have the negatives of teaching an integrated curriculum
- How did the learning on Climate Action go for you? In addition, for the students?
- During each term, the teachers met once a week. Was the frequency of meetings sufficient? Valuable? Good use of teacher time?
- How is the communication between the teachers in regards to planning and implementation an integrated teaching and learning program
- How do you think the students are responding to the learning program?
- What has been a particular challenge in regards to planning and implementation an integrated teaching and learning program?
- What has been a success/positive?

Weekly meetings

Aim of the weekly meeting is to:

- Share where the class are and the next steps in the learning programs
- Share any issues and concerns
- Plan the learning for students
- Led by the form teacher supported by myself, Tamara Yuill Proctor share understanding and knowledge on curriculum integration, good practice, Q&A by the teachers based on teacher experiences and understanding

Appendix F: Connected class, unit plan and lesson sequence

Connected Class, Unit Plan and Lesson Sequence Template

2020

Teacher:

Term:

Overarching Concept or Theme:

Curriculum			Key Student Learning activities	
English AOs:	Science AOs	Social Science AOs		
Transferable Skills	Transferable Skills	Transferable Skills	Digital Learning Curriculum	EOTC/OTHER
<p><u>Designing and Developing a Digital Outcomes Progress Outcome 2</u> (delete the outcomes you are not using. Briefly explain how you are meeting the PO)</p> <ul style="list-style-type: none"> • make decisions about creating, manipulating, storing, retrieving, sharing, and testing digital content for a specific purpose, given particular parameters, tools, and techniques. • can select from an increasing range of applications and file types to develop outcomes for particular purposes. • understand that digital devices impact on humans and society and that both the devices and their impact change over time. • identify the specific role of components in a simple input-process-output system and how they work together, and they recognise the "control role" that humans have in the system. 			<p><u>Computational Thinking Progress Outcomes</u> (delete the outcomes you are not using. Briefly explain how you are meeting PO2 OR PO3)</p> <p><u>PO2</u></p> <ul style="list-style-type: none"> • give, follow, and debug simple algorithms in computerised and non-computerised context • use these algorithms to create simple programs involving outputs and sequencing (putting instructions one after the other) in age-appropriate programming environments. <p><u>PO3</u></p> <ul style="list-style-type: none"> • In authentic contexts and taking account of end-users, students decompose problems into step-by-step instructions to create algorithms for computer programs. • They use logical thinking to predict the behaviour of the programs, and they understand that there can be more than one <u>algorithm</u> for the same problem. • They develop and debug simple programs that use inputs, outputs, sequence, and iteration (repeating part of the algorithm with a loop). They understand that digital devices store data using just two states represented by binary digits (bits). 	
Elearning Tools				

Opportunities to Evaluate Student Learning	Week 1								
English									
Science									
Social Studies	- Students set learning goals – using rubric and self-reflection								

Outline of the Task:

Teacher content delivery:

Date			

Key Learning Activities	Rough outline	
1.		
2.		
3.		
4.		

Lesson Sequence (add more weeks as necessary)

Week	English		Social Studies
1			
2			
3			